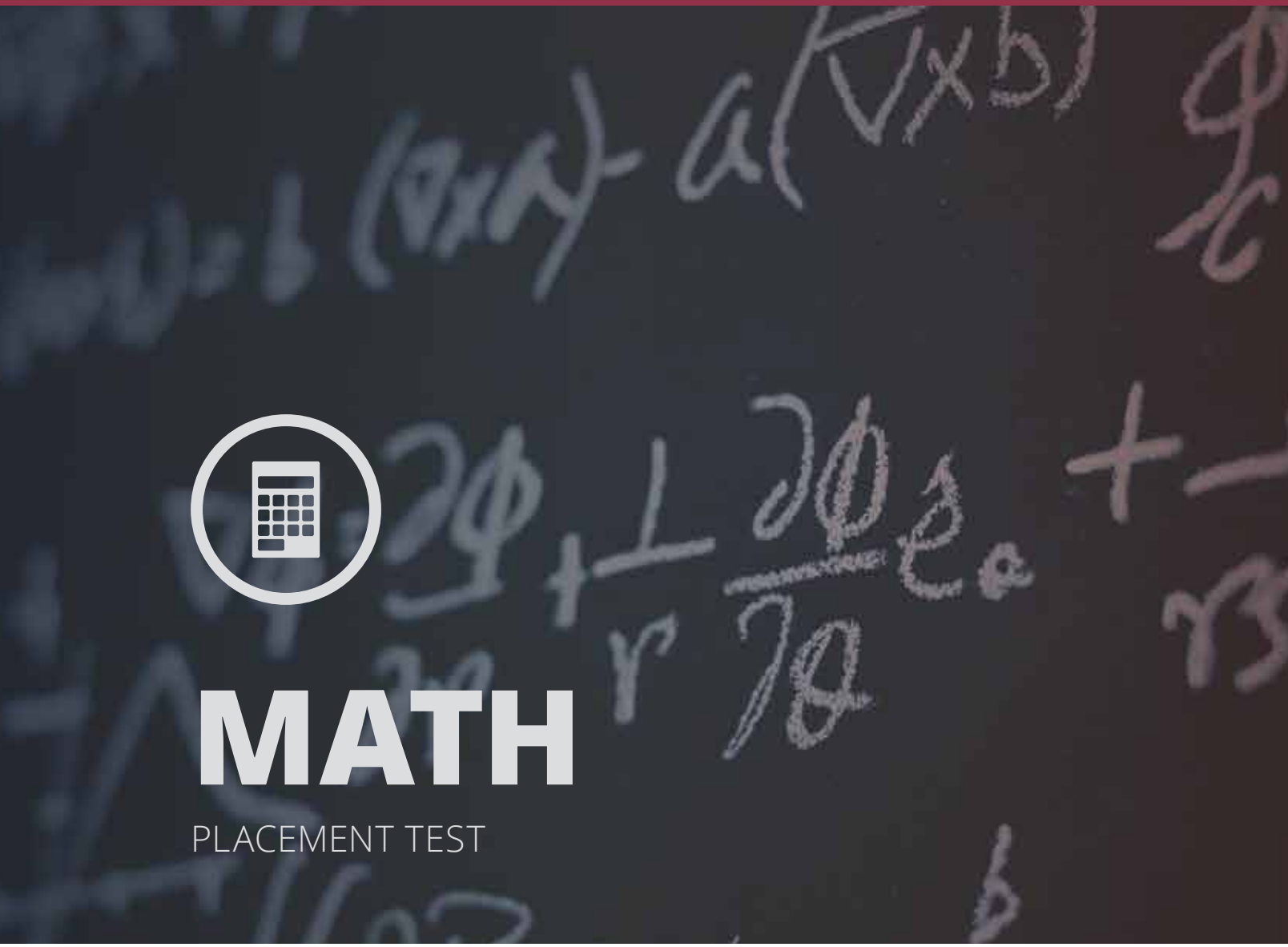
LIFEPAC®



MATH

PLACEMENT TEST

700 – 1200

Alpha Omega
PUBLICATIONS

Mathematics 700-1200

Placement Tests

CONTENTS

Alpha Omega Publications®

804 N. 2nd Ave. E., Rock Rapids, IA 51246-1759

MATHEMATICS 700-1200
Introduction

PLACEMENT TEST for the LIFEPAC CURRICULUM
Instructions

This test is designed to aid the teacher in proper placement of the student into the LIFEPAC curriculum. It has two sections: the Student Test and the Answer Key.

This is not a timed test and the student should be given an opportunity to answer each question adequately. If the student becomes bogged down and the test seems too difficult, skip to the next section. If the test is still too difficult, this child's academic skill level has been reached and testing may stop. Each test level should take no longer than one hour. Students should not use calculators for any of these tests.

Testing should begin approximately two grade levels below the student's current or just completed grade level. For example, a student entering tenth grade [1000] should begin testing at the eighth grade [800] level. This allows for proper grade level placement as well as identification of any learning gaps that the student may have.

Once the test has been administered, it is ready to be scored. The teacher or parent does all of the scoring. Use the Answer Key to mark all incorrect answers on the Student Test. Next, record the total number of **correct** answers in the score box or on the line at the top of each unit test. **Each numbered question equals one point and always subtract from 10 even on the tests with fewer than 10 questions.** When all tests have been graded, transfer the number correct by LIFEPAC to the Student Placement Worksheet on the back page of the Answer Keys. Then add the total number of points per grade level.

Test	Level	Test	Level
701 - 710	7	1001 - 1010	10
801 - 810	8	1101 - 1110	11
901 - 910	9	1201 - 1210	12

There are ten possible points per section. Put all answers on the blanks to the right of the questions unless instructed to do otherwise.

Math 701: Integers

Circle the correct letter for each multiple choice question. **Score: _____**

1. Which of the following can be used to describe the location that is 9 units to the right of zero on the number line?

a. negative nine b. positive nine c. nine less than zero

2. Which of the following lists is in the correct order from smallest to largest?

a. -13, -19, -21, -24 b. 11, -12, 15, -19 c. -7, -3, 6, 2 d. -19, -14, 5, 11

3. Add -13 + 5.

a. -8 b. 8 c. -18 d. 18

4. Which of the following is another way to express the problem 1 - (-7)?

a. -1 + (-7) b. 1 + (-7) c. 1 + 7 d. -1 + 7

5. Which of the following expressions has a product of 36?

a. (-3)(12) b. 4 · 8 c. 2(-18) d. (-6)(-6)

6. Select all that apply. To which sets does $-\frac{5}{8}$ belong.

a. real numbers b. rational numbers c. irrational numbers d. integers

e. whole numbers f. natural numbers

7. If *a* and *b* represent numbers, which of the following statements represents the commutative property of multiplication?

a. $a + b = b + a$ b. $a \cdot b = b \cdot a$ c. $a + 0 = a$ d. $a \cdot 1 = a$

8. Simplify 5 - 2 · 3 + 4.

a. 13 b. -5 c. 3 d. 21

9. What is the value of -6^2?

a. -36 b. 36 c. -12 d. 12

10. Simplify $\frac{72}{-8}$.

a. 12 b. -9 c. 9 d. -12

Math 702: Fractions

Circle the correct letter for each multiple choice question. **Score: _____**

1. Which number is equivalent to the fraction $\frac{15}{7}$?

a. $\frac{7}{15}$ b. $2\frac{1}{15}$ c. 2 d. $2\frac{1}{7}$

2. Which list has three equivalent fractions for $\frac{2}{5}$?

a. $\frac{4}{10}, \frac{6}{20}, \frac{10}{25}$ b. $\frac{4}{10}, \frac{6}{15}, \frac{8}{20}$ c. $\frac{6}{15}, \frac{8}{16}, \frac{10}{25}$ d. $\frac{6}{15}, \frac{8}{20}, \frac{12}{25}$

3. What is the prime factorization of 96?

a. $8 \cdot 12$ b. $2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$ c. $2^5 \cdot 3$ d. $2^5 \cdot 3^2$

4. The GCF of 28 and 42 is ____.

a. 2 b. 4 c. 7 d. 14

5. Find the LCM of 9 and 15.

a. 1 b. 3 c. 45 d. 135

6. Find the sum of $\frac{7}{13}$ and $\frac{11}{26}$.

a. $\frac{3}{26}$ b. $\frac{25}{26}$ c. $\frac{25}{39}$ d. $\frac{18}{39}$

7. Evaluate $\frac{20}{6} - \frac{2}{3}$.

a. $2\frac{1}{6}$ b. $2\frac{2}{3}$ c. $3\frac{1}{3}$ d. $3\frac{2}{3}$

8. Which list of fractions is in order from smallest to largest?

a. $\frac{3}{4}, \frac{3}{5}, \frac{3}{10}, \frac{3}{12}$ b. $\frac{3}{5}, \frac{3}{4}, \frac{3}{12}, \frac{3}{10}$ c. $\frac{3}{10}, \frac{3}{5}, \frac{3}{4}, \frac{3}{12}$ d. $\frac{3}{12}, \frac{3}{10}, \frac{3}{5}, \frac{3}{4}$

9. Multiply the following numbers. Reduce the answer to lowest terms.

$3\frac{1}{4} \cdot 1\frac{1}{3}$

a. $3\frac{1}{3}$ b. $3\frac{1}{12}$ c. $4\frac{1}{3}$ d. $4\frac{1}{12}$

10. Divide. Reduce the answer to lowest terms.

$\frac{1}{5} \div \frac{3}{4}$

a. $\frac{3}{16}$ b. $\frac{3}{20}$ c. $\frac{4}{15}$ d. $1\frac{4}{15}$

Math 703: Decimals

Circle the correct letter for each multiple choice question. **Score: _____**

1. Which symbol makes the number sentence 4.567 ___ 4.576 correct?

a. < b. > c. =

2. Round 259.98991 to the nearest hundredths.

a. 259.99 b. 259.9899 c. 259.98991 d. 260.00001

3. Timmy put $0.82 in his piggy bank on Monday, $0.70 on Tuesday and $0.25 on Wednesday. What is the total amount he put in his piggy bank?

a. $0.98 b. $1.14 c. $1.57 d. $1.77

4. The floor at a roller-skating rink is 72.25 feet long and 51.5 feet wide. How much longer is the rink than it is wide?

a. 671.0 ft b. 67.10 ft c. 21.25 ft d. 20.75 ft

5. Evaluate 1.4 · 0.32.

a. 0.448 b. 0.0448 c. 4.480 d. 44.80

6. Jeremiah has a batting average of 0.312 this baseball season. Express his average as a fraction in lowest terms.

a. $\frac{312}{1000}$ b. $\frac{39}{125}$ c. $\frac{13}{50}$ d. $\frac{13}{42}$

7. Which of the following is $25\frac{9}{16}$ equal to?

a. 25.916 b. 25.25 c. 25.169 d. 25.5625

8. The length of a rectangle can be found using the following formula: $\text{length} = \frac{\text{area}}{\text{width}}$. What is the length of a rectangle that has a width of 2.5 cm and an area of 20.5 cm²?

_____ cm

9. In Trevor's biology class, the students tested for bacteria on a kitchen sponge. They found that there were approximately 17,000,000 bacterial colonies on a single sponge. Express their findings in scientific notation.

a. $17 \cdot 10^6$ b. $1.7 \cdot 10^6$ c. $1.7 \cdot 10^7$ d. $0.17 \cdot 10^8$

10. 87.5 ml = ____ l

a. 87,500 b. 0.0875 c. 875 d. 0.875

Math 704: Patterns and Equations

Circle the correct letter for each multiple choice question. **Score: _____**

1. A number increased by negative eight is equal to fourteen. Which equation could be used to find the number?

a. $n + 8 = 14$ b. $n - (-8) = 14$ c. $n + (-8) = 14$ d. $8 - n = 14$

2. Evaluate the expression $w^2 - v + 1$ for $w = -2$ and $v = -8$.

a. 5 b. 13 c. -11 d. -3

3. Determine whether the following sequence is arithmetic, geometric, or neither.

1, 4, 9, 16, ...

a. arithmetic b. geometric c. neither

4. What are the inputs of this function? {(-3, 2), (-4, 2), (8, 3), (7, 1)}

a. {-4, -3, 7, 8} b. {1, 2, 3} c. {-4, -3, 1, 2, 3, 7, 8} d. {1, 2, 3, 7, 8}

5. Which of the following functions has the function rule $y = x + 4$?

a. {(0, 2), (-2, -6), (1, 5)} b. {(2, 6), (-3, -7), (0, 4)}

c. {(-3, 1), (0, 4), (2, 6)} d. {(-2, 2), (-1, -5), (3, 7)}

6. What is the solution to $w - 9\frac{1}{2} = 15$?

a. 5½ b. 6½ c. 24½ d. 23½

7. What is the solution to $\frac{n}{4} = -12.4$?

a. $n = 3.1$ b. $n = -3.1$ c. $n = 49.6$ d. $n = -49.6$

8. What should be done to both sides of the equation in order to solve $p - 17 = -23$?

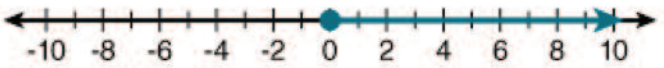
a. The number 17 should be subtracted. b. The number 17 should be added.

c. The number -23 should be subtracted. d. The number -23 should be added.

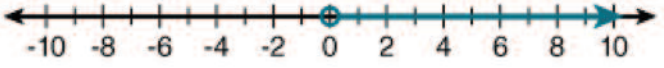
9. The cost to rent a car is $25 plus an additional $0.15 for each mile the car is driven. How many miles was a car driven if it had a bill of $71.80?

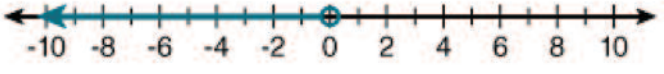
a. 479 b. 312 c. 454 d. 645

10. Which number line represents the graph of $x \leq 0$?

a. 

b. 

c. 

d. 

Math 705: Ratios and Proportions

Circle the correct letter for each multiple choice question. **Score: _____**

1. Which of the following is not equivalent to the others?

a. 0.4 b. 40% c. 4% d. $\frac{2}{5}$

2. What is the rate $2.50 for 10 items, as a unit rate?

a. $1.25 for 5 b. $0.25 each c. $25 each d. $0.50 each

3. Which of the following is a proportion?

a. $\frac{3}{4}=\frac{12}{15}$ b. $\frac{8}{10}=\frac{6}{8}$ c. $\frac{6}{9}=\frac{8}{12}$ d. $\frac{4}{6}=\frac{9}{12}$

4. Convert 53 grams to kilograms.

a. 530 kg b. 53,000 kg c. 0.053 kg d. 5.3 kg

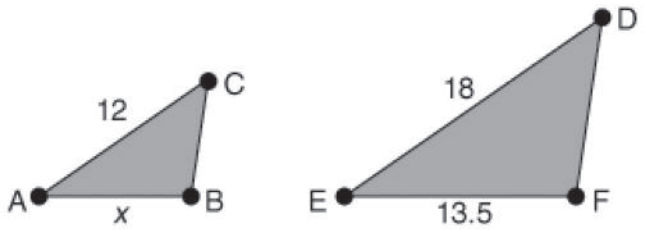
5. Find 20% of 150.

a. 30 b. 20 c. 120 d. 130

6. Twenty-one is 25% of what number?

a. 5.25 b. 63 c. 10.5 d. 84

7. Find the length of *AB* .



a. 6 b. 9 c. 9.5 d. 10

8. The scale on a drawing is 1 cm = 6 m. How many meters does a length of 5.5 centimeters on the drawing represent?

a. 11.5 m b. 3.3 m c. 0.92 m d. 33 m

9. A $40 backpack is on sale for $28. What is the percent of change?

a. 30% b. 12% c. -30% d. -70%

10. If there are 12 girls and 15 boys in a class, which ratio is not true?

a. 12 girls to 27 students b. 5 boys to 9 students

c. 15 boys to 12 girls d. 3 girls to 5 boys

Math 706: Probability and Graphing

Circle the correct letter for each multiple choice question. **Score: _____**

1. Chris has 2 pairs of black socks, 4 pairs of red socks, and 18 pairs of white socks in a dresser drawer. What is the probability that he will choose a pair of white socks, without looking in the drawer first?

a. 75% b. 0.33 c. ¼ d. 50%

2. If you toss two coins 120 times, predict the number of times the coins will both be tails.

a. 25 b. 30 c. 60 d. 90

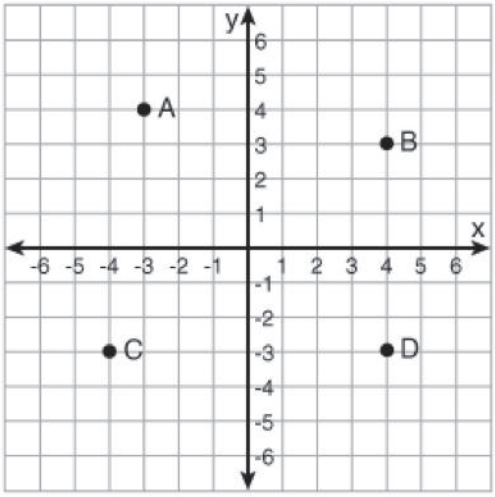
3. A spinner is divided into 10 equal sections, numbered 1 to 10. How many outcomes are there if you spin the spinner and then roll a regular 6-sided number cube?

a. 16 b. 32 c. 60 d. 600

4. To find the number of outcomes for flipping 4 coins, which expression would you use?

a. 2 + 2 + 2 + 2 b. 2 · 2 · 2 · 2 c. ½ + ½ + ½ + ½ d. ½ · ½ · ½ · ½

5. Which point is located at (-3, 4)?



a. point A b. point B c. point C d. point D

6. Which table represents a linear function?

a.

x	y
1	5
2	10
3	15
4	10

b.

x	y
2	4
3	6
5	8
12	20

c.

x	y
0	0
3	9
5	15
7	21

d.

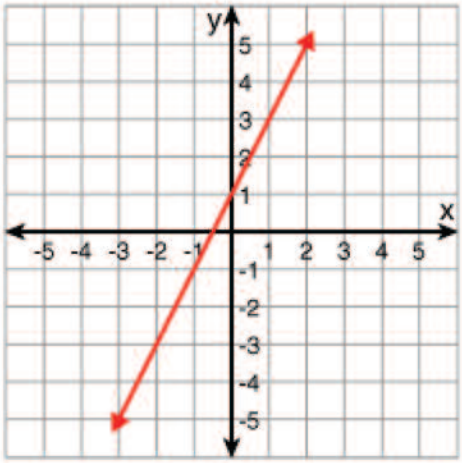
x	y
1	1
2	4
4	16
5	25

7. The following two points are on a line: (2, 3), (-2, 5). What is the slope of the line?

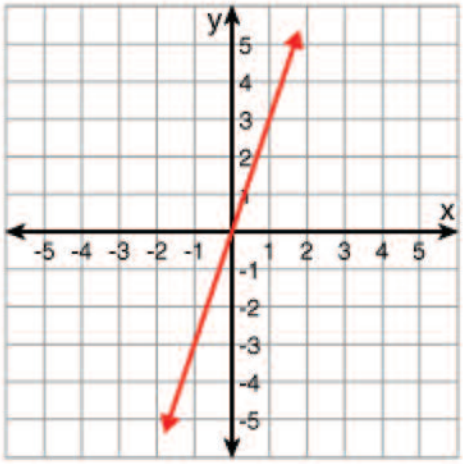
a. 2 b. -½ c. -2 d. ½

8. Which graph shows direct variation?

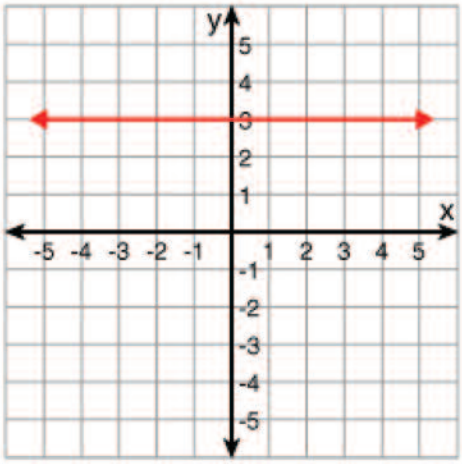
a.



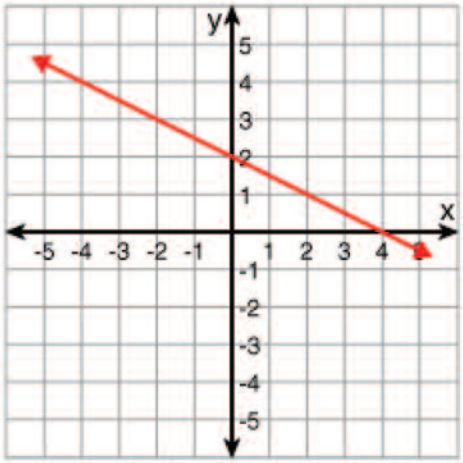
b.



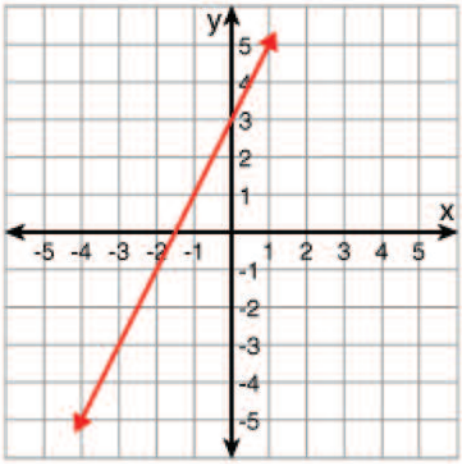
c.



d.



9. What is the slope of the line?



a. ½ b. 2 c. -2 d. -½

10. The variables *x* and *y* vary directly. If one pair of the values is *x* = 3 and *y* = 12, write an equation that shows the relationship between *x* and *y*.

a. $x = 4y$ b. $\frac{x}{y} = 4$ c. $y = 4x$ d. $y = \frac{x}{4}$

Math 707: Data Analysis

Circle the correct letter for each multiple choice question. **Score: _____**

1. Select all the statements that describe the following set of numbers.

3, 9, 8, 6, 3, 4, 9, 2, 5, 10, 8, 1

a. This set has three modes.

b. The median is the mean of 5 and 6.

c. The mean is smaller than the median.

d. The mode is 3.

e. The mean is approximately 5.67.

2. What is the range of the following set?

28, 45, 12, 34, 36, 45, 19, 20

a. 8 b. 33 c. 45 d. 57

3. What is the interquartile range of the set of data this box-and-whisker plot represents?

a. 3 b. 6 c. 8 d. 10

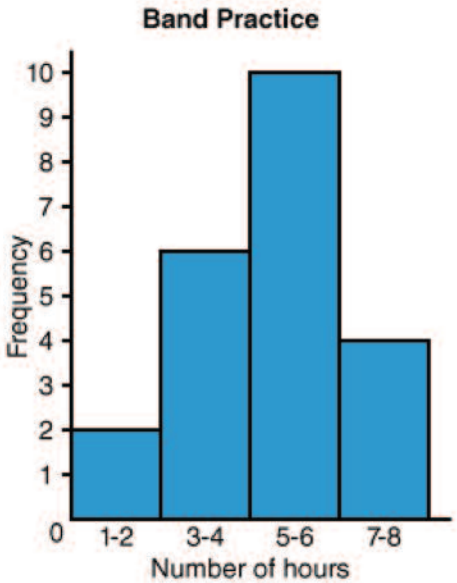
4. The following stem-and-leaf plot represents the scores earned by Mr. Roberts's class on their most recent science test. How many of the students scored less than a 75?

Stems	Leaves
6	1 7 9
7	3 7 8 8
8	0 1 1 1 6
9	1 2 2 5 9
10	0 0

6|5 = 65

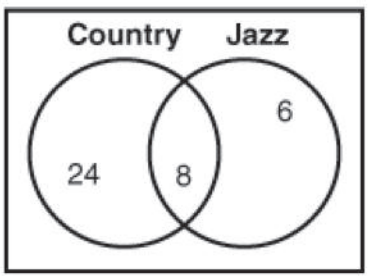
a. 4 b. 5 c. 6 d. 7

5. **The following histogram represents the number of hours students practice each week for band. How many students practiced at least five hours?**



a. 10 b. 4 c. 8 d. 14

6. **A survey showed that a total of 32 people enjoy country music, 14 enjoy jazz, and 8 enjoy both. Which of the following Venn diagrams best represents the results of this survey?**

a.


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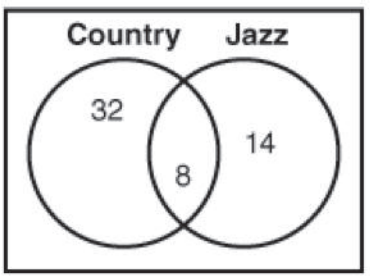
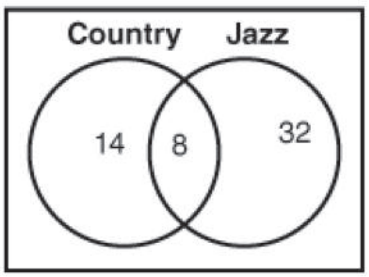
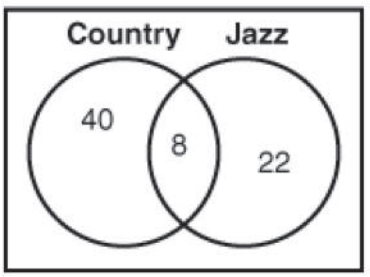
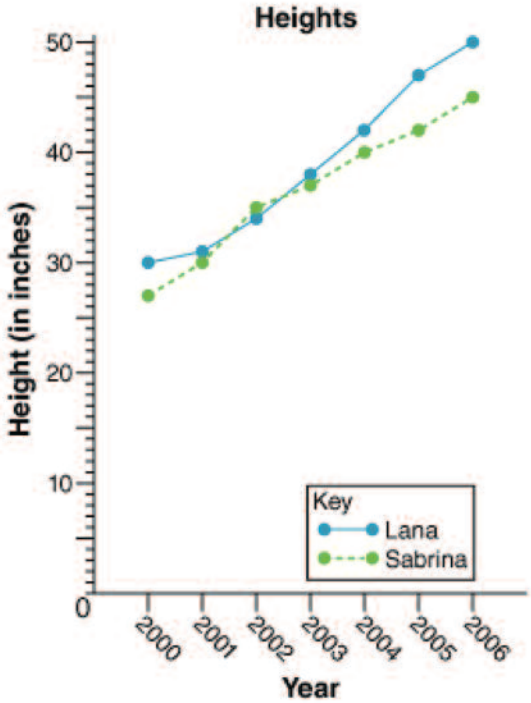


c.


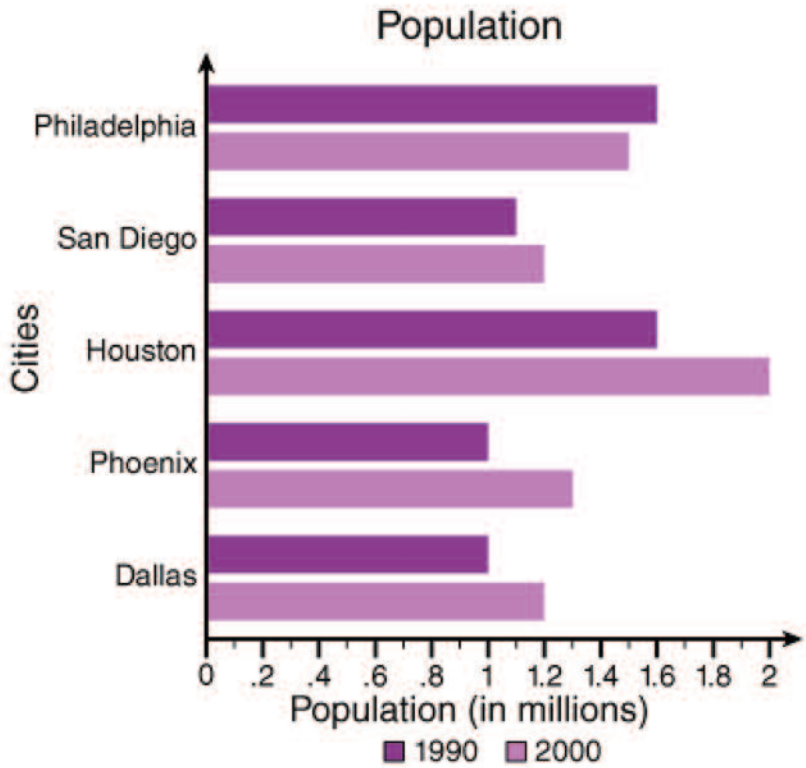
d.


7. **The following double line graph represents the heights (in inches) of Lana and Sabrina over a period of seven years. For how many of the years shown was Lana taller than Sabrina?**



a. 4 b. 5 c. 6 d. 7

8. **The following double bar graph displays the population of some major cities. What was the population of San Diego in 2000?**

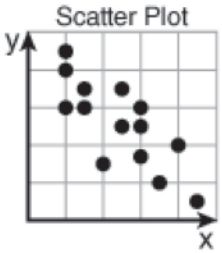


a. 1,100,000 b. 1,000,000 c. 1,200,000 d. 2,000,000

9. **A group of 125 teenagers were asked which of the following activities they would most likely choose to spend their free time doing: reading a book, watching television, playing video games, or listening to music. The results are displayed in the following circle graph. What is the central angle measure of the section representing those teenagers who prefer to play video games?**

a. 86.4° b. 100.8° c. 15° d. 22.5°

10. **The following scatter plot demonstrates which type of correlation?**



a. positive correlation b. negative correlation c. no correlation

Math 708: Geometry

Circle the correct letter for each multiple choice question. **Score: _____**

1. Which pair of angles contains complementary angles?

a. 30°, 30° b. 120°, 60° c. 45°, 45° d. 90°, 30°

2. What is the sum of the interior angles of an octagon?

a. 360° b. 720° c. 1080° d. 1440°

3. Is the statement "A scalene triangle is an acute triangle" always, sometimes, or never true:

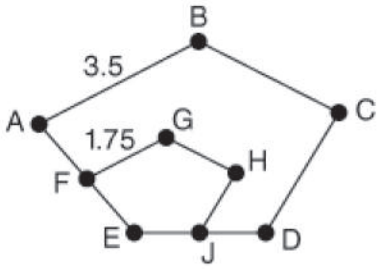
a. always b. sometimes c. never

4. Which of the following is *not* an attribute of parallelograms?

a. Opposite sides are parallel. b. Diagonals bisect each other.

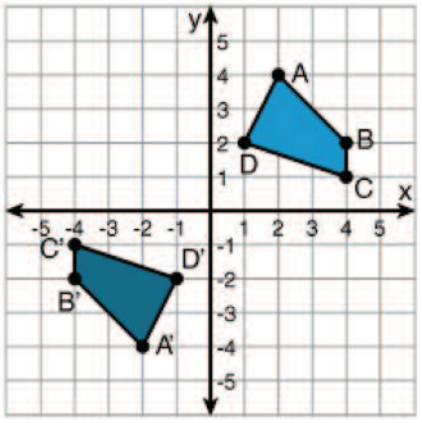
c. Consecutive angles are supplementary. d. Diagonals are congruent.

5. *ABCDE* and *FGHJE* are similar pentagons. If the perimeter of *FGHJE* is 7.3, what is the perimeter of *ABCDE*?



a. 14 b. 14.6 c. 15 d. 14.5

6. *A'B'C'D'* is the image of *ABCD*. What transformation(s) would result in this image?



a. *ABCD* is reflected across the *x*-axis and then the *y*-axis.

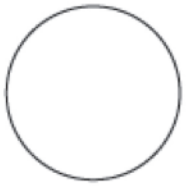
b. *ABCD* is reflected over the *x*-axis and then rotated 180°.

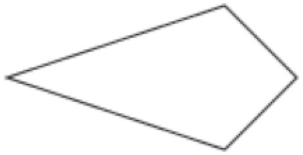
c. *ABCD* is reflected across the *y*-axis and then rotated 180°.

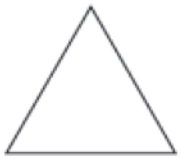
d. *ABCD* is rotated 90° around the origin and then reflected over the *x*-axis.

7. Which figure has one line of symmetry?

a. 

b. 

c. 

d. 

8. Which statement is true of two similar figures?

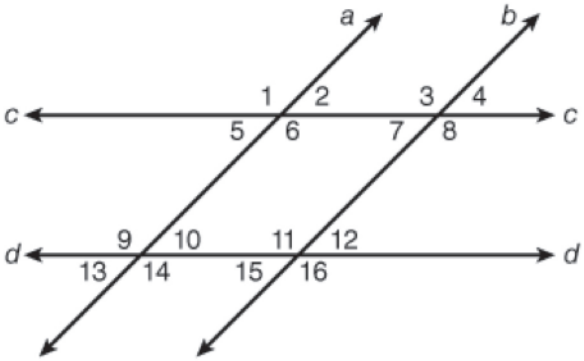
a. Corresponding sides are always congruent.

b. Corresponding angles are always congruent.

c. They are always different sizes, but the same shape.

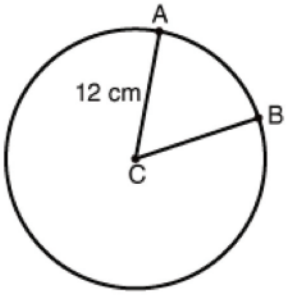
d. The areas of the figures have the same ratio as the ratio of corresponding sides.

9. If *a*||*b* and *c*||*d*, which pair of angles are congruent?



a. 1 and 4 b. 5 and 8 c. 4 and 9 d. 10 and 12

10. What is the length of $\overset{\frown}{AB}$ if m$\angle ACB$ = 60° and point *C* is the center of the circle? (Use 3.14 for π.)



a. 6.28 b. 12.56 c. 37.68 d. 75.36

Math 709: Measurement and Area

Circle the correct letter for each multiple choice question. **Score: _____**

1. Two sides of a triangle measure 18 m and 11 m. If the perimeter of the triangle is 37 m, what is the length of the third side?

a. 12 m b. 8 m c. 66 m d. 30 m

2. What is the circumference of a circle that has a diameter of 8 inches? Use 3.14 for π.

a. 12.56 in. b. 25.12 in. c. 50.24 in. d. 200.96 in.

3. The base of a parallelogram is 6 cm. If the area of the figure is 42 cm², what is its height?

a. 7 cm b. 3.5 cm c. 36 cm d. 18 cm

4. What is the area of a triangle that has a base of 10 ft and a height of 5 ft?

a. 15 ft^2 b. 7.5 ft^2 c. 50 ft^2 d. 25 ft^2

5. Find the area of a circle that has a radius of 9 mm. Use 3.14 for π.

a. 254.34 mm^2 b. 56.52 mm^2 c. 63.59 mm^2 d. 28.26 mm^2

6. A trapezoid has base lengths of 8 yards and 4 yards. If the height of the figure is 3 yards, what is the area?

a. 36 square yards b. 96 square yards c. 18 square yards d. 12 square yards

7. A square has side lengths of 4 feet. If the dimensions are tripled, how much larger will the area of the new square be than the area of the original square?

a. three times b. six times c. nine times d. The area won't change.

8. What is the value of $\sqrt{64}$?

a. 4 b. 8 c. 16 d. 32

9. Between which two integers does $\sqrt{50}$ lie?

a. 5 and 6 b. 25 and 26 c. 10 and 11 d. 7 and 8

10. What is the hypotenuse of a right triangle that has legs measuring 6 cm and 8 cm?

a. 10 cm b. 14 cm c. 50 cm d. 100 cm

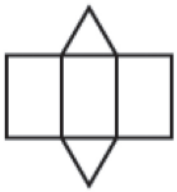
Math 710: Surface Area and Volume

Circle the correct letter for each multiple choice question. **Score: _____**

1. All of the following solid figures have two congruent and parallel bases *except* the ____.

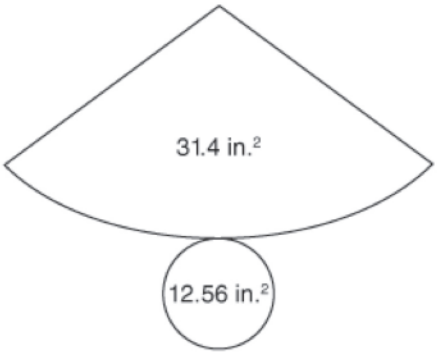
a. rectangular pyramid b. heptagonal prism c. cylinder d. cube

2. What shape can be created by the given net?



a. wedge b. triangular prism c. cone d. triangular pyramid

3. Find the surface area of the cone represented by the net below.



a. 31.4 in.^{2} b. 43.96 in.^{2} c. 394.38 in.^{2} d. 56.52 in.^{2}

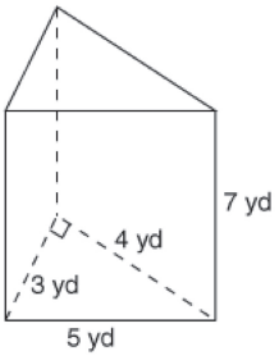
4. What is the surface area of a die in which each edge has a length of 15 mm? (Hint: On a cube, the length, width, and height have the same measure.)

a. 1,350 mm^2 b. 450 mm^2 c. 180 mm^2 d. 1,687.5 mm^2

5. What is the volume of a rectangular sandbox that is 3 feet by 4 feet by 1 foot?

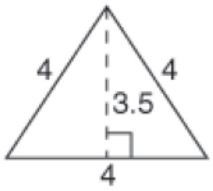
a. 7 ft^3 b. 8 ft^3 c. 12 ft^3 d. 13 ft^3

6. What is the surface area of the following triangular prism?



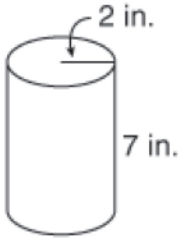
a. 24 yd^2 b. 90 yd^2 c. 50 yd^2 d. 96 yd^2

7. **A triangular prism has a height of 11 meters and a base with the following measurements. All dimensions are in meters. What is the volume of the prism?**



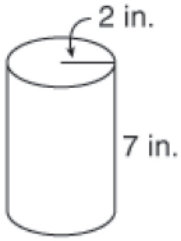
a. 88 m^3 b. 28 m^3 c. 77 m^3 d. 44 m^3

8. **What is the total surface area of the following cylinder?**



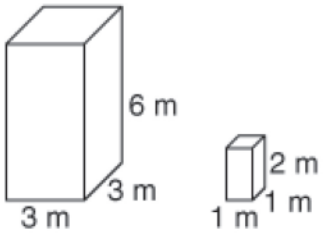
a. 113.04 $in.^2$ b. 100.48 $in.^2$ c. 131.88 $in.^2$ d. 69.08 $in.^2$

9. **What is the volume of the following cylinder?**



a. 43.96 $in.^3$ b. 12.56 $in.^3$ c. 21.98 $in.^3$ d. 87.92 $in.^3$

10. **How many times larger is the surface area of the larger prism compared to the surface area of the smaller prism?**



a. 9 b. 6 c. 3 d. 2

Pre-Algebra Math 801: The Real Number System

Circle the correct letter for each multiple choice question. **Score: _____**

1. Choose all of the symbols that make the following sentence true. 4^0 ___ 5^{-1}

a. > b. < c. ≥ d. ≤

e. = f. ≠

2. Choose all of the symbols that make the following sentence true. 4.2×10^{-3} _____ ¼

a. > b. < c. ≥ d. ≤

e. = f. ≠

3. Match the following items by writing the letter on the blank.

_____ (-14) + 81 = 81 + (-14)

_____ $\frac{13}{17} \cdot \frac{17}{13} = 1$

_____ 101 + (29 + 417) = (101 + 29) + 417

_____ $\frac{1}{3}(24 + 15) = \frac{1}{3} \cdot 24 + \frac{1}{3} \cdot 15$

_____ -72 + 0 = -72

a. multiplicative inverse

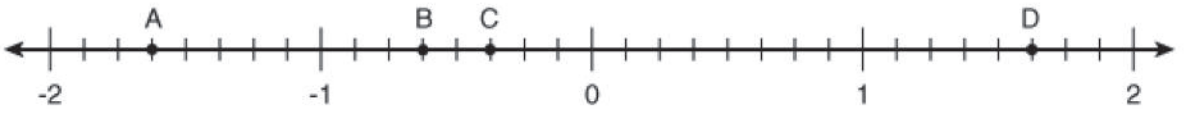
b. additive identity

c. distributive property

d. commutative property of addition

e. associative property of addition

4. Which of the following is a true statement based on the graph shown?



a. A > B b. D < C c. B ≤ C d. D = |C|

5. If $\sqrt{x}$ is between 4 and 5, then x is ____.

a. greater than 2 and less than 3 b. greater than 4 and less than 5

c. greater than 8 and less than 10 d. greater than 16 and less than 25

6. Which of the following numbers is irrational?

a. $\frac{3}{7}$ b. $1.\overline{45}$ c. $\sqrt{32}$ d. $\sqrt{81}$

7. Which of the following lists is in order from least to greatest?

a. 5^{-1}, -4, 1, $\sqrt{3}$ b. -4, 5^{-1}, 1, $\sqrt{3}$ c. -4, 1, 5^{-1}, $\sqrt{3}$ d. 5^{-1}, -4, $\sqrt{3}$, 1

8. If $n = 4$, then $9^8 \div 9^n$ is equal to ____.

a. 1 b. 9^2 c. 9^4 d. 9^{12}

9. Which of the following expressions *cannot* be written as a whole number?

a. $|-2|$ b. $-\frac{15}{5}$ c. $\sqrt{36}$ d. 9^0

10. What is the distance between -3 and 6?

a. -9 b. -3 c. 3 d. 9

Pre-Algebra Math 802: Modeling Problems in Integers

Circle the correct letter for each multiple choice question. **Score: _____**

1. Functions are ____ relations.

a. always b. sometimes c. never

2. Solve $\frac{-6-4(-3)}{-2+1}$ **.**

a. -6 b. -3 c. 3 d. 6

3. If f(n) = - 5n - 2, then f(3) is ____.

a. -13 b. -17 c. -4 d. -55

4. Which equation does not have the same solution as the others?

a. $11x = 33$ b. $\frac{x}{3} = 3$ c. $x - 2 = 1$ d. $x + 9 = 12$

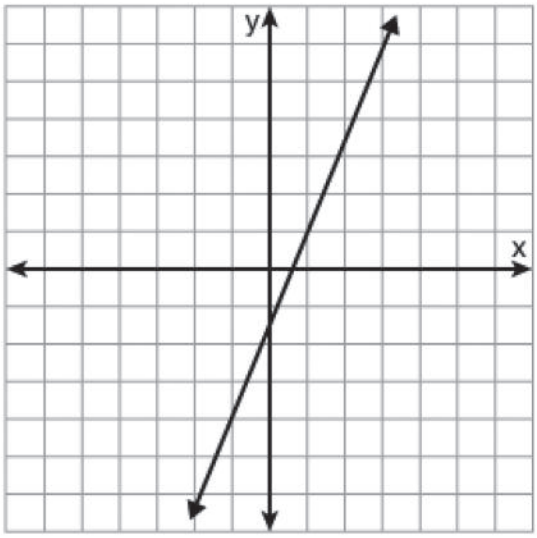
5. The solution to $4x - 11 = 33$ is also a solution of which of the following equations?

a. $2x + 8 = 8$ b. $4x - 7 = 13$ c. $3x - 22 = 11$ d. $5x + 3 = 18$

6. Evaluate $-2x^2y$, if $x = -4$ and $y = 1$.

a. 32 b. -32 c. -16 d. 16

7. Based on the graph below, what is f(-1)?



a. 4 b. 0 c. 1 d. -4

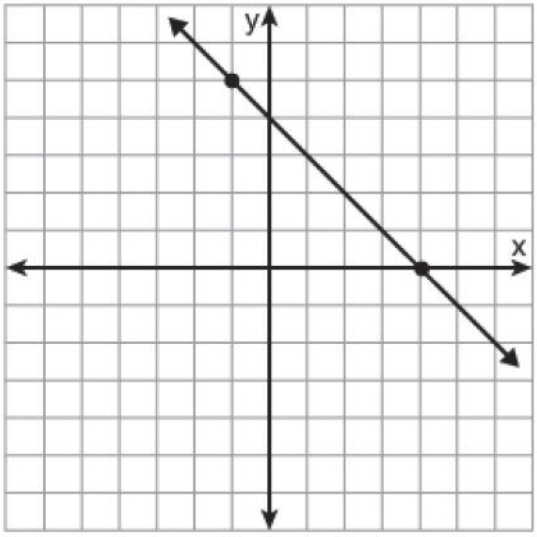
8. Which of the following algebraic equations could represent the sentence, "The sum of a number and 17 is twenty-two"?

a. $\frac{x}{17} = 22$ b. $17x = 22$ c. $x - 17 = 22$ d. $x + 17 = 22$

9. **Naya is four less than twice her brother's age. Naya is eighteen years old. Which equation can we use to solve for her brother's age?**

a. $4x + 2 = 18$ b. $4x - 2 = 18$ c. $2x + 4 = 18$ d. $2x - 4 = 18$

10. **Which t-chart matches the graph shown below?**



a.

x	*y*
3	-1
4	0
8	4

b.

x	*y*
-1	3
0	4
4	8

c.

x	*y*
-5	1
4	0
0	4

d.

x	*y*
-1	5
0	4
4	0

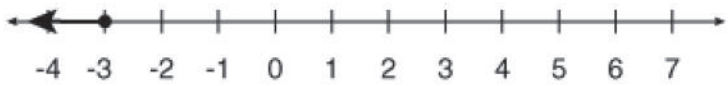
Pre-Algebra Math 803: Modeling Problems with Rational Numbers

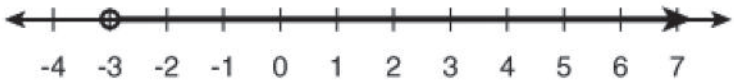
Circle the correct letter for each multiple choice question. **Score: _____**

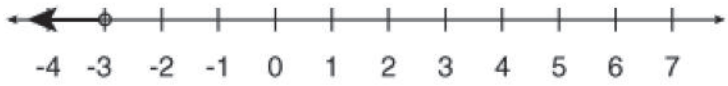
1. Write $-\frac{32}{12}$ as a mixed number in reduced form.

a. $-2\frac{2}{3}$ b. $-2\frac{8}{12}$ c. $-2\frac{3}{4}$ d. $-1\frac{20}{12}$

2. Which of the following is the graph of the inequality $-3 \le n$?

a.


b.


c.


d.


3. Solve $-4a + 5 \le -7$.

a. $a \ge -3$ b. $a \le -3$ c. $a \ge 3$ d. $a \le 3$

4. Luis needs to run more than 140 miles in order to go with the cross country team to a summer training camp. He has thirty-five days to pre-train for the camp. Which inequality can you use to find how many miles Luis must run each day to meet this goal?

a. $35m \ge 140$ b. $35m > 140$ c. $35m \le 140$ d. $35m < 140$

5. A carpenter has boards of lengths 27, 36, and 54 inches that must be cut into smaller boards of equal length, with no scrap wood left over. What is the longest length of boards he can cut?

a. 9 inches b. 3 inches c. 6 inches d. 12 inches

6. How much is $\frac{7}{9}$ of $-\frac{3}{14}$?

a. $\frac{4}{5}$ b. $-\frac{27}{98}$ c. $-\frac{1}{6}$ d. $-\frac{1}{3}$

7. Solve $22.5 + x = -47.37$.

a. -24.87 b. 24.87 c. -49.62 d. -69.87

8. What is the value of -4.326 + (-0.32) ÷ 0.4?

a. -3.526 b. -10.015 c. -11.613 d. -5.126

9. What is the GCF of $32ab^3$ and $40a^2$?

a. $8ab$ b. $4ab$ c. $8a$ d. $4a$

10. Simplify $\frac{14x^3y^2}{35xy^4z^2}$.

a. $\frac{2x^2}{5y^2z^2}$ b. $\frac{2x}{5yz}$ c. $\frac{2x^2y^2z^2}{5}$ d. $\frac{2}{5x^2y^2z^2}$

Pre-Algebra Math 804: Proportional Reasoning

Circle the correct letter for each multiple choice question. **Score: _____**

1. Which of the following lists is in order from smallest to largest?

a. 4%, 0.042, $\frac{3}{8}$, $\frac{2}{5}$ b. 0.042, 4%, $\frac{2}{5}$, $\frac{3}{8}$ c. $\frac{2}{5}$, 4%, 0.042, $\frac{3}{8}$ d. 0.042, $\frac{3}{8}$, $\frac{2}{5}$, 4%

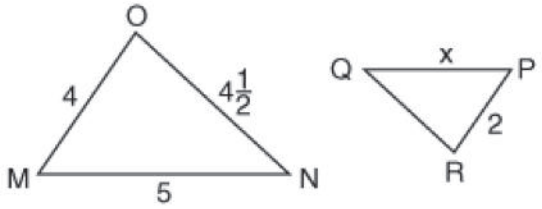
2. Which of the following items has the lowest unit price?

a. 4 for $5.00 b. $1.22 each c. 6 for $7.44 d. 3 for $3.60

3. A t-shirt that was originally priced at $14 is marked down to $10. What is the percent decrease?

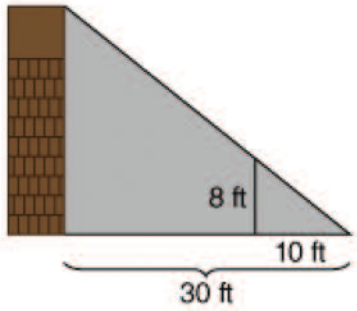
a. 40% b. 28.6% c. 71.4% d. 140%

4. ΔMNO ~ ΔPQR What is the length of *x*?



a. $2\frac{2}{9}$ b. $2\frac{1}{2}$ c. $1\frac{4}{5}$ d. $1\frac{3}{5}$

5. Which proportion could be used to solve for the height of the building?



a. $\frac{8}{10} = \frac{n}{20}$ b. $\frac{n}{8} = \frac{10}{30}$ c. $\frac{10}{20} = \frac{8}{n}$ d. $\frac{10}{30} = \frac{8}{n}$

6. A car travels at 66 kilometers per hour. What is its rate in meters per second?

a. 45 meters per second b. 1.8 meters per second

c. 237.6 meters per second d. 18.3 meters per second

7. Which of the following is a proportion?

a. $\frac{4}{5} = \frac{2}{10}$ b. $\frac{3}{7} = \frac{6}{14}$ c. $\frac{3}{4} = \frac{9}{16}$ d. $\frac{6}{9} = \frac{3}{5}$

8. The door on a model building is 2 inches wide. The door on the actual building is 4 feet wide. What was the scale used?

a. 1:2 b. 1:12 c. 1:4 d. 1:24

9. Select all of the ratios that are equivalent to $\frac{3}{13}$.

a. $\frac{2}{9}$ b. $\frac{2}{8}$ c. 6:26 d. $\frac{12}{52}$

e. $\frac{5}{24}$ f. 1.5 to 6.5

Pre-Algebra Math 805: More with Functions

Circle the correct letter for each multiple choice question. **Score: _____**

1. What is the solution to $4x - 14 + 6 = 12$? _____

2. A rectangle with a length of $x - 4$ and a width of 8 has a perimeter of 34. What is the value of x?

_____

3. What is the slope of a line that runs parallel to $y = 2x + 5$? _____

4. Simplify $2x^2 + 7x - 4x - 6x^2$.

a. $-x^2$ b. $-4x^2 + 3x$ c. $-4x^4 + 3x^2$ d. $-x$

5. Which function is *not* an example of exponential decay?

a. $y = 0.5(3)^x$ b. $y = 2(0.4)^x$ c. $y = 3(0.2)^x$ d. $y = 0.2(0.5)^x$

6. Which of the following sequences is *not* arithmetic?

a. 3, 5, 7, 9, ... b. 7, 21, 63, 189, ... c. 4, 8, 12, 16, ... d. 9, 12, 15, 18, ...

7. Solve $-4(-2y + 3) = 20$.

a. -1 b. 1 c. 4 d. -4

8. All of the following points lie on the graph of $y = 2^x$ *except* _____.

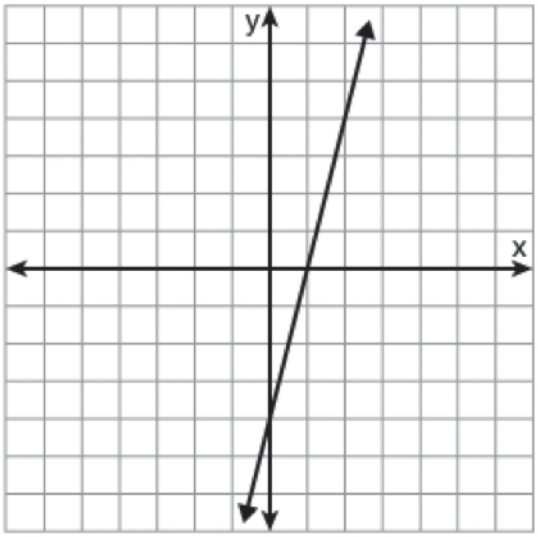
a. (0, 0) b. (1, 2) c. (2, 4) d. (3, 8)

9. What is the slope of a line passing through (3, 4) and (5, 8)?

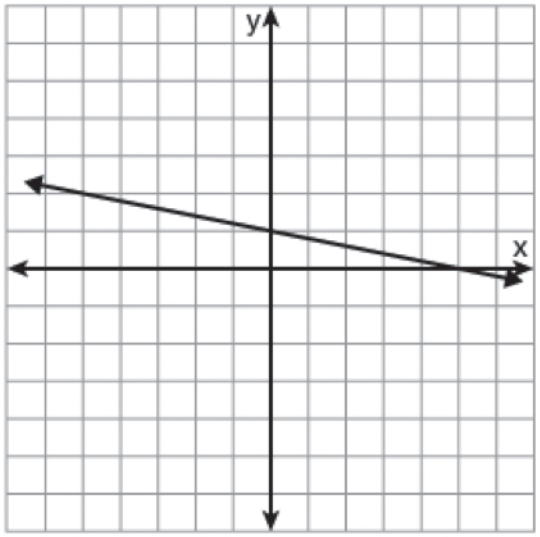
a. $-\frac{3}{2}$ b. $\frac{2}{3}$ c. 2 d. 3

10. **Which graph has an *x*-intercept of -4 and a *y*-intercept of -1?**

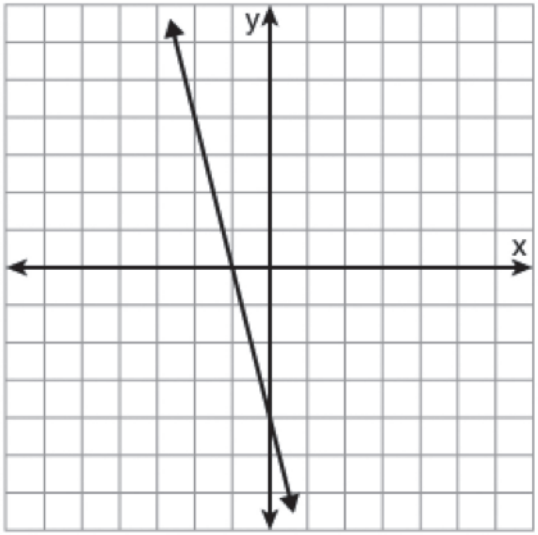
a.



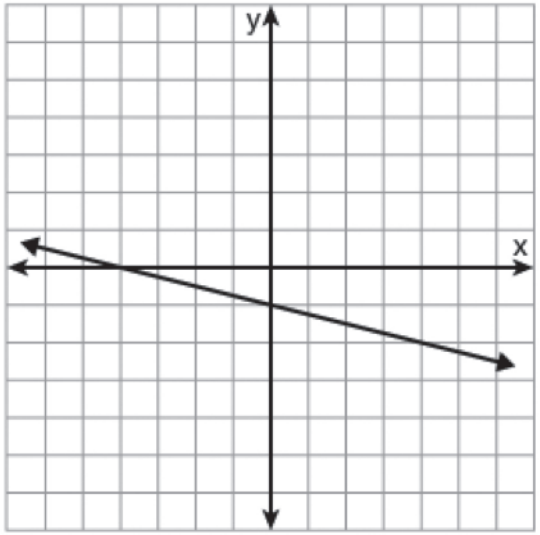
b.



c.



d.



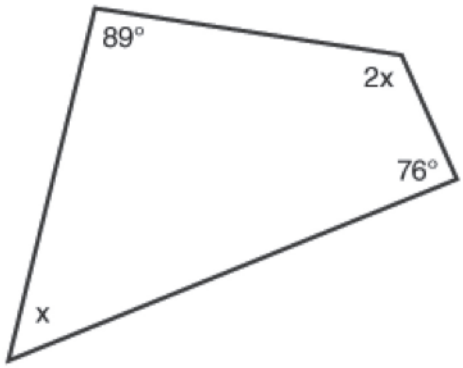
Pre-Algebra Math 806: Measurement

Circle the correct letter for each multiple choice question. **Score:** _____

1. Determine if the side lengths 12, 13, and 13 form a triangle. If it is a triangle, classify it by its sides.

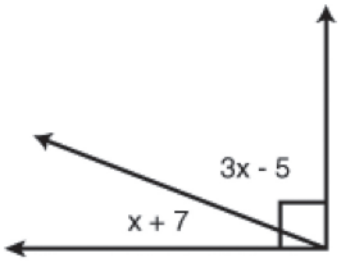
a. It's not a triangle. b. scalene triangle c. isosceles triangle d. equilateral triangle

2. What is the measure of 2*x*?



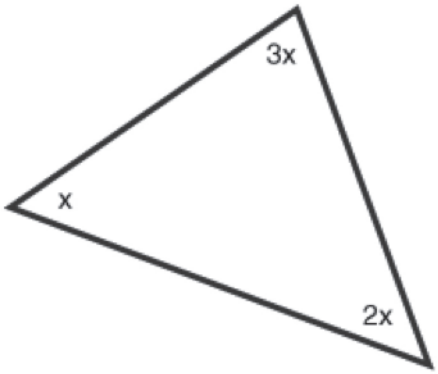
a. 65° b. 130° c. 195° d. 360°

3. What is the measure of *x*?



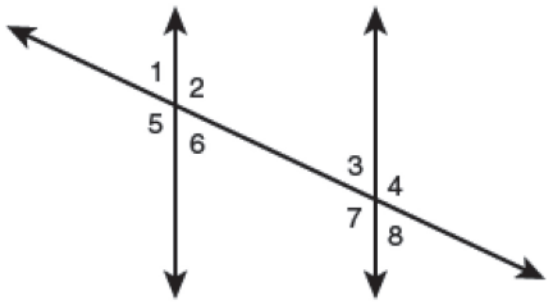
a. 90° b. 61° c. 29° d. 22°

4. What is the measure of the largest angle?



a. 180° b. 90° c. 60° d. 30°

5. Which set of angles is an example of vertical angles?



a. ∠3 and ∠8 b. ∠4 and ∠5 c. ∠2 and ∠7 d. ∠1 and ∠2

6. Which set of side lengths will *not* form a right triangle?

a. 5, 12, 13 b. 7, 24, 25 c. 9, 16, 20 d. 8, 15, 17

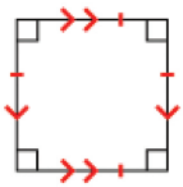
7. The sum of the interior angles of a heptagon is ____.

a. 720° b. 900° c. 1,080° d. 1,260°

8. If the measure of an inscribed angle is 116°, what is the measure of the intercepted arc it creates?

a. 232° b. 116° c. 58° d. 29°

9. Select all of the names of this polygon.



a. quadrilateral b. trapezoid c. isosceles trapezoid d. parallelogram

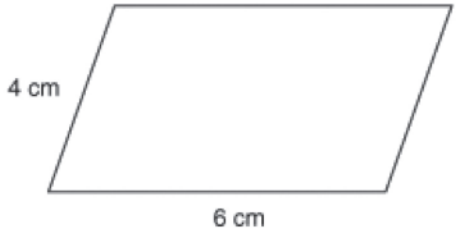
e. rectangle f. rhombus g. square

Pre-Algebra Math 807: Plane Geometry

Circle the correct letter for each multiple choice question. **Score: _____**

1. If the perimeter of a figure is doubled, then the dimensions were _____ .

2. Reanna was asked to find the perimeter of the following parallelogram. She measured the lengths of the sides, and then multiplied 6 centimeters by 4 centimeters. Her answer was 24 square centimeters. Which of the following statements is true?



a. Reanna's answer is correct.

b. Reanna should have multiplied 6 cm by the vertical height.

c. Reanna should have multiplied her answer by ½.

d. Reanna should have added all of the sides together.

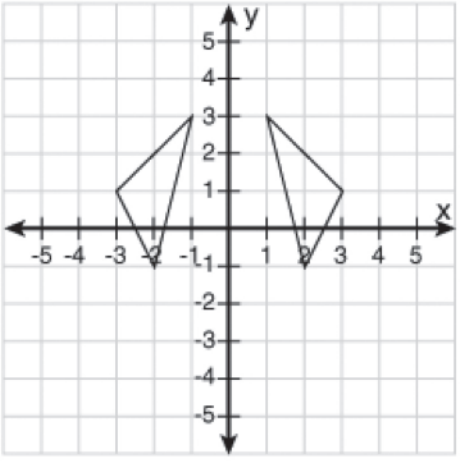
3. What is the midpoint between (-8, -5) and (-2, 2)?

a. (-5, -3.5) b. (-5, -1.5) c. (-10, -3) d. (-3, -3.5)

4. Paul lives 6 miles west and 3 miles north of school. What is the direct distance from Paul's house to school?

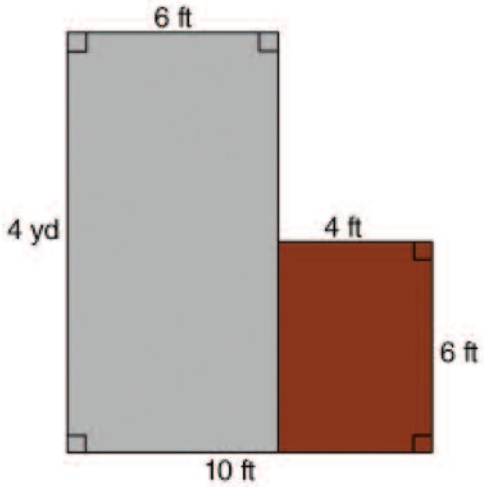
a. 9 miles b. 4.5 miles c. 6.7 miles d. 10.5 miles

5. What is the equation of the line of reflection in the following coordinate plane?



a. $x = 0$ b. $y = 0$ c. $x = 1$ d. $y = 3$

6. **Tyler is putting an L-shaped patio in his backyard. He's decided to use a reddish colored paving stone for one part of the patio that is the smaller area, and a gray paving stone for the other that is the larger area. How many square feet is the gray part of the patio?**



a. 24 ft^2 b. 40 ft^2 c. 72 ft^2 d. 120 ft^2

7. **A pre-image point is rotated 270° clockwise. If the pre-image point had the coordinates (3, -5), what are the coordinates of its image point?**

a. (-5, -3) b. (5, 3) c. (-3, 5) d. (-3, -5)

8. **A rectangle has an area of 48 square feet and a perimeter of 32 feet. Which of the following could be its dimensions?**

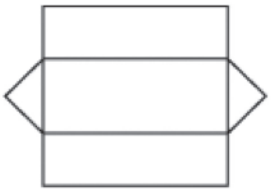
a. 6 ft and 8 ft b. 2 ft and 24 ft c. 3 ft and 16 ft d. 12 ft and 4 ft

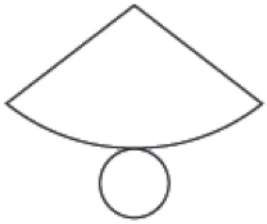
Pre-Algebra Math 808: Measures of Solid Figures

Circle the correct letter for each multiple choice question. **Score: _____**

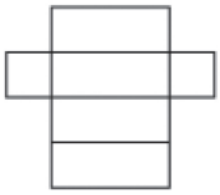
◊ **A list of formulas that may be helpful is located at the end of this quiz.**

1. Which of the following is the net of a triangular prism?

a. 

b. 

c. 

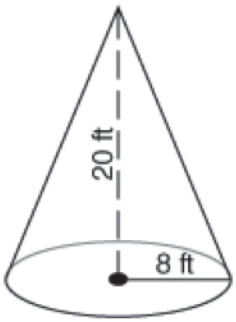
d. 

2. If a figure has 10 vertices and 15 edges, how many faces does it have? _____

3. A cube has side lengths of 15 inches. What is the volume of the cube?

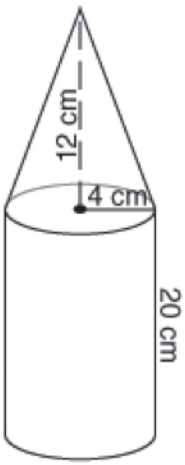
a. 45 in.^{3} b. 3,375 in.^{3} c. 450 in.^{3} d. 2,700 in.^{3}

4. What is the volume of the cone? (use 3.14 for π)



a. 4,019.2 ft^3 b. 1,339.73 ft^3 c. 1,067.6 ft^3 d. 3,202.8 ft^3

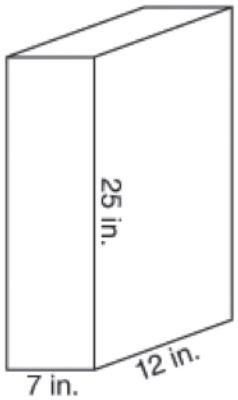
5. The figure shown is a composite figure. What is its volume? (use 3.14 for π) _____ cm^3



6. What is the surface area of a sphere with a radius of 11 centimeters? (use 3.14 for π)

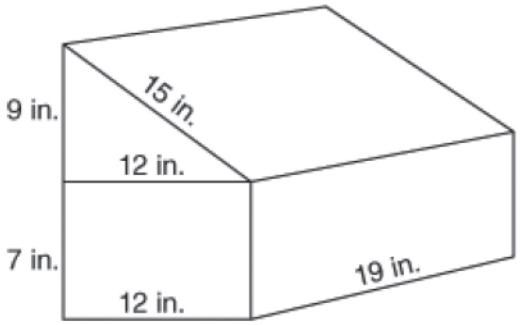
a. 276.32 cm^2 b. 452.16 cm^2 c. 1,808.64 cm^2 d. 1,519.76 cm^2

7. What is the surface area of the figure?



a. 350 in.^{2} b. 1,118 in.^{2} c. 168 in.^{2} d. 600 in.^{2}

8. What is the surface area of the composite figure?



a. 1,172 in.^{2} b. 1,226 in.^{2} c. 1,334 in.^{2} d. 1,394 in.^{2}

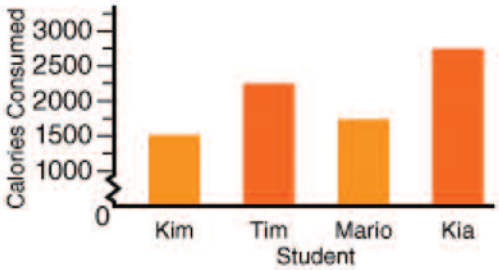
Formulas

Name	Total Surface Area	Volume	Key:
Rectangular Prism	$2lw + 2lh + 2wh$	lwh	l = length, r = radius
Triangular Prism	$2B + Ph$	Bh	w = width
Pyramid	$2l/ + l^2$	$(1/3)Bh$	h = height
Cylinders	$2\pi rh + 2\pi r^2$	πr^2h or Bh	B = area of base
Cone	$\pi r/ + \pi r^2$	$(1/3)\pi r^2h$	P = perimeter of base
Sphere	$4\pi r^2$	$(4/3)\pi r^3$	$/$ = slant height

Pre-Algebra Math 809: Data Analysis

Circle the correct letter for each multiple choice question. **Score: _____**

1. Which student consumed 2,250 calories?



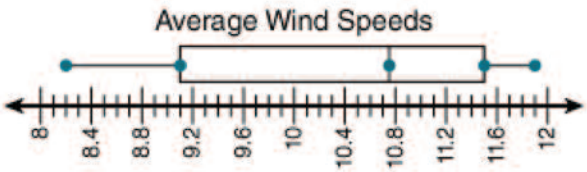
a. Kim b. Tim c. Mario d. Kia

2. It is called a ____ when members of the population volunteer to take part in the sample.

a. random sample b. self-selected sample

c. biased sample d. convenience sample

3. What is the lower extreme of the annual wind speeds in Chicago?



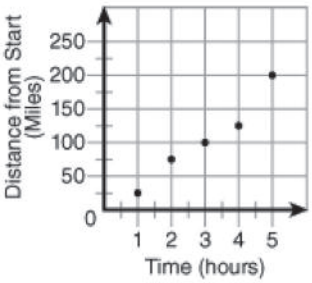
a. 9.1 b. 11.5 c. 8.2 d. 10.75

4. The following table shows the number of medals won in the 2008 Olympics for swimming by the top five countries. How many degrees will the China section be in a circle graph of the data?

Country	Number of Medals
USA	31
Australia	20
Great Britain	6
China	6
France	6

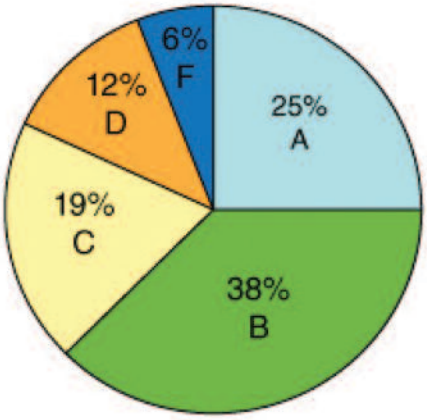
a. 6° b. 9° c. 32° d. 64°

5. According to the scatter plot, how many miles from home will the family be in 2 hours?



a. 50 b. 75 c. 100 d. 125

6. **The circle graph below shows the scores of the latest math test. It represents 32 students. Approximately how many students earned a C or higher on the math test?**



a. 32 b. 26 c. 12 d. 8

7. **What is the difference between the median number of electoral votes per state and the range of the number of electoral votes in the following table?**

State	Number of Electoral Votes
California	55
Florida	27
Illinois	21
Kentucky	8
Missouri	11
Nevada	5
North Carolina	15
Texas	34
Utah	5

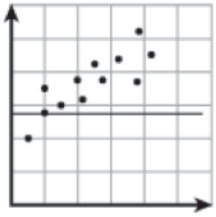
a. 50 b. 39 c. 35 d. 11

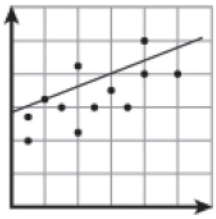
8. **A group of teenagers was asked where they prefer to study and do homework. Their results are shown in the table below. Which type of graph would be best to display this data?**

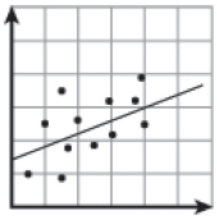
Place	Number of Teenagers
library	3
bedroom	52
kitchen	23
living room	22

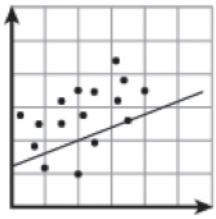
a. circle graph b. box-and-whisker plot c. line graph d. histogram

9. Which graph shows the line of best fit?

a. 

b. 

c. 

d. 

10. Take a look at the frequency table below. Which frequency is the mode?

Number Rolled	Tally	Frequency
1	IIII	4
2	III	3
3	I	1
4	IIII	4
5	II	2
6	IIIIII	6

a. 2 b. 3 c. 4 d. 6

Pre-Algebra Math 810: Probability

Circle the correct letter for each multiple choice question. **Score:** _____

1. **You and two friends (Adam and Alana) will only play a game if it is fair for all three of you. The game your friend has proposed is to roll two dice and find the sum. If the sum is from 2-5 you get the point, 6-8 Adam gets the point, and 9-12 Alana gets the point.**

   Is this game fair for all three of you? _____ **Who has the best advantage?** _____

2. **A bag contains five yellow marbles, nine red marbles, three blue marbles, six white marbles, and seven black marbles. What is the theoretical probability of pulling a black marble from the bag?**

   a. $\frac{7}{30}$ b. $\frac{3}{10}$ c. $\frac{7}{23}$ d. $\frac{6}{25}$

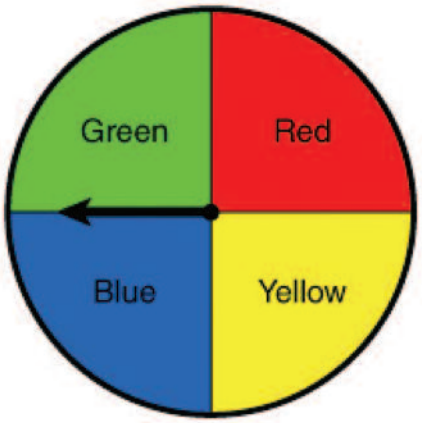
3. **Evaluate** ${}_8P_4$ = _____

4. **Find P(A or B), if the events are disjointed.**

   P(A) = $\frac{9}{25}$ **P(B) =** $\frac{9}{25}$ **.**

   a. $\frac{4}{25}$ b. $\frac{18}{25}$ c. 0 d. $\frac{9}{25}$

5. **What are the odds of spinning green?** _____



6. **You rolled a die 50 times. Your results are shown in the table below. What is the experimental probability of rolling a 1?**

Number	Frequency
1	4
2	9
3	6
4	12
5	9
6	10

a. $\frac{1}{50}$ b. $\frac{1}{25}$ c. $\frac{2}{50}$ d. $\frac{2}{25}$

7. **Evaluate ${}_8C_3$.**

a. 24 b. 168 c. 56 d. 336

8. **What is the probability of flipping a coin and having heads land up five times in a row?**

a. $\frac{1}{32}$ b. $\frac{1}{16}$ c. $\frac{1}{10}$ d. $\frac{1}{2}$

9. **There are 12 sprinters competing for first, second, and third place ribbons. How many different ways can the ribbons be awarded?**

a. 36 b. 1,320 c. 660 d. 120

10. **You are required to choose three topics from a list of five to write about on your science test. How many different pairings are possible?**

a. 10 b. 20 c. 12 d. 15

901

Score:

1. **The variable term in** $2x^3 - 4$ **is ___.** 1. _____

   a. 2 **b.** 3 **c.** 4 **d.** $2x^3$

2. **The product in** $2(a + b) + 5$ **is ___.** 2. _____

   a. 2 **b.** $(a + b)$ **c.** $2(a + b)$ **d.** 5

3. **Simplifying** $18(x - 1) + 9$ **equals ___.** 3. _____

   a. $18x - 9$ **b.** $18x - 18 + 9$ **c.** $18x + 9$ **d.** $18x + 27$

4. **Simplifying** $7.8x - 2.1x$ **equals ___.** 4. _____

   a. $4.6x$ **b.** $5.7x$ **c.** $9.9x$ **d.** $10.9x$

5. **Evaluate** $xy + x$ **for** $x = 3$ **and** $y = 5$**.** 5. _____

   a. 11 **b.** 13 **c.** 18 **d.** 20

6. **Evaluate** $5a^3 - 2b + c$ **for** $a = 2$, $b = 3$, **and** $c = 4$ **.** 6. _____

   a. 9 **b.** 20 **c.** 28 **d.** 38

7. **The meaning of** $3x^2 - 4$ **in words is ___.** 7. _____

   a. four less than three times the square of a number
   b. three times a number minus four
   c. four minus three times a number squared
   d. three times a number squared less four times the number

8. **The meaning of** y^3 **is ___.** 8. _____

   a. three times a number **b.** a number squared
   c. a number less three **d.** a number cubed

9. **The difference of** $8 - (-3)$ **is ___.** 9. _____

   a. 5 **b.** -5 **c.** 11 **d.** -11

10. **The quotient of** $\frac{12x^2}{-4}$ **is ___.** 10. _____

    a. 4 **b.** $-3x^2$ **c.** $8x^2$ **d.** $12x^2$

902

Score:

1. **Evaluate.** $-2\,|-2| + |1| =$ ___. 1. _____

a. -3 **b.** 0 **c.** 1 **d.** 5

2. $\frac{R}{2} + 6 = 14$ ***R*** **=** ___. 2. _____

a. -16 **b.** 8 **c.** 16 **d.** 40

3. **Evaluate** $A = \frac{h}{2}(a + b)$ **when** $h = 7$, $a = 10$, **and** $b = 12$. 3. _____

a. 72 **b.** 77 **c.** 87 **d.** 112

4. Nine less than three times a number is fifty **is written** ___.

a. $3n - 9 = 50$ **b.** $9 - 3n = 50$

c. $9 = 3n - 50$ **d.** $3 + 9n = 50$ 4. _____

5. **The solution to** $\frac{-x}{3} = 4$ **is** ___.

a. $x = -12$ **b.** $x = -4$ **c.** $x = 1\frac{1}{3}$ **d.** $x = 3$ 5. _____

6. **Solve** $x + a = yb$ **for** b.

a. $b = x + a - y$ **b.** $b = y - (x + a)$

c. $b = y(x + a)$ **d.** $b = \frac{x + a}{y}$ 6. _____

7. **The solution to** $8(x + 1) > 7(x + 2)$ **is** ___.

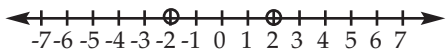
a. $x > -6$ **b.** $x > \frac{22}{15}$ **c.** $x > 6$ **d.** $x > 10$ 7. _____

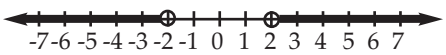
8. **The solution to** $10(y + 4) < 0$ **is** ___.

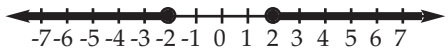
a. $y < -8$ **b.** $y < -4$ **c.** $y < -\frac{2}{5}$ **d.** $y < \frac{1}{4}$

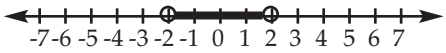
8. _____

9. **The graph of the solution to** $4|y| < 8$ **is** ___.

a.


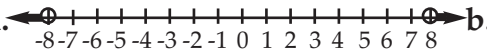
b.


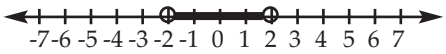
c.


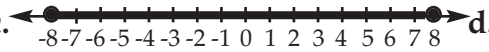
d.


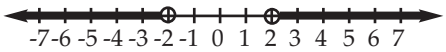
9. _____

10. **The graph of the solution to** $|x| + 3 > 5$ **is** ___.

a.


b.


c.


d.


10. _____

903

Score:

1. 12 diminished by 6 times a number **in mathematical symbols is ___.** 1. _____

a. $12 + 6x$ **b.** $12 - 6x$ **c.** $6x - 12$ **d.** $6x \div 12$

2. A boy is 6 years older than his sister, whose age is x . 2. _____
In mathematical symbols, the boy's age is ___.

a. $6x$ **b.** $6 - x$ **c.** $x + 6$ **d.** $x - 6$

3. Jay has 3 more dimes than nickels. He has 25 coins altogether. 3. _____
The equation is ___.

a. $3 + d + d = 25$ **b.** $n + 3 + n = 25$
c. $n + n - 3 = 25$ **d.** $3d + n = 25$

4. **The equation for** a triangle with sides of q inches, $4q$ inches, and 4. _____
$2q$ inches**,** and a perimeter of 24 inches **is ___.**

a. $q + 4q + 2q = 24$ **b.** $6q = 24$
c. $q + 4q - 3q = 24$ **d.** $24 = q - 4q + 2q$

5. The larger of two numbers is 5 times the smaller number. 5. _____
The sum of the numbers is 54. **The numbers are ___.**

a. 30 and 6 **b.** 30 and 24 **c.** 40 and 8 **d.** 45 and 9

6. Sally has seven times as many dimes as pennies. Their value 6. _____
is $2.84. **The number of pennies and dimes she has is ___.**

a. 2 pennies, 14 dimes **b.** 4 pennies, 28 dimes
c. 3 pennies, 21 dimes **d.** 5 pennies, 35 dimes

7. Jerry's age is three less than twice the age of Larry. The sum of 7. _____
their ages is twenty-seven. **The age of each boy is ___.**

a. Jerry: 13, Larry: 8 **b.** Jerry: 15, Larry: 12
c. Jerry: 17, Larry: 10 **d.** Jerry: 19, Larry: 8

8. Two boys who live 14 miles apart start at noon to walk toward 8. _____
each other at rates of 3 mph and 4 mph respectively.
They will meet in ___.

a. 2 hrs. **b.** 3 hrs. **c.** $3\frac{1}{2}$ hrs. **d.** 4 hrs.

9. A man bought two lots for the same price. He sold one at a profit 9. _____
of $3,000 and the other at a loss of $1,500, receiving twice as much
for the first lot as for the second. **Each lot cost ___.**

a. $5,540 **b.** $6,000 **c.** $7,510 **d.** $8,000

10. Brine is a solution of salt and water. If a tube contains 50 pounds 10. _____
of a 5% solution of brine, **the amount of water that must evaporate to change it to an 8% solution is ___.**

a. $2\frac{1}{2}$ lbs. **b.** 8 lbs. **c.** $12\frac{1}{2}$ lbs. **d.** $18\frac{3}{4}$ lbs.

904

Score:

1. **The sum of** $3c^2d^3 + (-5c^2d^3) + 10c^2d^3$ **is ___.** 1. _____

   a. $6c^2d^3$ **b.** $8c^2d^3$ **c.** $12c^2d^3$ **d.** $18c^2d^3$

2. **The polynomial** $3 - 3x^2 + 4x + 8x^3$ **arranged in descending powers of** x **is ___.** 2. _____

   a. $-3x^2 + 4x + 8x^3 + 3$ **b.** $3 + 4x - 3x^2 + 8x^3$

   c. $8x^3 - 3x^2 + 4x + 3$ **d.** $8x^3 + 4x - 3x^2 + 3$

3. **The difference of** $8x^2 + 4x - 5$ less $2x^2 + 2x + 7$ **is ___.** 3. _____

   a. $6x^2 + 2x - 12$ **b.** $10x^2 + 2x + 2$

   c. $6x^2 + 2x - 14$ **d.** $5x^2 - 6x + 2$

4. **The product of** $-\frac{1}{2}p(4p^3 + 6)$ **is ___.** 4. _____

   a. $2p^3 + 6p$ **b.** $-2p^4 - 3p$ **c.** $-2p^3 - 6p$ **d.** $2p^3 - 3p$

5. **The quotient of** $-3d^3e^4f^5 \div 9d^5e^4f^3$ **is ___.** 5. _____

   a. $\frac{ef^2}{3d^2}$ **b.** $\frac{-3d^2f}{e}$ **c.** $-\frac{f^2}{6d^2e}$ **d.** $-\frac{f^2}{3d^2}$

6. **The difference of** $a - b$ less $b - c$ **is ___.** 6. _____

   a. $a - c$ **b.** $-a + 2b - c$ **c.** $a - 2b + c$ **d.** $a + b - c$

7. **The expression** $-6(-2a - 15)$ **in simplified form is ___.** 7. _____

   a. $-12a - 12$ **b.** $12a - 90$ **c.** $-12a - 30$ **d.** $12a + 90$

8. **The expression** $(5d + 10p) \div (-5)$ **in simplified form is ___.** 8. _____

   a. $5d - 2p$ **b.** $-d - 2p$ **c.** $d + 2p$ **d.** $-d - \frac{1}{2}p$

9. **Simplify** $3x\,[2(x + 5) - 7x]$ **: ___.** 9. _____

   a. $-15x^2 + 30x$ **b.** $-36x^2 + 15x$

   c. $-36x^2 + 30x$ **d.** $27x^2 + 15x$

10. **Simplify** $(8z - 10) \div (-2) + 5(z - 1)$ **: ___.** 10. _____

    a. $z - 10$ **b.** $11z$ **c.** z **d.** $13z - 17$

905

Score:

1. **The greatest common factor of x^5y and x^4y^2 is ___.** 1. _____
   a. x^5y^2 **b.** x^4y **c.** xy **d.** x^2y

2. **The factorization of $14a + 7b$ is ___.** 2. _____
   a. $2(7a + 3b)$ **b.** $7(2a + b)$ **c.** $7a(2 + b)$ **d.** $14(a + b)$

3. **Find the trinomial product of $(4x + 3)(-2x - 5)$: ___.** 3. _____
   a. $8x^2 + 14x - 15$ **b.** $6x^2 - 14x - 15$
   c. $-8x^2 - 26x - 15$ **d.** $12x^2 - 26x + 15$

4. **Find the product of $(4a + 3)(4a - 3)$: ___.** 4. _____
   a. $12a^2 - 9$ **b.** $16a^2 - 9$ **c.** $8a^2 + 9$ **d.** $16a^2 + 2a - 9$

5. **The binomial factors of $2x^2 + 7x + 3$ are ___.** 5. _____
   a. $(2x + 3)(x + 1)$ **b.** $(x + 3)(2x - 1)$
   c. $(x + 3)(2x + 1)$ **d.** $(2x - 1)(x - 3)$

6. **Factor $81n^2 - 100$: ___.** 6. _____
   a. $(9n - 10)^2$ **b.** $(9n - 10)(9n + 10)$
   c. $(81n + 10)(n - 10)$ **d.** $(9n + 10)^2$

7. **The factors of $2 - 98n^2$ are ___.** 7. _____
   a. $-2(7n - 1)(7n + 1)$ **b.** $-2(7n - 1)^2$
   c. $-2(1 - 7n)(1 + 7n)$ **d.** $-2(49n^2 - 1)$

8. **The factors of $16y^3 + 68y^2 + 42y$ are ___.** 8. _____
   a. $2(4y + 7)(2y + 3)$ **b.** $4y(2y + 5)(2y + 2)$
   c. $(4y^2 + 14y)(4y + 3)$ **d.** $2y(2y + 7)(4y + 3)$

9. **The formula for area is $A = lw$.** 9. _____
   If a rectangle has an area of $2x^2 + x - 3$, **its dimensions are ___.**
   a. l: $2x - 1$ w: $x + 3$ **b.** l: $2x + 1$ w: $x - 3$
   c. l: $2x - 3$ w: $x + 1$ **d.** l: $2x + 3$ w: $x - 1$

10. A person purchased $5k + 2$ items for a total cost of $35k^2 + 29k + 6$. 10. _____
    The average cost per item was ___.
    a. $6k + 2$ **b.** $6k + 3$ **c.** $7k + 2$ **d.** $7k + 3$

906

Score:

1. **The excluded value(s) for** $\frac{y^2 - y + 5}{y + 4}$ **is (are) ___.** 1. _____

a. $y = -4$ **b.** $y = 0$ and $y = -1$

c. $y = 4$ **d.** $y = 5$ and $y = 1$

2. **Simplify the complex fraction** $\dfrac{2 + \frac{1}{a}}{\frac{2}{a} - a}$ **___.** 2. _____

a. $\frac{3}{2 - a}$ **b.** $\frac{a + 2}{a - 2}$ **c.** $\frac{2 + a}{2 - a^2}$ **d.** $\frac{2a + 1}{2 - a^2}$

3. **The indicated sum of** $\frac{y}{3} + \frac{5y}{3} - \frac{4y}{3}$ **is ___.**

a. y **b.** $\frac{2y}{3}$ **c.** $\frac{y}{3}$ **d.** $\frac{10y}{3}$ 3. _____

4. **The indicated quotient of** $(-\frac{1}{3xy}) \div (-3xy)$ **is ___.**

a. $\frac{1}{3}$ **b.** 1 **c.** $-\frac{1}{9xy}$ **d.** $\frac{1}{9x^2y^2}$

4. _____

5. **Solve the literal equation** $\frac{5a}{x} = \frac{5b}{x - 1}$ **for** x **: ___.**

a. $x = -\frac{a}{b - a}$ **b.** $x = \frac{b}{a} + 1$ **c.** $x = 5\sqrt{ab}$ **d.** $x = 0$

6. **Solve the inequality** $\frac{x}{2} + \frac{1}{3} \leq 0$ **: ___.** 5. _____

a. $x \leq -\frac{1}{6}$ **b.** $x \geq \frac{1}{3}$ **c.** $x \leq -\frac{2}{3}$ **d.** $x \leq \frac{1}{6}$

7. The formula for Fahrenheit temperature F corresponding to Celsius temperature C is $F = \frac{9}{5}C + 32$. 6. _____

Rewritten with C **as the subject is ___.**

a. $C = \frac{5F - 32}{9}$ **b.** $C = \frac{9(F + 32)}{5}$ **c.** $C = \frac{5}{9}(F - 32)$ **d.** $C = 5(F + 32)$

7. _____

8. The formula for area A of a trapezoid with bases a and b and height h is $A = \frac{1}{2}(a + b)h$. 8. _____

Rewritten with a as the subject is ___.

a. $a = \frac{2Ah}{b}$ **b.** $a = \frac{A}{2h} - b$ **c.** $a = \frac{2A + b}{h}$ **d.** $a = \frac{2A}{h} - b$

9. A person drives to a destination at a rate of thirty-five mph and returns over the same route at forty mph. If the round trip takes three hours, **the distance to the destination is ___.** 9. _____

a. 55 mi. **b.** 56 mi. **c.** 57 mi. **d.** 58 mi.

10. The present ages of a husband and wife are in the ratio of seven to six. Five years ago the ratio was six to five. 10. _____

Their ages now are ___.

a. h: 35 yrs w: 30 yrs **b.** h: 41 yrs w: 35 yrs

c. h: 49 yrs w: 42 yrs **d.** h: 56 yrs w: 49 yrs

907

Score:

1. **Three examples of irrational numbers are ___.** 1. _____

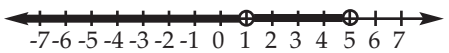
a. $4\frac{1}{5}$, 0.283, -81.7 **b.** $\frac{2}{9}$, $\sqrt{16}$, -6

c. 0.1237285. . ., $\sqrt{26}$, $\frac{\pi}{2}$ **d.** $0.\overline{3}$, $-6.\overline{234}$, $\frac{1}{99}$

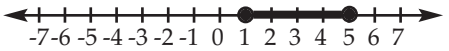
2. **The decimal** 0.292292229 **rounded to the nearest thousandth is ___.** 2. _____

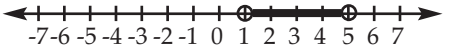
a. 0.3 **b.** 0.29 **c.** 0.292 **d.** 0.2923

3. **The graph of** $1 < |k| < 5$ **for integers is ____.** 3. _____

a.


b.


c.


d.


4. $\sqrt[3]{64a^6} =$ ___. 4. _____

a. $4a^3$ **b.** $4a^2$ **c.** $8a^2$ **d.** undefined

5. **The indicated sum and/or difference of** $2\sqrt{x} - 3\sqrt{x^3} + 5\sqrt{x}$ **is ___.** 5. _____

a. $7\sqrt{x} - 3x\sqrt{x}$ **b.** $4\sqrt{x}$

c. $10\sqrt{x}$ **d.** $3\sqrt{x} - 3x\sqrt{x}$

6. **The difference of** $2\sqrt{18y^3} - 3\sqrt{8y^3}$ **is ___.** 6. _____

a. $-y\sqrt{y}$ **b.** $-2y\sqrt{y}$

c. $4y^2\sqrt{3y} - 6y^2\sqrt{2y}$ **d.** 0

7. **The simplified product of** $(x + 2\sqrt{3})^2$ **is ___.** 7. _____

a. $x^2 + 4\sqrt{3}x + 12$ **b.** $x^2 + 12x + 12$

c. $2x + 4\sqrt{3}$ **d.** $x^2 + 12$

8. **The simplified quotient of** $\frac{\sqrt{96x^3}}{\sqrt{2x}}$ **is ___.** 8. _____

a. $x\sqrt{48x}$ **b.** $4x\sqrt{3}$ **c.** $4\sqrt{5x}$ **d.** $4x\sqrt{3x}$

9. **The exact irrational root** (E) **and the rational approximation** (A) **to the nearest tenth of** $\sqrt{8p} = 6$ **are ___.** 9. _____

a. E: $\frac{\sqrt{2}}{3}$ A: 0.5 **b.** E: $4\sqrt{3}$ A: 6.9

c. E: $12\sqrt{2}$ A: 17.0 **d.** E: $\frac{3\sqrt{2}}{2}$ A: 2.1

10. **Solve** $a - 1 = \sqrt{2b + 3}$ **for** b: ___. 10. _____

a. $b = \frac{a^2 - 2a - 2}{2}$ **b.** $b = \frac{a\sqrt{2} + 2}{2}$

c. $b = \frac{a^2 - 4}{2}$ **d.** $b = \frac{a - \sqrt{2}}{4}$

908

Score:

1. **Three ordered-pair solutions for** $3x - 2y = -1$ **are ___.** 1. _____

a. $(-6, -\frac{17}{2}), (0, \frac{1}{2}), (5, 8)$ **b.** $(1, 2), (3, 5), (8, 12)$

c. $(-3, -4), (2, 4), (6, \frac{19}{2})$ **d.** $(-2, -3), (-1, -1), (9, 15)$

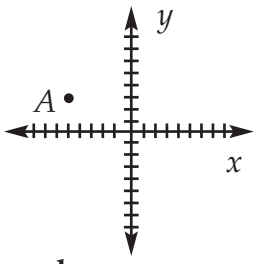
2. **Three ordered pair solutions for** $y = \frac{x}{2}$ **are ___.** 2. _____

a. $(-1, -1), (5, \frac{5}{2}), (3, 6)$ **b.** $(-6, -3), (2, 4), (5, 10)$

c. $(-3, -\frac{3}{2}), (0, \frac{1}{2}), (2, 4)$ **d.** $(-4, -2), (0, 0), (3, \frac{3}{2})$

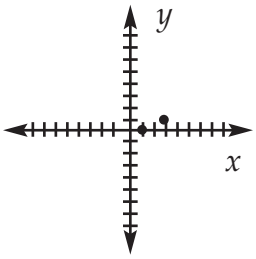
3. **The ordered pair number for** point A **on the graph is ___.** 3. _____

a. (5, 3) **b.** (5, -3)
c. (-5, 3) **d.** (-5, -3)

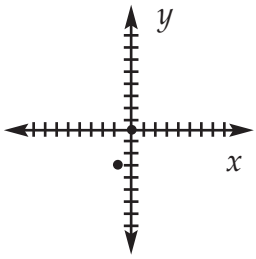


4. **Points** (0, 0) **and** (1, 3) **are located on graph ___.** 4. _____

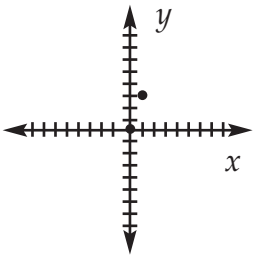
a.



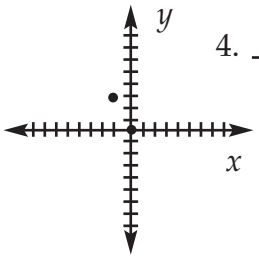
b.



c.



d.



5. **Using** x **and** y**, the translation for** the ordinate is two more than the abscissa **is ___.**

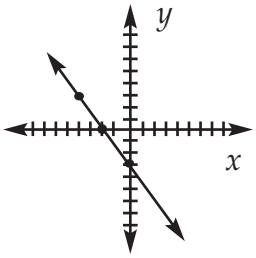
a. $y = x + 2$ **b.** $y = 2x$ **c.** $x = y + 2$ **d.** $y = x - 2$

6. **Using** x **and** y**, the translation for** twice the abscissa increased by three times the ordinate is ten **is ___.** 5. _____

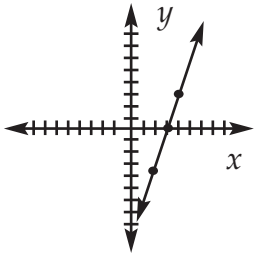
a. $x + 2 + y + 3 = 14$ **b.** $2x + 3y = 10$
c. $2y + 3x = 10$ **d.** $2x - 3y = 12$

7. **The graph of the line** $2x + 3y + 6 = 0$ **is ___.** 6. _____

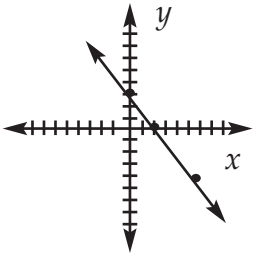
a.



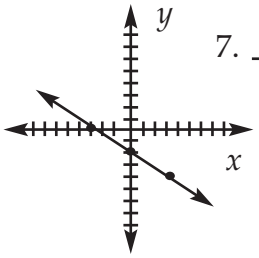
b.



c.



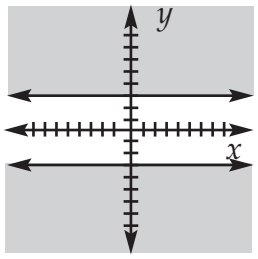
d.



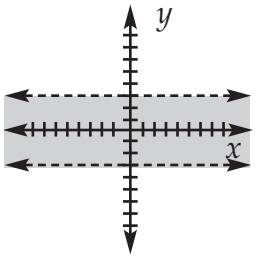
7. _____

8. The graph of the line $|y| - 3 \geq 0$ **is ___.** 8. _____

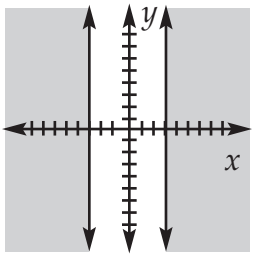
a.



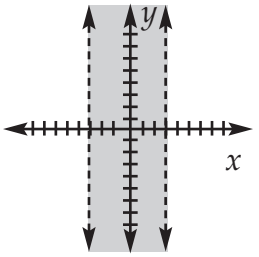
b.



c.



d.



9. A line passes through two points, (-3, -4) and (2, 5). 9. _____
The equation of the line is ___.
a. $7x + 9y + 57 = 0$ **b.** $5x + 5y - 35 = 0$
c. $9x - 5y - 43 = 0$ **d.** $9x - 5y + 7 = 0$

10. The equation of a line that passes through (2, 2) and (2, -3) **is ___.** 10. _____
a. $x - 1 = 0$ **b.** $2x - 3y = 0$ **c.** $x - 2 = 0$ **d.** $x + 3 = 0$

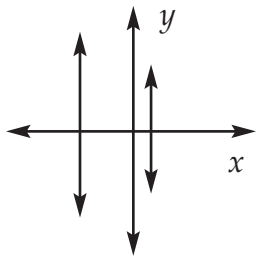
909 **The equations of the following systems are ___.** 1. _____

Score:

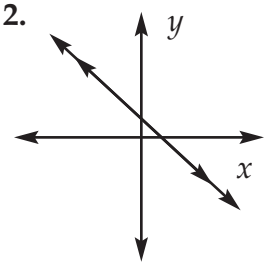
a. not algebraic **b.** consistent **c.** equivalent **d.** inconsistent

2. _____

1.

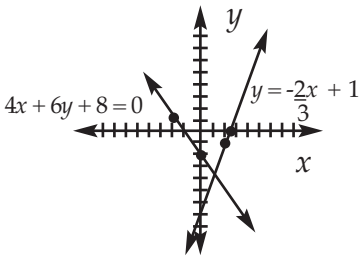


2.

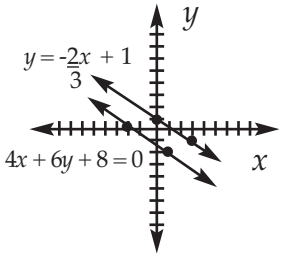


3. **The graph of the solution to the system** $\begin{cases} y = -\frac{2}{3}x + 1 \\ 4x + 6y + 8 = 0 \end{cases}$ **is ___.** 3. _____

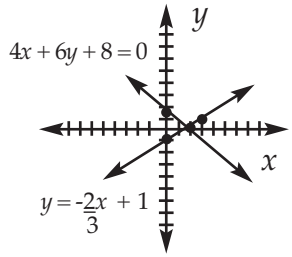
a.



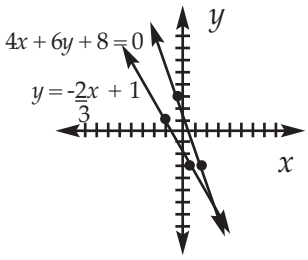
b.



c.

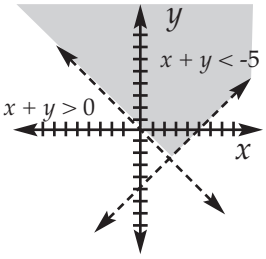


d.

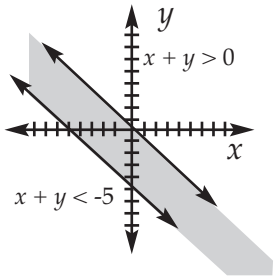


4. **The graph of** $\begin{cases} x + y > 0 \\ x + y < -5 \end{cases}$ **is ___.** 4. _____

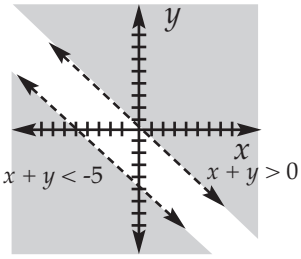
a.



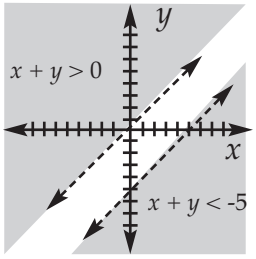
b.



c.



d.



5. Using the opposite-coefficients method, **the solution set for the system** $\begin{cases} 2x + 6y + 3 = 0 \\ x - 4y - 9 = 0 \end{cases}$ **is ___.** 5. _____

a. $\{ (6, -\frac{5}{2}) \}$ **b.** $\{ (-4, -\frac{5}{4}) \}$ **c.** $\{ (3, -\frac{3}{2}) \}$ **d.** inconsistent equations

6. Using the opposite-coefficients method, **the solution for the system** $\begin{cases} x - 9y = 2 \\ 3x - 3y = -10 \end{cases}$ **is ___.** 6. _____

a. $\{ (-7, -1) \}$ **b.** $\{ (-4, -\frac{2}{3}) \}$ **c.** $\{ (11, 1) \}$ **d.** inconsistent equations

7. Using the comparison method, **the solution set for the system** $\begin{cases} 2x + y = 1 \\ 9x + 3y = -3 \end{cases}$ **is ___.** 7. _____

a. { (0, 1) } **b.** { (2, -7) } **c.** { (-2, 5)} **d.** inconsistent equations

8. Using the substitution method, **the solution set for the system** $\begin{cases} 3x + y = 1 \\ y = 5x - 4 \end{cases}$ **is ___.** 8. _____

a. { $(\frac{5}{8}, -\frac{7}{8})$ } **b.** { (1, 1) } **c.** { (2, -5) } **d.** inconsistent equations

9. A school sold 480 tickets to its play. The adult tickets cost $2.00, and the children's tickets cost $1.50 each. If $820 was collected, **the number of each type of ticket that was sold was ___.** 9. _____

a. A: 200 C: 280 **b.** A: 180 C: 300
c. A: 160 C: 320 **d.** A: 150 C: 330

10. The sum of $12,000 was invested, part at 12% interest and part at 8% interest. Twice as much money was invested at 8% as at 12%. **The amount of money invested at each rate was ___.** 10. _____

a. 8%: $9,000 12%: $3,000 **b.** 8%: $8,000 12%: $4,000
c. 8%: $4,000 12%: $8,000 **d.** 8%: $6,000 12%: $6,000

910

Score:

1. **Solve the equation by completing the square:** $x^2 + 5x - 5 = 0$ 1. _____

a. $\frac{-5 \pm 3\sqrt{5}}{2}$ **b.** $\frac{5\sqrt{-3}}{5}$ **c.** $\frac{-5 - 3\sqrt{-3}}{3}$ **d.** $\frac{-1 + 5\sqrt{-5}}{2}$

2. **Solve the equation using the quadratic formula:** $2x^2 + x = 15$ 2. _____

a. $\{\frac{3}{5}, -15\}$ **b.** $\{\frac{5}{2}, -3\}$ **c.** $\{\frac{15}{2}, 1\}$ **d.** $\{\frac{5}{3}, -2\}$

3. **Solve the equation by factoring:** $6x^2 - 24 = 0$

a. { (-4, -6) } **b.** { (-2, 2) } **c.** { (-4, 4) } **d.** { (2) } 3. _____

4. **Solve:** $4(3y - 2) + 5(y + 8) = 0$ 4. _____

a. $y = 2\frac{14}{17}$ **b.** $y = 1\frac{2}{3}$ **c.** $y = \frac{2}{3}$ **d.** $y = -1\frac{15}{17}$

5. **Find the quotient:** $(36x^3 - 24x^2 - 18x) \div 6x$

a. $6x^2 - 4x - 3$ **b.** $6x^3 - 4x^2 - 3x$

c. $6x^3 + 4x^2 + 3x$ **d.** $36x^3 - 24x^2 - 3$ 5. _____

6. **Solve.** $\frac{d - 3}{6d} + \frac{d^2 + 4d + 2}{18d^2} =$ ____.

a. $\frac{d^2 + 4d + 2}{3d}$ **b.** $\frac{d^2 + 4d - 1}{18d^2}$ 6. _____

c. $\frac{d^2 + 7d - 7}{18d^2}$ **d.** $\frac{4d^2 - 5d + 2}{18d^2}$

7. **Simplify:** $\frac{4 - \sqrt{3}}{\sqrt{15}}$

a. $4\sqrt{-3}(15)$ **b.** $60\sqrt{-45}$

c. $\frac{4\sqrt{15} - 3\sqrt{5}}{15}$ **d.** $\frac{4\sqrt{15} + 3\sqrt{15}}{15}$ 7. _____

8. **Solve this system by the most convenient algebraic method.**

$x = -2y + 6$

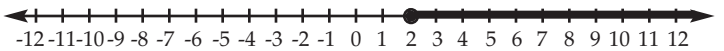
$3x = 4y + 8$

a. { (4, 1) } **b.** { (-1, 4) } **c.** { (6, -3) } **d.** { (4, 8) }

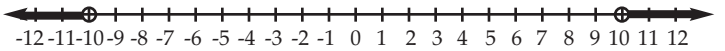
8. _____

9. Which graph is the solution of $|x| - 8 > 2$**?** 9. _____

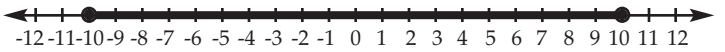
a.



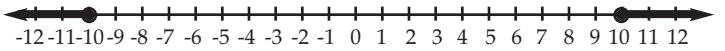
b.



c.



d.



10. The area of a triangle is one-half times the base times the height.
If the area is 54 sq. in. and the height is 12 in, what is the base? 10. _____

a. 21 in. **b.** 6 in. **c.** 9 in. **d.** 15 in.

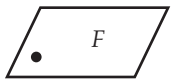
1001

Score:

1. **The name for** 

is ___. 1. _____

a. point A **b.** $\overleftrightarrow{A}$ **c.** plane AB **d.** $\overleftrightarrow{AB}$

2. **The name for** 

is ____. 2. _____

a. point F **b.** $\overleftrightarrow{F}$ **c.** plane P **d.** plane F

3. **The name for** $K\bullet$ **is ___.** 3. _____

a. point K **b.** line K **c.** dot K **d.** plane K

4. **The set of all possible points is ___.** 4. _____

a. space **b.** collinear points
c. coplanar points **d.** betweenness of points

5. Point B is between A and C if A, B, and C are collinear and the equation $AB + BC = AC$ is true. 5. _____
This sentence is the definition of ___.

a. space **b.** collinear points
c. coplanar points **d.** betweenness of points

6. **A statement accepted without proof is a ___.** 6. _____

a. bisector **b.** theorem **c.** postulate **d.** ray

7. **A general statement that can be proved is a(n) ___.** 7. _____

a. axiom **b.** theorem **c.** postulate **d.** ray

8. **The following statement is an example of a theorem:___.** 8. _____

a. Through any two different points, exactly one line exists.
b. Exactly one plane contains a given line and a given point not on the line.
c. If two planes intersect, then their intersection is a line.
d. One and only one of the following is true. $a = b$, $a > b$, $a < b$

9. The line through A and B is $\overleftrightarrow{AB}$. 9. _____
The length of segment $\overline{AB}$ is AB.
The ray starting at A and passing through B is $\overrightarrow{AB}$.
These descriptions are of ___.

a. undefined terms **b.** defined terms
c. postulates **d.** theorems

10. For any two points, only one line can be drawn containing them.
A line is straight. Two planes cannot intersect in a point, but in a line.
These descriptions are of ___.

a. undefined terms **b.** defined terms 10. _____
c. postulates **d.** theorems

1002
Score:

1. Some roses are red or some violets are blue **is an example of** ___. 1. _____
a. conjunction **b.** disjunction **c.** conditional **d.** intersection

2. If a point lies on a line, then the line contains the point. 2. _____
The converse of this statement is "If a line contains a point, then the point lies on the line."
Using the truth table, this statement is ___.
a. true
b. false
c. sometimes true or false
d. neither true nor false

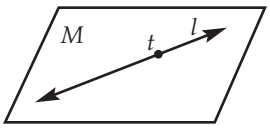
Converse		
p	q	$q \rightarrow p$
T	T	T
T	F	T
F	T	F
F	F	T

3. **Choose from** (**a.** deductive reasoning **b.** inductive reasoning). 3. _____/_____
1)_____ reasoning is making a general conclusion based on specific examples, and 2)_____is making a conclusion by fitting a specific example into a general statement.

4. **Given:** 4. _____

Conclusion: l_1 and l_2 intersect only at point P.
The general principle that justifies the conclusion is ___.
a. definition of midpoint **b.** definition of bisector
c. theorem: if two lines intersect, their intersection is one point
d. postulate: if a plane contains a line, it contains the point on the line

5. **Given:** l is in plane M
t is on line l
Conclusion: t is in plane M. 5. _____



The general principle that justifies the conclusion is ___.
a. postulate: a line contains at least two points
b. postulate: if a plane contains a line, it contains the point of the line
c. theorem: if two lines intersect, then one plane contains both lines
d. definition of line segment

6. **In a two column proof, the** statement of the theorem **is** ___. 6. _____
a. not essential to the proof **b.** preceded by *then*
c. includes a lettered figure **d.** written in *if-then* form

7. **The** given conditions **of a proof are** ___. 7. _____
a. the part you want to prove **b.** always postulates
c. the hypothesis of the statement; the part that follows the *if* **d.** not expressed in terms of letters or numerals used in the figure

8. **The** to prove **part of a proof is the** ___.
a. part that follows *if* **b.** second part of a 2-column proof
c. follows the word *then;* the part you want to prove **d.** actual proof 8. _____

9. **Given:** $a = b$ 9. _____

$a \neq c$

Prove: $b \neq c$

The indirect proof is ___.

a. Suppose $b = c$. Then $a = c$ by the transitive property. But we know that $a \neq c$. This statement is a contradiction. Therefore, our supposed relationship is false, and its negation is true.

b. Suppose $a = c$. Then $b = c$. But we know that $a = b$ and not $a \neq c$. Therefore, $b \neq c$.

c. Suppose $a > 25$, such as $a = 26$. Then $2(26) < 51$ or $52 < 51$. This is a contradiction, so $a > 25$ is false and $a < 25$ is true.

d. Suppose $a = 2$. Then $(2)^2 + 2 = 8$, which means $6 = 8$. This is a contradiction because $8 = 8$. Therefore, $a = 2$ is false and $a \neq 2$ is true.

10. _____

10. A triangle cannot have two right angles. Suppose a triangle has two right angles. Then the sum of the angles would be more than 180°, but this fact contradicts the fact that the sum is 180°. Therefore, that a triangle cannot have two right angles is true.

The theorem for this indirect proof is ___.

a. Given: an isosceles triangle
To Prove: an isosceles triangle cannot have two right angles

b. Given: the sum of the angles of a triangle equals 180°, and a right angle equals 90°
To Prove: a right triangle cannot have two right angles

c. Given: a triangle
To Prove: a triangle has 180°

d. Given: the sum of the angles of a triangle equals 180°
To Prove: a right angle equals 90°

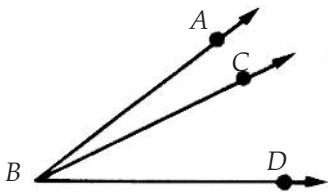
1003

Score:

1. **The angle**  **is a(n) ___ angle.** 1. _____

   a. 80° **b.** obtuse **c.** right **d.** acute

2. **In the diagram,** m $\angle ABC = 15° 10' 12''$ **and** m $\angle CBD = 31° 52' 48''$. **The measure of** $\angle ABD$ **= ___.** 2. _____



   a. 16° 42′ 36″ **b.** 47° 2′ 50″ **c.** 47° 3′ **d.** 47° 13′

3. $\angle A$ **and** $\angle B$ **are supplementary. If** $\angle A = 55° 28'$, **then** $\angle B$ **= ___.** 3. _____

   a. 35° 28′ **b.** 44° 32′ **c.** 124° 32′ **d.** 125° 28′

4. $\angle V$ **and** $\angle W$ **are vertical angles. If** $\angle V = 72°$, **then** $\angle W$ **= ___.** 4. _____

   a. 18° **b.** 28° **c.** 72° **d.** 108°

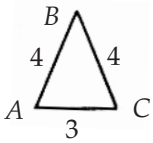
5. **Planes that have no point in common are called ___ planes.** 5. _____

   a. equivalent **b.** perpendicular **c.** similar **d.** parallel

6. **A line that intersects two or more coplanar lines in different points is called a ___.** 6. _____

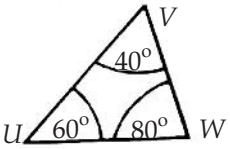
   a. transversal **b.** perpendicular **c.** parallel **d.** skew line

7. **Triangle** ABC **is a(n) ___ triangle.** 7. _____



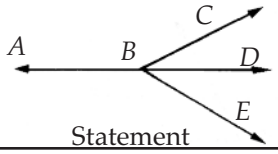
   a. scalene **b.** equilateral **c.** right **d.** isosceles

8. $\triangle$UVW **is a(n) ___ triangle.** 8. _____



   a. equilateral **b.** acute **c.** obtuse **d.** right

9. **Given:** m $\angle CBD$ = m $\angle DBE$ 9. _____
   Prove: m $\angle ABC$ + m $\angle DBE = 180°$
   The proof is ___.



a.

Statement	Reason
1. $\overrightarrow{BC}$ and $\overrightarrow{BE}$ intersect at B	1. Given
2. $\angle ABC$, $\angle CBD$ are supplementary	2. Exterior sides in opposite rays
3. m $\angle CBD$ = m $\angle DBE$	3. Two $\angle$'s supplementary to same $\angle$ =.
4. $\angle CBD$, $\angle ABE$ are supplementary	4. Same as Step 2
5. m $\angle ABC$ = m $\angle ABE$	5. Same as Step 3

b.

Statement	Reason
1. $\overleftrightarrow{DB} \perp \overleftrightarrow{CE}$	1. Given
2. $\angle CBD$, $\angle DBE$ rt $\angle$'s	2. $\perp$'s form rt. $\angle$'s
3. m $\angle CBD$ = m $\angle$DBE	3. all rt. $\angle$'s
4. $\angle ABC$, $\angle CBD$ supplementary	4. Exterior sides in opposite rays
5. m $\angle ABC$ + m $\angle CBD$ = 180°	5. Definition of supplementary $\angle$'s
6. m $\angle ABC$ + m $\angle DBE = 180$	6. Substitution

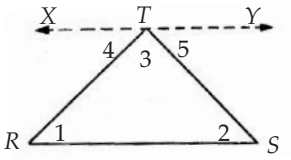
	Statement	Reason
c. 1.	m∠ CBD = ∠ DBE	1. Given
2.	∠ ABE, ∠ DBE are supplementary	2. Exterior sides in opposite rays
3.	m∠ ABE + m ∠ DBE = 180°	3. Definition of supplementary ∠ 's
4.	m ∠ ABE + m ∠ CBD = 180°	4. Substitution

	Statement	Reason
d. 1.	m∠ CBD = m∠ DBE	1. Given
2	∠ ABC, ∠ CBD are supple-mentary	2. Exterior sides in opposite rays
3.	m ∠ ABC + m ∠ CBD = 180°	3. Definition of supple-mentary ∠ 's
4.	m ∠ ABC + m∠ DBE = 180°	4. Substitution

10. Given: △RST

Prove: m ∠ 1 + m ∠ 2 + m ∠ 3 = 180°

The proof is ___.



10. _____

	Statement	Reason
a. 1.	Through T draw $\overleftrightarrow{XY}$ || $\overline{RS}$	1. Auxiliary line
2.	m ∠ XTS + m ∠ 5 = 180°	2. Exterior sides in opposite rays
3.	m ∠ XTS = m ∠ 4 + m ∠ 3	3. Angle addition theorem
4.	m ∠ 4 + m ∠ 3 + m ∠ 5 = 180°	4. Substitution
5.	m ∠ 1 = m ∠ 4 m ∠ 2 = m ∠ 5	5. If lines , || then alternate interior ∠'s =.
6.	m ∠ 1 + m ∠ 2 + m ∠ 3 = 180°	6. Substitution

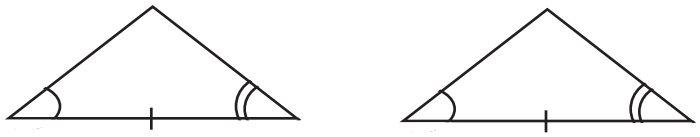
	Statement	Reason
b. 1.	Through T draw $\overleftrightarrow{XY}$ || RS	1. Auxiliary line
2.	rt. isosceles △ RST	2. Given
3.	$RT = ST$	3. Definition of isosceles △
4.	∠ 3 is rt ∠ = 90°	4. Definition of rt ∠
5.	m ∠ 1 = m ∠ 2	5. Base ∠ 's of isosceles △ =
6.	∠ 1, ∠ 2 are comple-mentary	6. Acute ∠ 's of rt. △ are comple-mentary
7.	m ∠ 1 + m ∠ 2 + m ∠ 3 = 180°	7. Angle addition theorem

	Statement	Reason
c. 1.	△ RST with exterior ∠ 's 4 and 5	1. Given
2.	m ∠ 1 + m ∠ 2 + m ∠ 3 = 180°	2. Sum of measures of ∠ 's of △ = 180°
3.	m ∠ 3 + m ∠ 4 + m ∠ 5 = 180°	3. Exterior sides in opposite rays

	Statement	Reason
d. 1.	Through T draw $\overleftrightarrow{XY}$ || RS	1. Auxiliary line
2.	m ∠ 1 = m ∠ 4, m ∠ 2 = m ∠ 5	2. If two || lines are cut by a transversal, then correspond-ing ∠'s are = .
3.	m ∠ XTS + m ∠ 5 = 180°	3. Exterior sides in opposite rays
4.	m ∠ XTS + m ∠ 2 = 180°	4. Substitution
5.	∠ XTS = ∠ 4 + ∠ 3	5. Angle addition theorem
6.	∠ 2 + ∠ 3 + ∠4 = 180°	6. Substitution

1004 Score:

1. **The method used to prove the two triangles are congruent is ___.** 1. _____

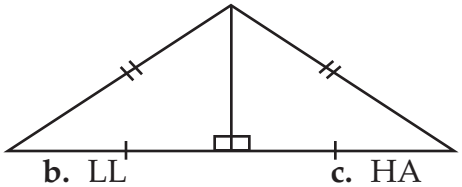


a. SSS **b.** SAS **c.** ASA **d.** AAS

2. **The method used to prove the two triangles are congruent is ___.** 2. _____

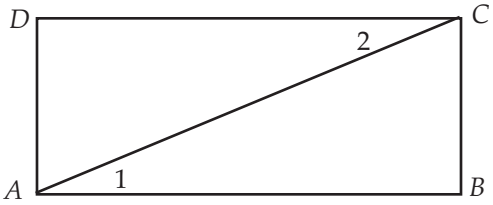
a. SSS **b.** SAS **c.** ASA **d.** AAS

3. **The congruence statement to use that would show the right triangles congruent is ___.** 3. _____



a. HH **b.** LL **c.** HA **d.** LA

4. **Given:** $\angle D$, $\angle B$ are rt $\angle$'s 4. _____
$DC \parallel AB$
Prove: $\triangle ADC \cong \triangle CBA$
The proof is ___.



a.

Statement	Reason
1. $CD \perp DA$, $CD \perp BC$, $DC = AB$	1. Given
2. $\angle D$, $\angle B$ are rt $\angle$'s	2. $\perp$'s form rt $\angle$'s
3. $AC = AC$	3. Reflexive
4. $\triangle ADC \cong \triangle CBA$	4. LL

b.

Statement	Reason
1. $\angle D$, $\angle B$ are rt $\angle$'s, $DA = BC$	1. Given
2. $CA = CA$	2. Reflexive
3. $\triangle ADC \cong \triangle CBA$	3. HL

c.

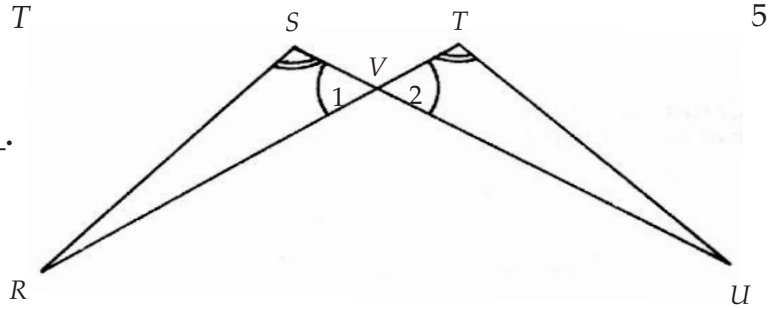
Statement	Reason
1. $\angle D$, $\angle B$ are rt.$\angle$'s, $DC \parallel AB$	1. Given
2. $\angle 1 = \angle 2$	2. If lines $\parallel$, then alt. interior $\angle$'s =.
3. $AC = AC$	3. Reflexive
4. $\triangle ADC \cong \triangle CBA$	4. HA

d.

Statement	Reason
1. $\angle D$, $\angle B$ are rt. $\angle$'s, $DC \parallel AB$	1. Given
2. $\angle D = \angle B$, $\angle A = \angle C$	2. Rt. $\angle$'s =
3. $AC = AC$	3. Reflexive
4. $\triangle ADC \cong \triangle CBA$	4. ASA

5. **Given:** $\angle S = \angle T$
$RV = UV$
Prove: $SR = TU$
The proof is ___.

5. _____



a.

Statement	Reason
1 $\angle S, \angle T$ are rt. $\angle$'s $SV = TV$	1. Given
2. $\angle 1 = \angle 2$	2. Vertical $\angle$'s are =.
3. $\triangle RSU \cong \triangle UTV$	3. LA
4. $SR = TU$	4. CPCTE

b.

Statement	Reason
1. $\angle S = \angle T$ $RV = UV$	1. Given
2. $\angle 1 = \angle 2$	2. Vertical $\angle$'s are =.
3. $\triangle RSV \cong \triangle UTV$	3. AAS
4. $SR = TU$	4. CPCTE

c.

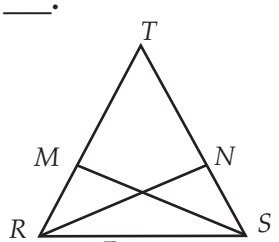
Statement	Reason
1. $\angle S = \angle T$ V is midpoint of RT	1. Given
2. $\angle 1 = \angle 2$	2. Vertical $\angle$'s are =.
3. $RV = TV$	3. Definition of midpoint
4. $\triangle RSV \cong \triangle UTV$	4. SSA
5. $SR = TU$	5. CPCTE

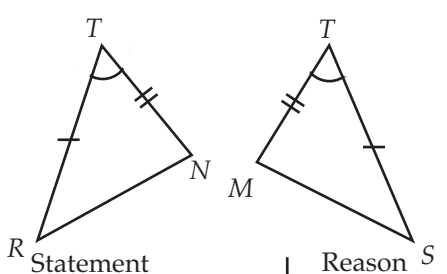
d.

Statement	Reason
1. $\angle S = \angle T$ $RV = UV$ $US \perp SR$ $RT \perp TU$	1. Given
2. $\angle S$ is rt. $\angle$ $\angle T$ is rt. $\angle$	2. $\perp$ lines form rt $\angle$'s.
3. $\angle S = \angle T$	3. All rt $\angle$'s =.
4. $\angle 1 = \angle 2$	4. Vertical $\angle$'s are =.
5. $\triangle RSV \cong \triangle UTV$	5. HA
6. $SR = TU$	6. CPCTE

6. **Given:** $RT = ST \quad MT = NT$
Prove: $\angle RNT = \angle SMT$
The proof is ___.

6. _____





a.

Statement	Reason
1. $RT = ST$ $SM \perp TR$ $RN \perp TS$	1. Given
2. $\angle TMS$ is rt. $\angle$. $\angle TNR$ is rt. $\angle$.	2. $\perp$ lines form rt. $\angle$'s
3. $\angle T = \angle T$	3. Reflexive
4. $\triangle RTN \cong \triangle STM$	4. HA
5. $\angle RNT = \angle SMT$	5. CPCTE

b.

Statement	Reason
1. $RT = ST$ $\angle TRN = \angle TSM$	1. Given
2. $\angle T = \angle T$	2. Reflexive
3. $\triangle RTN \cong \triangle STM$	3. AAS
4. $\angle RNT = \angle SMT$	4. CPCTE

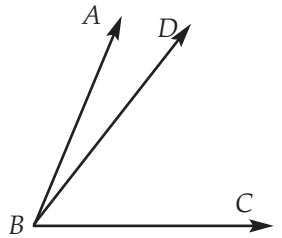
c.

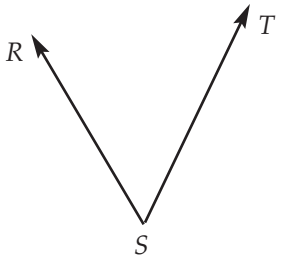
Statement	Reason
1. $MT = NT$ $RN = SM$	1. Given
2. $\angle T = \angle T$	2. Reflexive
3. $\triangle RTN \cong \triangle STM$	3. SSA
4. $\angle RNT = \angle SMT$	4. CPCTE

d.

Statement	Reason
1. $RT = ST$ $MT = NT$	1. Given
2. $\angle T = \angle T$	2. Reflexive
3. $\triangle RTN \cong \triangle STM$	3. SAS
4. $\angle RNT = \angle SMT$	4. CPCTE

7. **Given:** $\angle DBC = \angle RST$ 7. _____
Prove: $\angle ABC > \angle RST$
The proof is___.





a.

Statement	Reason
1 $\angle DBC = \angle RST$	1. Given
2. $\angle ABC = \angle DBC + \angle ABD$	2. $\angle$ addition theorem
3. $\angle ABC > \angle DBC$	3. If $a = b + c$ and $c > 0$, then $a > b$.
4. $\angle ABC > \angle RST$	4. Substitution

b.

Statement	Reason
1. $\angle DBC = \angle RST$	1. Given
2. $\angle ABC = \angle DBC + \angle ABD$	2. $\angle$ addition theorem
3. $\angle ABD < \angle RST$	3. Substitution

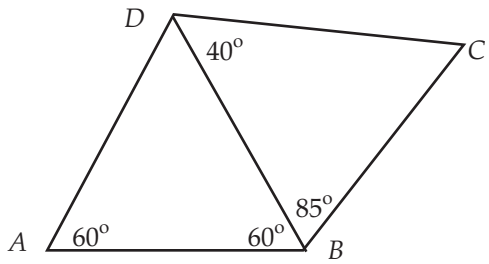
c.

Statement	Reason
1. $\angle DBC = \angle RST$	1. Given
2. $\angle ABC = \angle ABD + \angle DBC$	2. $\angle$ addition theorem
3. $\angle ABC > \angle ABD$	3. If $a = b + c$ and $c > 0$, then $a > b$.

d.

Statement	Reason
1. $\angle DBC = \angle RST$	1. Given
2. $\angle ABC = \angle ABD + \angle DBC$	2. $\angle$ addition theorem
3. $\angle ABC = \angle ABD + \angle RST$	3. Substitution
4. $\angle ABD < \angle RST$	4. If $a = b + c$ and $c > 0$, then $a > b$.

8. **The longest segment shown in the figure is ___.** 8. _____



a. $\overline{AB}$ **b.** $\overline{BD}$ **c.** $\overline{DC}$ **d.** $\overline{BC}$

9. **A true statement about a parallelogram is ___.** 9. _____
a. A parallelogram is not a quadrilateral.
b. The diagonals of a parallelogram bisect each other.
c. No two angles of a parallelogram are equal.
d. A parallelogram is a type of trapezoid.

10. _____

10. **A true statement about a trapezoid is ___.**
a. A trapezoid can be a rectangle.
b. A trapezoid has eight midpoints.
c. A trapezoid always has perpendicular diagonals.
d. A trapezoid has two bases that are parallel, two legs that are not parallel, and a median.

1005

Score:

1. **The ratio** 15:25:35 **in simplest form is ___.** 1. _____

   a. 3:4:6 **b.** 3:5:7 **c.** 3:6:9 **d.** 5:8:12

2. **The property of proportion that is illustrated by**

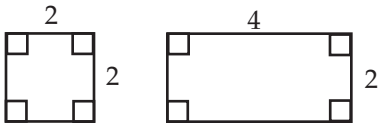
   if $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$ **is the ___ property**.

   a. Cross Product **b.** Equivalent Forms

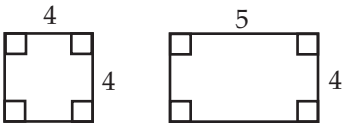
   c. Denominator Sum **d.** Numerator-Denominator Sum 2. _____

3. **The square and rectangle that are similar are ___.** 3. _____

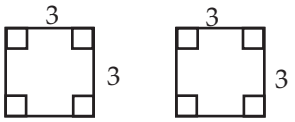
   a.



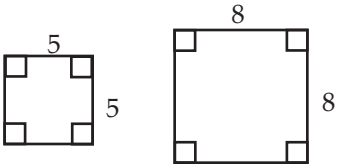
   b.



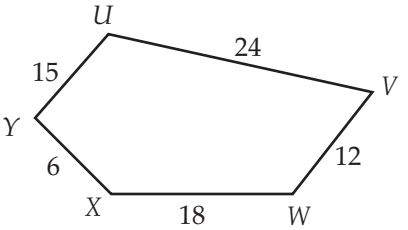
   c.



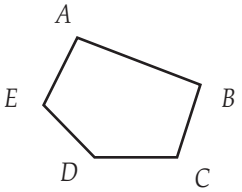
   d.



4. **The polygon similar to polygon** *UVWXY* **is ___.** 4. _____

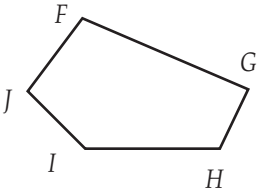


   a.



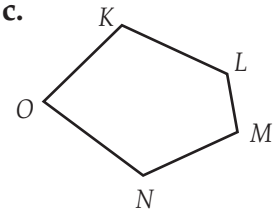
   $P = 25$
   longest
   side = 6

   b.



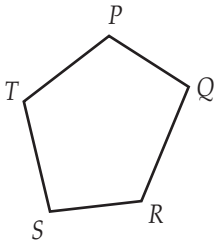
   $P = 25$
   longest
   side = 8

   c.



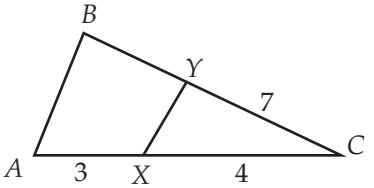
   $P = 50$
   longest
   side = 10

   d.



   $P = 50$
   longest
   side = 5

5. **Based on the figure, the measurement of** *BY* **is ___.** 5. _____



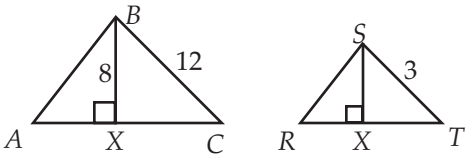
   a. $1\frac{5}{7}$ **b.** $5\frac{1}{4}$

   c. 6 **d.** $9\frac{1}{3}$

6. **Based on the given similar triangles, the measure of** *SX* **is ___.** 6. _____

   a. $\frac{1}{4}$ **b.** 1

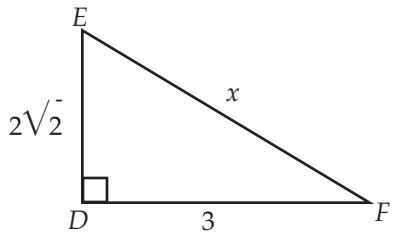
   c. $1\frac{1}{2}$ **d.** 2



7. $\triangle DEF$ is a right triangle.
The length of hypotenuse x is ___.

a. 4 **b.** $5\sqrt{2}$

c. $11\sqrt{2}$ **d.** $\sqrt{17}$

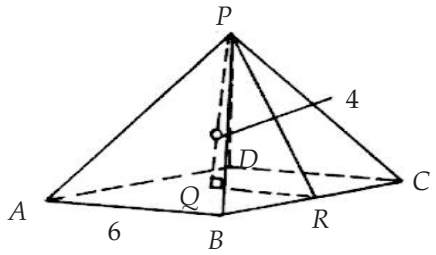


7. _____

8. **Given the square pyramid, the measure of PR is ___.**

a. $2\sqrt{13}$ **b.** 3

c. 5 **d.** 7



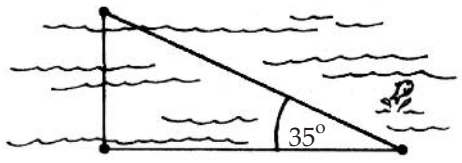
8. _____

9. A boy walks 8 miles due north and 6 miles due east.
His distance from the starting point is ___.
a. 10 mi. **b.** 12 mi. **c.** 14 mi. **d.** 16 mi.

9. _____

10. Given that tan 35° = 0.7002, **the width of the river is ___.**

10. _____



60 ft.

a. 85.7 ft. **b.** 68.4 ft. **c.** 50.8 ft. **d.** 42.0 ft.

1006

Score:

1. **The characteristics of a sphere are that it ___.** 1. _____

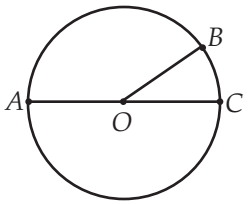
a. has four equal sides **b.** has two end points
c. is in a plane and has a radius and a diameter **d.** is not in a plane and has a radius and a diameter

2. **A line in the plane of a circle that intersects the circle in one point is a ___.** 2. _____

a. chord **b.** tangent line **c.** secant **d.** arc

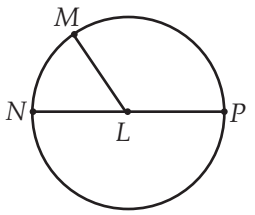
3. The measure of $\overset{\frown}{BC}$ is 30°. 3. _____
The measure of $\angle BOC$ **is ___.**

a. 30° **b.** 45°
c. 60° **d.** 150°



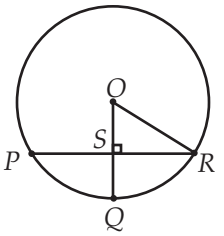
4. The measure of $\angle$ L is 130°. 4. _____
The measure of $\overset{\frown}{MN}$ **is ___.**

a. 30° **b.** 50°
c. 90° **d.** 130°



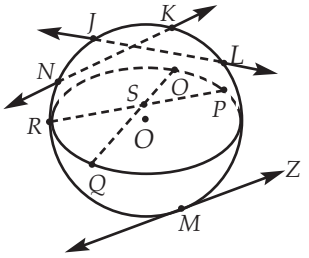
5. If $PS = 4$, **the measure of** chord PR **is ___.** 5. _____

a. 2 **b.** 4
c. 8 **d.** 16



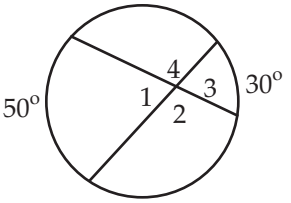
6. **The secant(s) shown is (are) ___.** 6. _____

a. *OQ, RP* **b.** *Z*
c. *RS, SP, OS, SQ* **d.** *JL, NK*



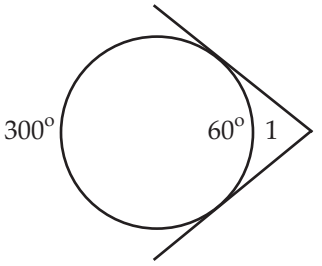
7. **The measure of** $\angle 2 =$ **___.** 7. _____

a. 40° **b.** 80°
c. 100° **d.** 140°



8. **The measure of** $\angle 1 =$ **___.** 8. _____

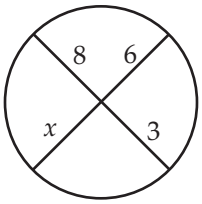
a. 30° **b.** 60°
c. 120° **d.** 180°



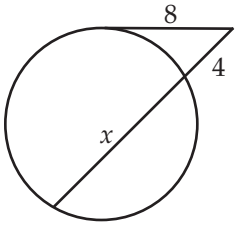
9. The length of x is ___.

a. 1 **b.** $2\frac{1}{4}$

c. 3 **d.** 4



9. _____



10. The length of x is ___.

a. 4 **b.** 8

c. 10 **d.** 12

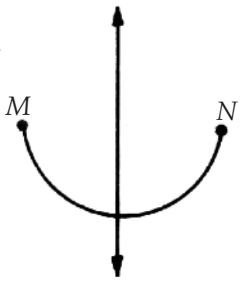
10. _____

1007

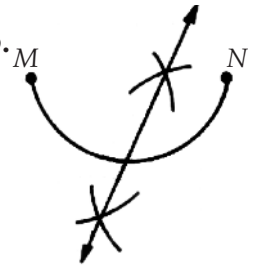
Score:

1. **The correctly constructed bisector of the given arc is ___.** 1. _____

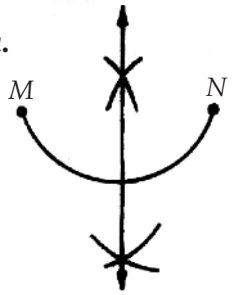
a.



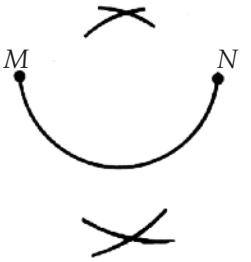
b.



c.

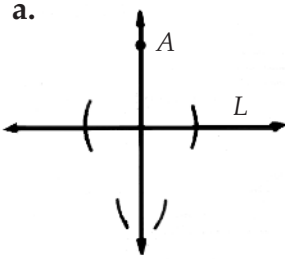


d.

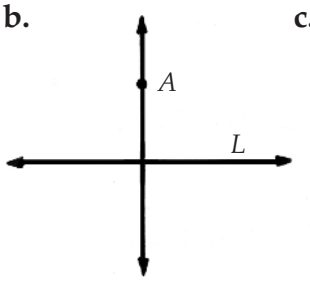


2. **The correctly constructed perpendicular to L through A is ___.** 2. _____

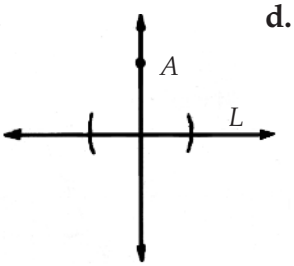
a.



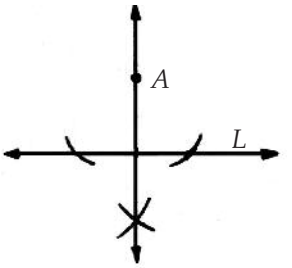
b.



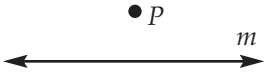
c.



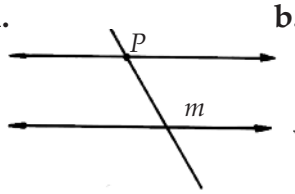
d.



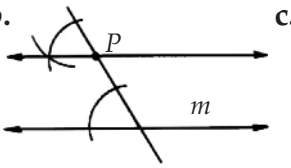
3. **Given point P off line m, the correctly constructed parallel to m through P is ___.** 3. _____



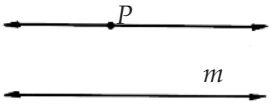
a.



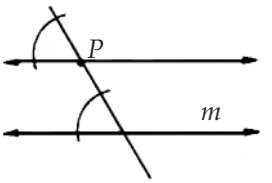
b.



c.

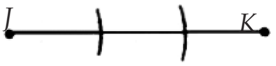


d.

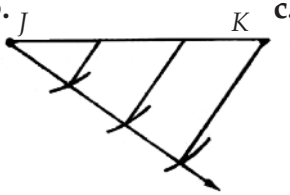


4. **The correct construction of JK divided into three parts is ___.** 4. _____

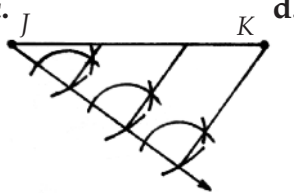
a.



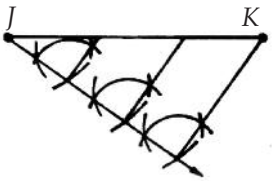
b.



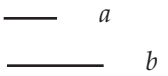
c.



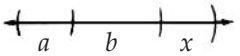
d.



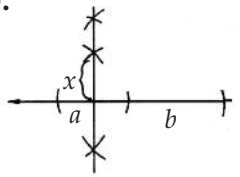
5. **Given a and b, the correct construction of x such that $\frac{a}{x} = \frac{x}{b}$ is ___.** 5. _____



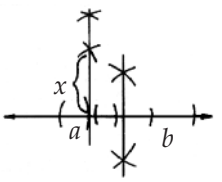
a.



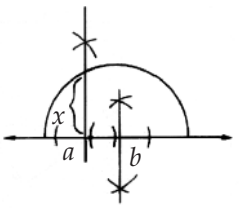
b.



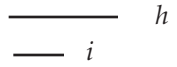
c.



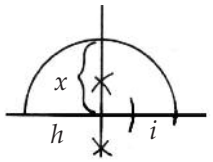
d.



6. **The geometric mean x between h and i is ___.** 6. _____



a.



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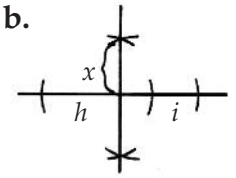
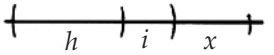
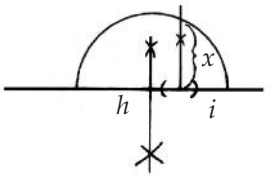


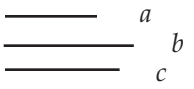
c.



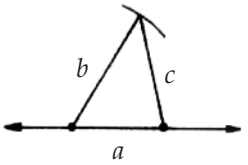
d.



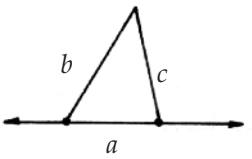
7. **Given a, b, and c are sides of a triangle, the correctly constructed triangle is ___.** 7. _____



a.



b.



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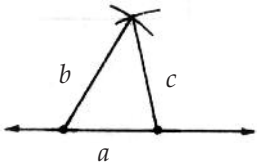

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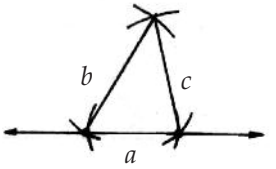
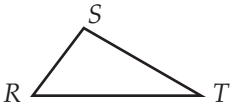
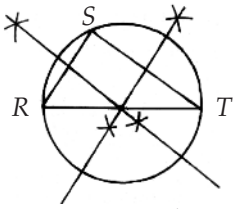


8. **The correctly circumscribed circle about triangle RST is ___.** 8. _____



a.



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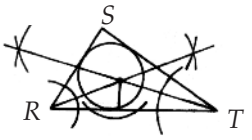
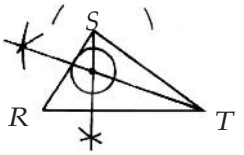


c.



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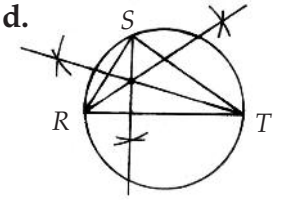
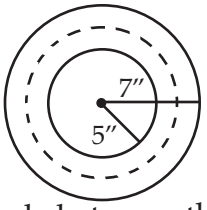
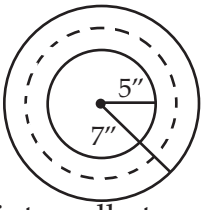


9. Given two circles with radii of 5″ and 7″, **the locus of points in the plane of the two circles and equidistant from them is ___.** 9. _____

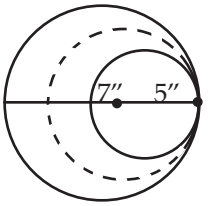
a. A circle concentric with the given circles with radius of 6″



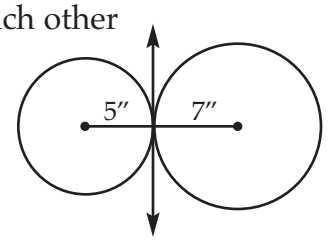
b. A circle concentric with the given circles with radius of 3″



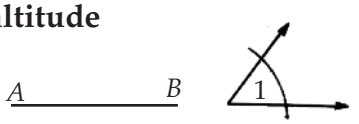
c. A circle between the two circles, tangent to both circles at one point



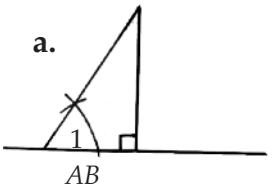
d. A line internally tangent to both circles, which are tangent to each other



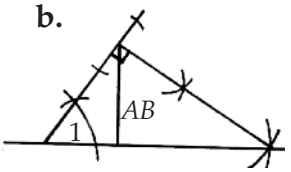
10. **The correct construction of a right triangle with acute angle equal to $\angle 1$ and the altitude to the hypotenuse equal to AB is ___.** 10. _____



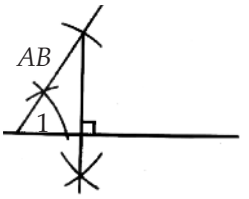
a.



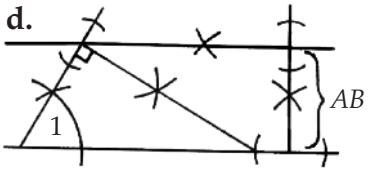
b.



c.



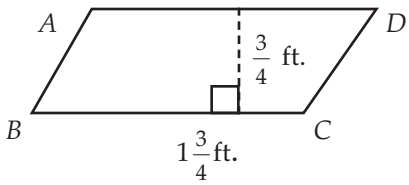
d.



1008

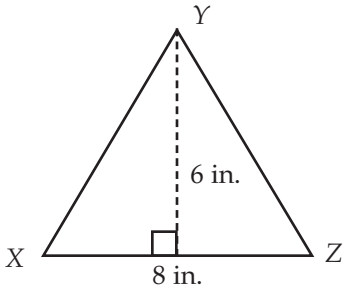
Score:

1. **The area of** ▱ *ABCD* **is ___.** 1. _____



a. $1\ \frac{5}{16}$ ft.^{2} **b.** $1\ \frac{9}{16}$ ft.^{2} **c.** $2\ \frac{1}{2}$ ft.^{2} **d.** $2\ \frac{5}{8}$ ft.^{2}

2. **The area of** $\triangle XYZ$ **is ___.** 2. _____



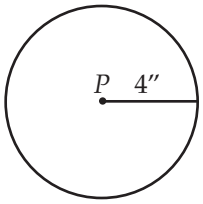
a. 14 in.^{2} **b.** 24 in.^{2}
c. 32 in.^{2} **d.** 48 in.^{2}

3. **The exact circumference of a circle with** radius $2\ \frac{1}{4}$ in. **is ___.** 3. _____

a. $2\ \frac{1}{4}\ \pi$ in. **b.** $3\ \frac{1}{2}\ \pi$ in. **c.** $4\ \frac{1}{2}\ \pi$ in. **d.** $5\ \frac{1}{16}\ \pi$ in.

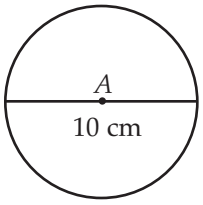
4. **Using** $\pi = 3.14$, **the approximate circumference of a circle with** radius 6.2 cm **is ___.** 4. _____
a. 9.7 cm **b.** 38.9 cm **c.** 114.7 cm **d.** 120.7 cm

5. **The exact area of** circle *P* **is ___.** 5. _____



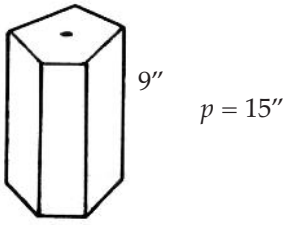
a. 2π in.^{2} **b.** 4π in.^{2}
c. 8π in.^{2} **d.** 16π in.^{2}

6. **The approximate area** ($\pi = 3.14$) **of** circle *A* **is ___.** 6. _____



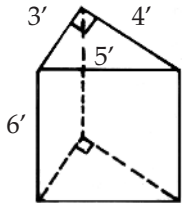
a. 314 cm^2 **b.** 157 cm^2
c. 78.5 cm^2 **d.** 31.4 cm^2

7. **The lateral area of the given prism is___.** 7. _____



a. 105 in.^{2} **b.** 115 in.^{2}
c. 125 in.^{2} **d.** 135 in.^{2}

8. The total area of the given prism is ___.

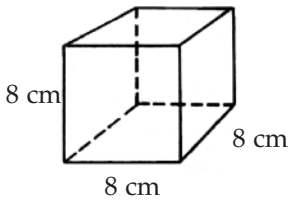


8. _____

a. 72 ft.^{2} **b.** 84 ft.^{2}
c. 96 ft.^{2} **d.** 108 ft.^{2}

9. The volume of the given cube is ___.

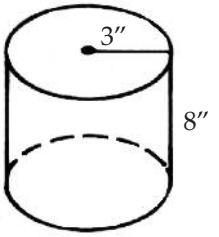
9. _____



a. 512 cm^3 **b.** 508 cm^3
c. 384 cm^3 **d.** 128 cm^3

10. The volume of the given cylinder is ___.

10. _____



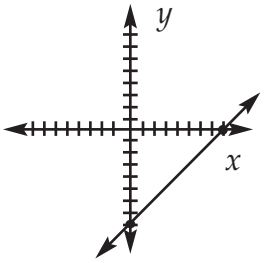
a. 72π cu. in. **b.** 60 cu. in.
c. 48 cu. in. **d.** 24π cu. in.

1009

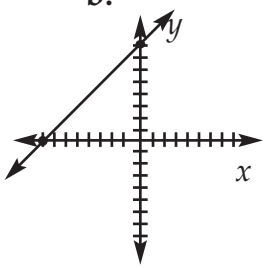
Score:

1. **The graph of the equation** $x + y = 8$ **is ___.** 1. _____

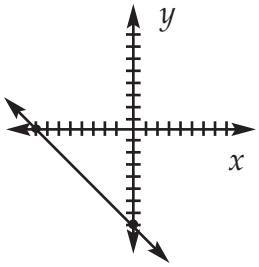
a.



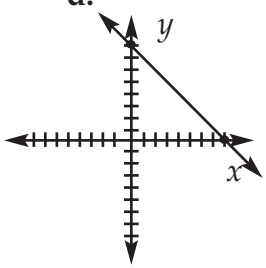
b.



c.

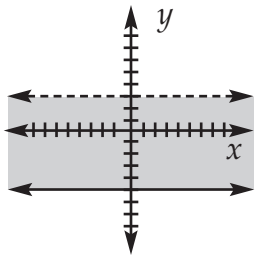


d.

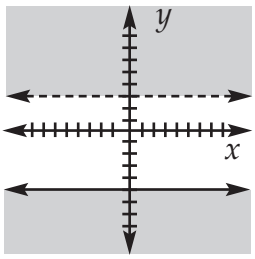


2. **The graph of the inequality** $-5 \leq y < 3$ **is ___.** 2. _____

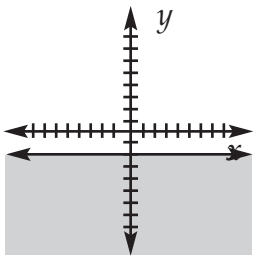
a.



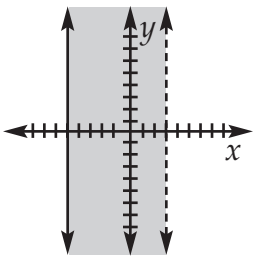
b.



c.



d.



3. **The distance between the points** (-3, 0) **and** (0, $\sqrt{7}$) **is ___.** 3. _____

a. $\sqrt{2}$ **b.** $-3 + \sqrt{7}$ **c.** 4 **d.** 16

4. **The coordinates of the midpoint of the segment whose end points are** (3, 5) **and** (-2, 0) **are ___.** 4. _____

a. $(-\frac{5}{2}, -\frac{5}{2})$ **b.** $(\frac{1}{2}, \frac{5}{2})$ **c.** $(\frac{1}{2}, \sqrt{30})$ **d.** (1, 5)

5. **The equation of the circle with center at** (5, 2) **and radius of** 3 **is ___.** 5. _____

a. $(x - 5)^2 + (y - 2)^2 = 9$ **b.** $(x + 5)^2 + (y + 2)^2 = 9$

c. $x^2 + y^2 = 3$ **d.** $x^2 + y^2 = 9$

6. **The equation in standard form of the line passing though the points** $P(6, 2)$ **and** $Q(8, -4)$ **is ___.** 6. _____

a. $x - y = 4$ **b.** $x + 3y = 12$ **c.** $3x + y = 8$ **d.** $3x + y = 20$

7. **The slope of the line that contains the points** $A(3, 2)$ **and** $B(7, 8)$ **is ___.** 7. _____

a. $-\frac{2}{3}$ **b.** $-\frac{1}{2}$ **c.** 1 **d.** $\frac{3}{2}$

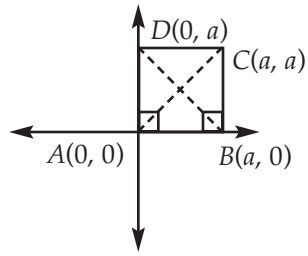
8. Lines p, q, r, and s have slopes of 2, -3, $-\frac{1}{2}$, and 3 respectively.

The pair of lines that are perpendicular are ___. 8. _____

a. p and q **b.** q and s **c.** p and r **d.** r and s

9. **Prove:** The diagonals of a square are perpendicular. 9. _____

The proof is ___.



a. $AD = \sqrt{c^2 + d^2}$

$BC = \sqrt{(b + c - b)^2 + d^2} = \sqrt{c^2 + d^2}$

$AB = \sqrt{b^2} = b$

$CD = \sqrt{(b + c - c)^2 + (d - d)^2} = \sqrt{b^2} = b$

b. $AC = \sqrt{(-a)^2 + b^2} = \sqrt{a^2 + b^2}$

$BD = \sqrt{a^2 + b^2}$

c. $m_{AC} = \frac{a - 0}{a - 0} = 1$ $\quad m_{AC} \bullet m_{BD} = -1$

$m_{BD} = \frac{a - 0}{0 - a} = -1$ $\quad \therefore \overline{AC} \perp \overline{BD}$

d. M is midpoint of $\overline{AC}$ and midpoint of $\overline{BD}$.

$m_{AD} = \frac{2k}{2j - b}$ $\quad m_{AB} = 0$

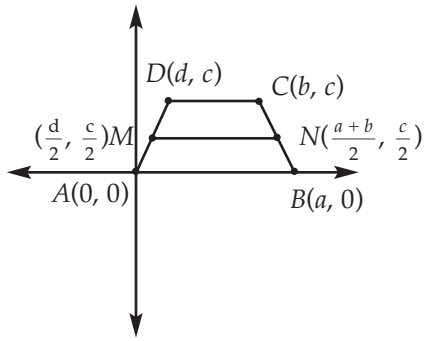
$m_{BC} = \frac{2k}{2j - b}$ $\quad m_{DC} = \frac{2k - 2k}{2j - 2j + b} = 0$

$\overline{AD} \parallel \overline{BC}$ $\quad \overline{AB} \parallel \overline{DC}$

$\therefore ABCD$ is a parallelogram.

10. **Prove:** The median of a trapezoid equals half the sum of its bases. 10. _____

The proof is ___.



a. $m_{AB} = \frac{0}{a} = 0$

$m_{CD} = \frac{0}{b - d} = 0$

Slopes are equal, $\therefore$ segments $\parallel$.

b. $MN = \sqrt{(\frac{a + b}{2} - \frac{d}{2})^2} = \frac{a + b - d}{2}$

$AB = \sqrt{a^2} = a$

$CD = \sqrt{(b - d)^2} = b - d$

$MN = \frac{1}{2}(AB + CD) = \frac{1}{2}(a + b - d)$

c. $AM = \sqrt{a^2 + b^2}$

$BC = \sqrt{4a^2 + 4b^2} = \sqrt{4(a^2 + b^2)} = 2\sqrt{a^2 + b^2}$

$\sqrt{a^2 + b^2} = \frac{1}{2}(2\sqrt{a^2 + b^2})$

$AM = \frac{1}{2}(BC)$

d. $m_{AC} = \frac{c}{a + b}$

$m_{BD} = \frac{c}{b - a}$

$\frac{c}{a + b} = -\frac{b - a}{c}$

$c^2 = a^2 - b^2$

$a^2 = b^2 + c^2$

$a = \sqrt{b^2 + c^2}$

$AB = a$

$BC = \sqrt{b^2 + c^2}$

$\therefore AB = BC$ and $ABCD$ is a rhombus.

1010

Score:

1. **The midpoint of the segment joining points** (a, b) **and** (j, k) **is ___.** 1. _____

a. $(j - a, k - b)$ **b.** $(\frac{j-a}{2}, \frac{k-b}{2})$ **c.** $(j + a, k + b)$ **d.** $(\frac{j+a}{2}, \frac{k+b}{2})$

2. The area of a square is 36.
The length of the diagonal of the square is ___. 2. _____

a. $36\sqrt{2}$ **b.** $6\sqrt{2}$ **c.** $3\sqrt{2}$ **d.** 6

3. Point T is the midpoint of $\overline{JH}$. The coordinate of T is (0, 5) and the coordinate of J is (0, 2). **The coordinate of** H **is ___.** 3. _____

a. (0, 8) **b.** (0, 3) **c.** (0, 7) **d.** (0, 11)

4. The measures of the angles of a quadrilateral are x, x, $x + 15^\circ$, and $x + 45^\circ$. $x =$ ___. 4. _____

a. 75° **b.** 105° **c.** 100° **d.** 95°

5. **The complement of an acute angle is a(n) ___ angle.** 5. _____

a. obtuse **b.** straight **c.** 90° **d.** acute

6. **If** $\frac{a}{b} = \frac{2}{5}$, **then ___.** 6. _____

a. $\frac{a}{b} = \frac{5}{2}$ **b.** $\frac{b}{a} = \frac{2}{5}$ **c.** $\frac{b}{a} = \frac{5}{2}$ **d.** $2a = 5b$.

7. For statements p and q, "$p \rightarrow q$" is false; "p or q" is true.
Which of the statements must be false? 7. _____

a. p **b.** q **c.** p and q **d.** neither p or q

8. **Find the equation of a line through point** (2, 5) **and having a slope of** $\frac{3}{7}$. 8. _____

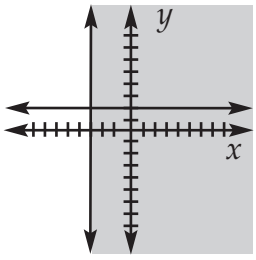
a. $3x - 7y = -29$ **b.** $3x + 7y = 29$
c. $7x - 3y = 15$ **d.** $7y + 3y = 15$

9. **Find the area of a** 120° **sector of a circle whose radius is** 6. 9. _____

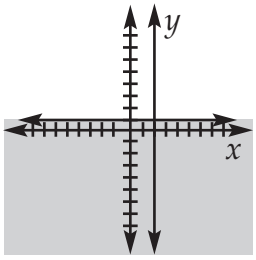
a. 15π **b.** 12π **c.** 18π **d.** 10π

10. **The graph of** $\{ (x, y): x = 2 \text{ and } y \leq 1\}$ **is ___.** 10. _____

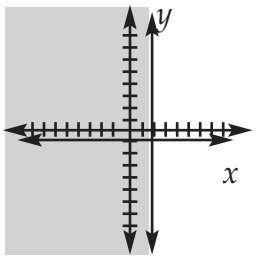
a.



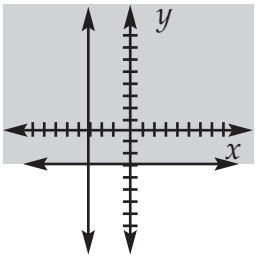
b.



c.



d.



1101

Score:

1. Given $A = \{1, 2, 3, 4, 5\}$ and $B = \{2, 4, 6, 8, 10\}$, $A \cap B$ **is** ___. 1. _____

a. $\{1, 2, 3, 4, 5, 6, 8, 10\}$ **b.** $\{1, 3, 5\}$
c. $\{2, 4\}$ **d.** $\{6, 8, 10\}$

2. Given $C = \{x \mid x \text{ is a whole number}\}$ and 2. _____
$D = \{x \mid x \text{ is a perfect square} < 100\}$, $C \cup D$ **is** ___.

a. the set of all whole numbers
b. the set of perfect squares < 100
c. $\{1, 4, 9, 16, 25, 36, 49\}$
d. $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

3. $10 \div 5 + 6 \div 3 =$ ___. 3. _____

a. $\frac{10}{33}$ **b.** 1 **c.** 4 **d.** $2\frac{2}{3}$

4. $3 + 4 \div 2 + 6(9 - 3) \div 12 + 1 =$ ___.

a. $3\frac{8}{13}$ **b.** $4\frac{7}{24}$ **c.** $7\frac{1}{2}$ **d.** 9 4. _____

5. **The domain of set** $E = \{ (4, 5), (6, 7), (8, 9) \}$ **is** ___.
a. $\{4, 6, 8\}$ **b.** $\{5, 7, 9\}$ **c.** $\{4, 6, 9\}$ **d.** $\{5, 6, 7, 9\}$ 5. _____

6. Given that $f(x) = 2x^2 + 3$, $f(3) =$ ___.
a. 29 **b.** 21 **c.** 15 **d.** 9 6. _____

7. $5c \bullet 5c \bullet c \bullet c$ **written in exponential notation is** ___.
a. 5^2c^4 **b.** $25c^3$ **c.** $2 \bullet 5 \bullet 4 \bullet c$ **d.** 5^3c^3 7. _____

8. $4^0 =$ ___.
a. 0 **b.** 1 **c.** 4 **d.** 40 8. _____

9. **The fraction** $\frac{1}{6^3}$ **written with a negative exponent is** ___.

a. 1^{-6} **b.** 6^{-3} **c.** 3^{-6} **d.** $(\frac{1}{6})^{-3}$ 9. _____

10. $\frac{a^3b^2}{a^{-1}b^{-3}} =$ ___.

a. ab **b.** a^2b^{-1} **c.** a^4b^5 **d.** $\frac{b}{a^2}$ 10. _____

1102

Score:

1. $|-4| =$ ___. 1. _____

a. -4 **b.** 0 **c.** 1 **d.** 4

2. $(-105) \div (-5) =$ ___. 2. _____

a. -21 **b.** -20 **c.** 20 **d.** 21

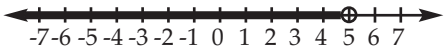
3. **The solution of** $\frac{x}{8} = 42$ **is** ___. 3. _____

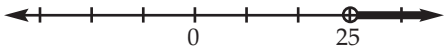
a. $x = 336$ **b.** $x = 210$ **c.** $x = 5\frac{1}{4}$ **d.** $x = 0.2$

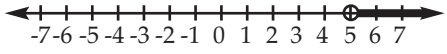
4. **The solution of** $4(7 - 3x) = 7(4 - 2x)$ **is** ___. 4. _____

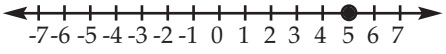
a. $x = -5$ **b.** $x = -2$ **c.** $x = 0$ **d.** $x = 3$

5. **The graph of** $5x > 25$ **is** ___. 5. _____

a. 

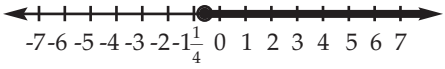
b. 

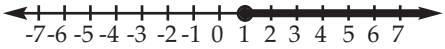
c. 

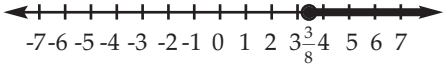
d. 

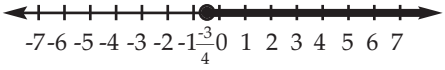
6. _____

6. **The graph of** $3(2x + 5) \geq 2(x + 6)$ **is** ___.

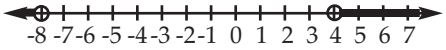
a. 

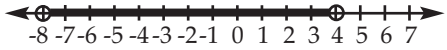
b. 

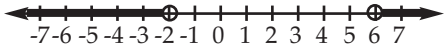
c. 

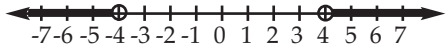
d. 

7. **The graph of** $|y + 2| > 6$ **is** ___. 7. _____

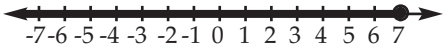
a. 

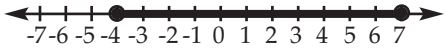
b. 

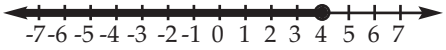
c. 

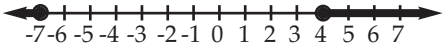
d. 

8. **The graph of** $|2x - 3| \leq 11$ **is** ___. 8. _____

a. 

b. 

c. 

d. 

9. At 10:00 AM, two airplanes leave an airport. **If the northbound airplane flies at** 280 mph **and the southbound at** 320 mph**, they will be** 1,000 miles **apart at** ___. 9. _____

a. 11:30 AM **b.** 11:40 AM **c.** 12:00 noon **d.** 1:20 PM

10. Mrs. Martin bought \$200 worth of travelers' checks in \$10 and \$20 denominations. **If she has** 12 **travelers' checks in all, she has** ___. 10. _____

a \$10: 5 \$20: 7 **b.** \$10: 6 \$20: 6 **c.** \$10: 3 \$20: 9 **d.** \$10: 4 \$20: 8

1103

Score:

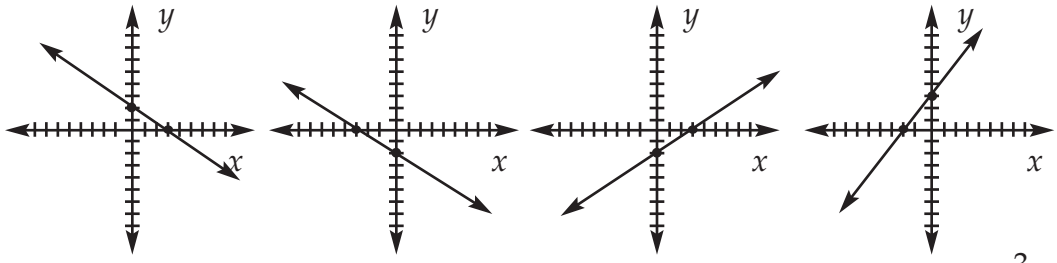
1. **Three solutions to** $y = \frac{x}{5} + 1$ **are ___.** 1. _____

a. (-20, 4), (10, 2), (15, 4) **b.** (-15, -2), (-10, -1), (0, 2)

c. (-10, -1), (5, 2), (10, 3) **d.** (-5, 0), (5, 3), (20, 5)

2. **The graph of** $2x + 3y = 6$ **is ___.** 2. _____

a. **b.** **c.** **d.**



3. **The equation of the line that passes through point** (-6, 8) **and that has a slope of** $-\frac{2}{3}$ **is ___.** 3. _____

a. $y = -\frac{2}{3}x + 12$ **b.** $y = -\frac{2}{3}x + 4$

c. $x = -\frac{2}{3}y + \frac{34}{3}$ **d.** $y = -\frac{2}{3}x + 8$

4. **The equation for the line that passes through the origin and is parallel to** $x + y = 6$ **is ___.** 4. _____

a. $x + y = 1$ **b.** $x = 0$ **c.** $y = -x$ **d.** $x = y$

5. **The solution to** $\begin{aligned} x + y &= k \\ 2x + 3y &= k + 1 \end{aligned}$ **by multiplying and adding is ___.** 5. _____

a. $(k + 1,\ 2k - 1)$ **b.** $(k - 1,\ 2k + 1)$

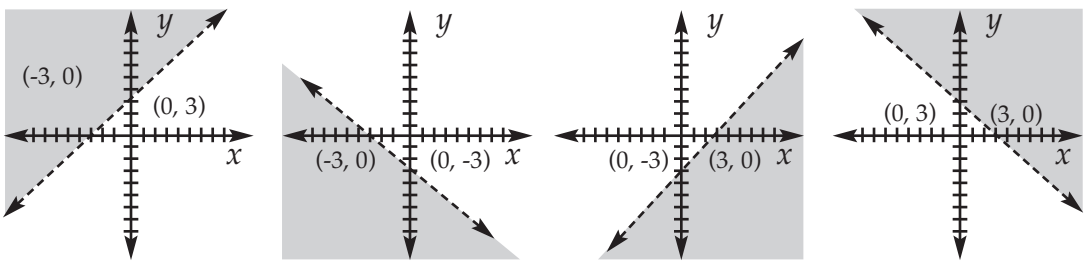
c. $(2k - 1,\ k - 1)$ **d.** $(2k - 1,\ 1 - k)$

6. **The solution to** $\begin{aligned} 8y - 1 &= x \\ 3x &= 2y \end{aligned}$ **by substitution is ___.** 6. _____

a. $(-4,\ -\frac{3}{8})$ **b.** $(\frac{1}{23},\ \frac{3}{46})$ **c.** $(\frac{1}{11},\ \frac{3}{22})$ **d.** $(\frac{5}{11},\ \frac{2}{11})$

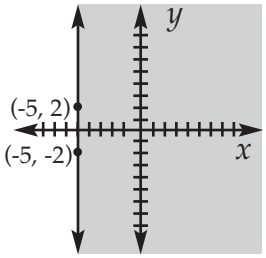
7. **The graph of** $y < x - 3$ **is ___.** 7. _____

a. **b.** **c.** **d.**

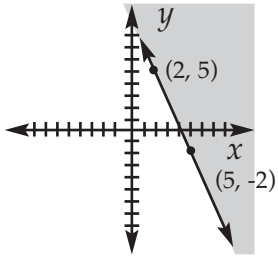


8. The graph of $2x + 5y \geq 0$ is ___. 8. _____

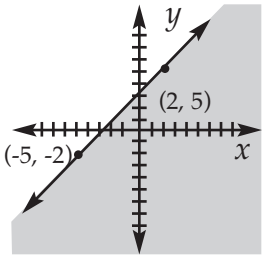
a.



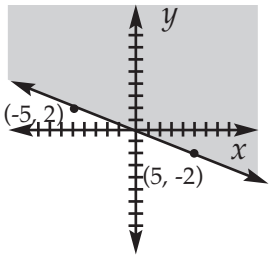
b.



c.



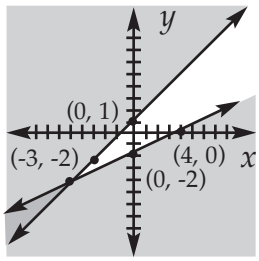
d.



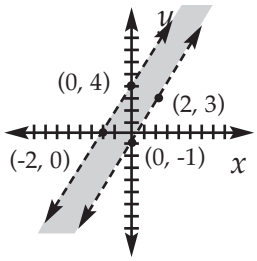
9. The graph of $2x - y > 4$ is ___. 9. _____

$2x - y < -1$

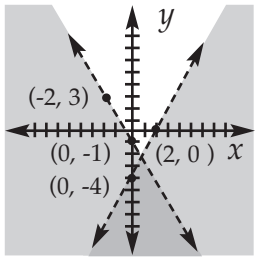
a.



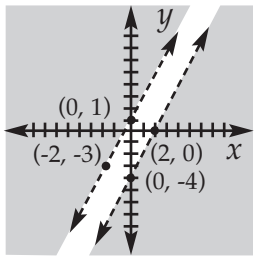
b.



c.



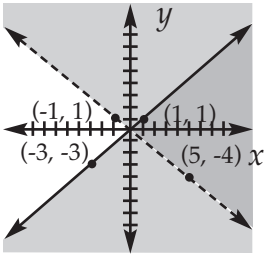
d.



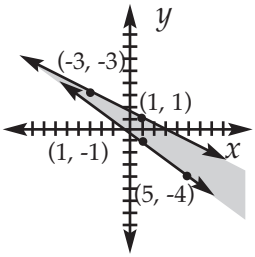
10. The graph of $5x + 6y > 1$ is ___. 10. _____

$y - x \leq 0$

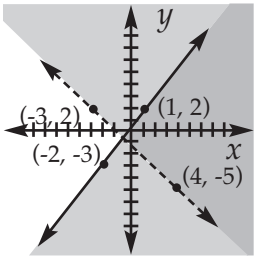
a.



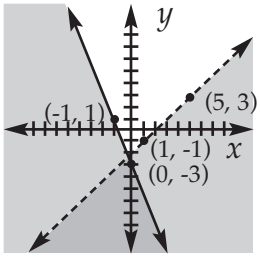
b.



c.



d.



1104

Score:

1. **The indicated product of** $(a^5)^7$ **is ___.** 1. _____

   a. a^2 **b.** $7a^5$ **c.** a^{12} **d.** a^{35}

2. **The indicated product of** $(ab - 9)(ab + 8)$ **is ___.** 2. _____

   a. $2ab - 72$ **b.** $ab^2 - ab + 72$

   c. $a^2b^2 - ab - 72$ **d.** $a^2b^2 - 17ab - 72$

3. **The indicated product of** $(x + 2y)^2$ **is ___.** 3. _____

   a. $x^2 + 4xy + 4y^2$ **b.** $x^2 + 2xy + 4y^2$

   c. $x^2 + 2xy + 2y^2$ **d.** $x^2 + 4xy + 2y^2$

4. **The factors of** $9x^2 - y^2$ **are ___.** 4. _____

   a. $(3x - y)^2$ **b.** $(3x - y)(3x + y)$

   c. $(3x + y)^2$ **d.** $3(x - y)^2$

5. **The sum of** $(6x^2 + 2x - 9) + (3x^2 - 5x + 12)$ **is ___.** 5. _____

   a. $9x^2 - 3x + 3$ **b.** $9x^2 + 7x - 3$

   c. $3x^2 - 3x + 3$ **d.** $9x^2 - 3x - 3$

6. **The difference of** $2x^2 + 5x - 10$ **is ___.** 6. _____

$$\underline{x^2 - 6x + 8}$$

   a. $3x^2 - x - 2$ **b.** $x^2 + 11x - 18$

   c. $x^2 - x - 2$ **d.** $-x^2 - 11x - 18$

7. **The quotient of** $(4x^2 - 11x - 20) \div (x - 4)$ **is ___.** 7. _____

   a. $4x - 5$ **b.** $2x + 5$

   c. $4x + 5$ **d.** $2x - 4$

8. **The quotient of** $(a^{2n} - a^n - 6) \div (a^n + 8)$ **is ___.** 8. _____

   a. $a^n - 9 + \frac{72}{a^n + 8}$ **b.** $a^n - 9 + \frac{66}{a^n + 8}$

   c. $a^{2n} - 2 + \frac{10}{a^n + 8}$ **d.** $a^n + 7 + \frac{-62}{a^n + 8}$

9. **If** x **varies directly as** y **and** $x = 7\frac{1}{2}$ **when** $y = 10$**, the value of** x **when** $y = 4$ **is ___.** 9. _____

   a. $1\frac{7}{8}$ **b.** 3 **c.** $5\frac{1}{3}$ **d.** $18\frac{3}{4}$

10. The volume of a right circular cone varies jointly as the altitude and the square of the radius of the base. If the volume of the cone is 154 cu. in. when its altitude is 12 in. and the radius of the base is $3\frac{1}{2}$ in., **when the volume of the cone is** 77 cu. in. **and the radius of the base is** $2\frac{1}{2}$ in.**, the altitude is ___inches.** 10. _____

   a. $5\frac{4}{9}$ in. **b.** 6 in. **c.** $10\frac{2}{7}$ in. **d.** $13\frac{1}{2}$ in.

1105

Score:

1. **The value of** $\frac{4}{2x^0}$ **is ___.** 1. _____

a. 2 **b.** $\frac{2}{x}$ **c.** 4 **d.** $4x$

2. **The variable** $(\frac{3a^2}{5})^{-3}$ **expressed with positive exponents is ___.** 2. _____

a. $\frac{9a^6}{15}$ **b.** $\frac{5}{3a}$ **c.** $5(3a^2)^3$ **d.** $\frac{5^3}{3^3a^6}$

3. **Divide:** $\frac{5}{2x + 3y} \div \frac{10}{4x^2 - 9y^2} =$ ___ . 3. _____

a. $4x + 6y$ **b.** $\frac{2x - 3y}{2}$ **c.** $\frac{2x + 3y}{2}$ **d.** $\frac{1}{2(2x - 3y)}$

4. Simplify: $\frac{2y^2 - 7y - 15}{3y^2 - 8y - 3} \bullet \frac{9y^2 - 1}{4y^2 - 9} \div \frac{y^2 + 3y - 10}{2y^2 - 9y + 9} =$ ___. 4. _____

a. $\frac{(y - 5)(3y - 1)}{(y + 5)(y - 2)}$ **b.** $\frac{-(3y - 1)(2y - 3)}{y - 2}$

c. $\frac{3y - 1}{y - 2}$ **d.** $\frac{9y^2 - 1}{(3y + 1)(2y - 3)}$

5. $\frac{x + 6}{x^2 + 8x + 15} + \frac{3x}{x + 5} - \frac{x - 3}{x + 3} =$ ___ . 5. _____

a. $\frac{2x + 2}{x + 5}$ **b.** $\frac{2x^2 + 9x - 9}{(x + 5)(x + 3)}$

c. $\frac{2x^2 + 8x + 21}{(x + 5)(x + 3)}$ **d.** $\frac{2x^2 + 16x + 15}{(x + 5)(x + 3)}$

6. $1 + 2x + \frac{1}{2x} =$ ___. 6. _____

a. $4x + 1$ **b.** $\frac{2x + 4x^2 + 1}{2x}$ **c.** $\frac{4x^2 + 3}{2x}$ **d.** $\frac{6x + 1}{2x}$

7. **The solution to** $\frac{5}{2x + 6} - 2 = \frac{1 - 8x}{4x}$ **is ___.** 7. _____

a. $x = -3\frac{1}{2}$ **b.** $x = -1$ **c.** $x = \frac{1}{3}$ **d.** $x = 2$

8. **The solution to** $\frac{3x - 1}{9x - 5} = \frac{x + 1}{3x + 1}$ **is ___.** 8. _____

a. $x = 1$ **b.** $x = 2$ **c.** $x = 3$ **d.** $x = 4$

9. A dairyman has 300 pounds of milk testing 3% butterfat. **The number of pounds of skimmed milk he must remove to have milk testing 3.6% butterfat is ___ pounds.** 9. _____

a. 46.5 **b.** 48 **c.** 50 **d.** 51.4

10. John can type $\frac{2}{3}$ of a manuscript in 8 hours. If Laura joins him, they can complete the typing in 4 hours. **The number of hours Laura would take to type the manuscript alone would be ___ hours.** 10. _____

a. 3 **b.** 4 **c.** 5 **d.** 6

1106

Score:

1. **The number** -8.64 **is a(n) ___ number.** 1. _____
   a. rational **b.** irrational **c.** radical **d.** imaginary

2. **The number** 0.123456789 . . . **is a(n) ___ number.** 2. _____
   a. rational **b.** irrational **c.** radical **d.** imaginary

3. **Rationalize the denominator and simplify:** $\frac{3\sqrt{2} - 2\sqrt{3}}{3\sqrt{2} + 2\sqrt{3}}$ = _____ . 3. _____

   a. $\frac{4 - \sqrt{6}}{2}$ **b.** $5 - \sqrt{2}$ **c.** $5 - 2\sqrt{6}$ **d.** $1 - 2\sqrt{6}$

4. **The solution to** $\sqrt{x - 5} - 2 = 0$ **is ___.**
   a. $x = 7$ **b.** $x = 9$ **c.** $x = 11$ **d.** $x = 13$ 4. _____

5. **The solution to** $10t^2 - 29t = -10$ **by factoring is ___.**
   a. $t = \frac{5}{2}, \frac{2}{5}$ **b.** $t = \frac{5}{2}, -2$ **c.** $t = -3, 2$ **d.** $t = \frac{1}{2}, 5$ 5. _____

6. **The solution to** $c^2 + 11c = 12$ **by completing the square is ___.**
   a. $c = \frac{1}{2}, 12$ **b.** $c = -1, 1$ **c.** $c = 1, -12$ **d.** $c = 2, 6$ 6. _____

7. **The quadratic formula is ___.**
   a. $x = \frac{b \pm \sqrt{b^2 + 4ac}}{2a}$ **b.** $x = \frac{-b \pm \sqrt{a^2 - 4ac}}{2b}$ 7. _____

   c. $x = \frac{a \pm \sqrt{a^2 - 4ab}}{2c}$ **d.** $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

8. **Using the quadratic formula, the solution to**
   $(3 - y)(y + 4) = 3y - 5$ **is ___.** 8. _____
   a. $y = -2 \pm \sqrt{21}$ **b.** $y = -1 \pm 3\sqrt{2}$
   c. $y = \frac{-3 \pm \sqrt{77}}{2}$ **d.** $y = \frac{2 \pm \sqrt{21}}{4}$

9. **An imaginary number ___.**
   a. does not exist **b.** equals -1
   c. is the square root of any negative number **d.** has no practical and real applications 9. _____

10. $i^{12} + 2 =$ **___.**
    a. $i + 2$ **b.** $-i + 2$ **c.** 1 **d.** 3 10. _____

1107

Score:

1. **The distance between the points** (0, 0) **and** (6, -8) **is ___.** 1. _____

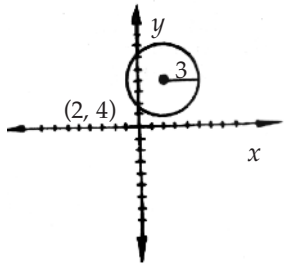
   a. $\sqrt{2}$ **b.** $\sqrt{14}$ **c.** 5 **d.** 10

2. **The distance between the points** (1, 5) **and** (1, -4) **is ___.** 2. _____

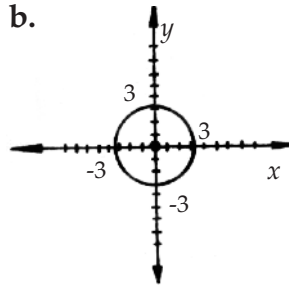
   a. 1 **b.** 6 **c.** 9 **d.** $\sqrt{85}$

3. **The graph of the circle with equation** $(x - 2)^2 + (y - 4)^2 = 9$ **is ___.** 3. _____

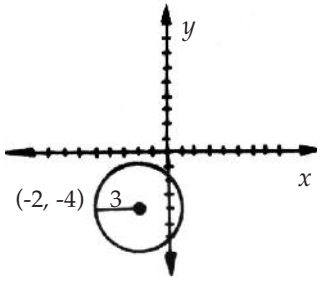
a.



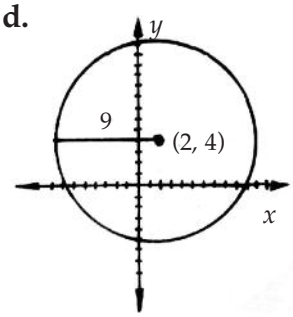
b.



c.



d.



4. **The equation of the circle with center at** (5, 6) **and radius of** 7 **is ___.** 4. _____

   a. $x^2 - y^2 = 49$ **b.** $(x - 5)^2 + (y - 6)^2 = 49$

   c. $(x - 5)^2 - (y - 6)^2 = 49$ **d.** $(x + 5)^2 + (y + 6)^2 = 49$

5. **The essential elements of the parabola with equation** $x = \frac{1}{16}y^2$ **are ___.** 5. _____

   a. focus at (4, 0)
   directrix $x = -4$

   b. focus at (16, 0)
   directrix $x = -16$

   c. focus at (0, 8)
   directrix $y = -8$

   d. focus at $(0, \frac{1}{16})$
   directrix $y = -\frac{1}{16}$

6. **The equation of the hyperbola with foci** (5, 0), (-5, 0) **and vertices** (4, 0), (-4 , 0) **is ___.** 6. _____

   a. $\frac{x^2}{25} - \frac{y^2}{1} = 1$ **b.** $\frac{y^2}{16} - \frac{x^2}{25} = 1$

   c. $\frac{x^2}{16} - \frac{y^2}{9} = 1$ **d.** $\frac{x^2}{9} + \frac{y^2}{25} = 1$

7. **The equation** $x^2 + 2y^2 = 2$ **is an equation of a(n) ___.**

   a. circle **b.** ellipse **c.** parabola **d.** hyperbola

7. _____

8. **The solution set to the system** $4x^2 + 9y^2 = 72$ **is ___.** 8. _____

$2x - y = 4$

a. $\{ (-2, -8), (\frac{1}{2}, -3) \}$ **b.** $\{ (0, 2\sqrt{2}), (\frac{2}{3}, -2\frac{2}{3}) \}$

c. $\{ (1, -2), (\frac{3}{4}, -2\frac{1}{2}) \}$ **d.** $\{ (3, 2), (\frac{3}{5}, -2\frac{4}{5}) \}$

9. Let y = safe load in pounds and x = depth in inches for a certain type of rectangular horizontal beam. A constant of proportionality exists such that $y = kx^2$ (y varies directly as x^2). **For a beam with** $y = 1{,}000$ pounds **and** $x = 5$ inches**, the constant** k **and the equation of the parabola for the beam are ___.** 9. _____

a. $k = 0.000005$ lbs.
$y = 0.000005x^2$

b. $k = 40$ lbs.
$y = 40x^2$

c. $k = 5{,}000$ lbs.
$k = xy$

d. $k = 25{,}000$ lbs.
$k = x^2y$

10. The Jones family plans a 300-mile trip. Let y = time traveled (in hours) and x = average speed (in miles per hour). **The equation for the rectangular hyperbola that expresses the relationship between time traveled** (y) **and average speed** (x) **is ___.** 10. _____

a. $300 = xy$ **b.** $y = \frac{x}{300}$ **c.** $x = 300y$ **d.** $300 = x^2 + y^2$

1108

Score:

1. $\dfrac{2ab^{-1}}{3e^{-3}d}$ = ___.

1. _____

a. $\dfrac{3e^3d}{2ab}$ **b.** $\dfrac{2ae^3}{3d^2}$ **c.** $\dfrac{6e^3}{abd}$ **d.** $\dfrac{2ae^3}{3bd}$

2. $\left(\dfrac{27}{8}\right)^{-\frac{2}{3}}$ = ___.

2. _____

a. $-\dfrac{9}{4}$ **b.** $\dfrac{2\sqrt{6}}{9}$ **c.** $\dfrac{4}{9}$ **d.** $\dfrac{3}{2}$

3. **The solution of** $3^x = \dfrac{1}{27}$ **is** ___.

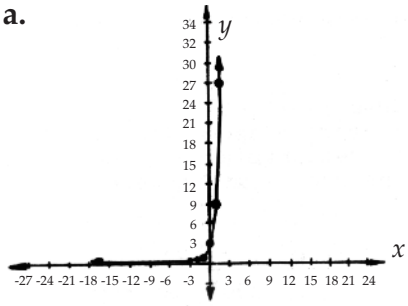
3. _____

a. $x = -3$ **b.** $x = 2$ **c.** $x = 3$ **d.** $x = 9$

4. _____

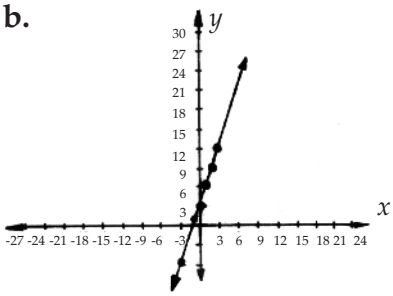
4. **The graph of** $y = 3^{x+1}$ **is** ___.

a.



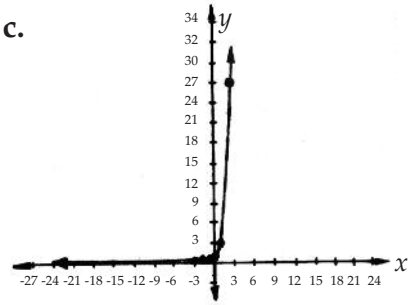
x	0	1	2	3	-1	-2	-3
y	3	9	27	81	1	$\frac{1}{3}$	$\frac{1}{9}$

b.



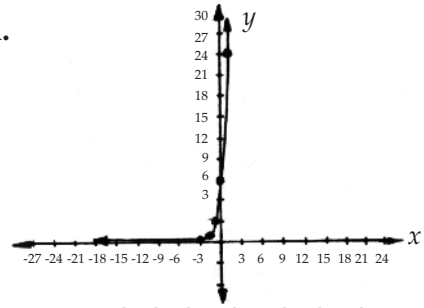
x	0	1	2	3	-1	-2	-3
y	3	6	9	12	1	-3	-6

c.



x	0	1	2	3	-1	-2	-3
y	1	3	9	27	$\frac{1}{3}$	$\frac{1}{9}$	$\frac{1}{27}$

d.



x	0	1	2	3	-1	-2	-3
y	9	27	81	243	3	1	$\frac{1}{3}$

5. **Evaluate** $\log_5 125$: ___.

5. _____

a. 0.04 **b.** 3 **c.** 5 **d.** 25

6. **Using the common logarithm table (next page),** $\log 4.75$ = ___.

6. _____

a. 0.5740 **b.** 0.6675 **c.** 0.6767 **d.** 0.6857

7. **The number** 0.283 **expressed in scientific notation is ___.** 7. _____

a. $2{,}830 \times 10^{-4}$ **b.** 283×10^{-3}

c. 28.3×10^{-2} **d.** 2.83×10^{-1}

8. **Using the common logarithm table,** antilog 3.2625 = **___.** 8. _____

a. 0.5132 **b.** 1.83 **c.** 1,830 **d.** 1,860

9. **The sum of** $\begin{pmatrix} 2 & 1 & 0 \\ 4 & 0 & 1 \end{pmatrix} + \begin{pmatrix} 1 & 1 & 5 \\ 2 & 3 & 4 \end{pmatrix}$ **is ___.** 9. _____

a. $\begin{pmatrix} 6 & 4 & 0 \\ 12 & 0 & 9 \end{pmatrix}$ **b.** $\begin{pmatrix} 3 & 2 & 5 \\ 6 & 3 & 5 \end{pmatrix}$ **c.** $\begin{pmatrix} 2 & 1 & 5 \\ 6 & 0 & 4 \end{pmatrix}$ **d.** $\begin{pmatrix} 2 & 1 & 0 \\ 8 & 0 & 4 \end{pmatrix}$

10. Mr. Jones buys two pens, one package of lined paper, and three boxes of staples. The respective prices are 60¢, 70¢, and 45¢ for each unit. On his way home, Mr. Jones remembers that he will have some extra needs, so he returns to the same store and buys three times the same order. **The matrices and the amount of Mr. Jones bill are ___.** 10. _____

a. $(8 \;\; 4 \;\; 12)\begin{pmatrix} 0.60 \\ 0.70 \\ 0.45 \end{pmatrix}$

Mr. Jones spent $13.

b. $(6 \;\; 3 \;\; 9)(0.60 \;\; 0.70 \;\; 0.45)$

Mr. Jones spent $9.75.

c. $(2 \;\; 1 \;\; 3)\begin{pmatrix} 1.20 \\ 0.70 \\ 1.35 \end{pmatrix}$

Mr. Jones spent $7.15.

d. $\begin{pmatrix} 7 \\ 4 \\ 11 \end{pmatrix}(0.60 \;\; 0.70 \;\; 0.45)$

Mr. Jones spent $13.

Common Logarithms of Numbers

N	0	1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396

1109

Score:

1. **An example of an arithmetic series is ___.** 1. _____

a. $1 + 2 + 3 + 4 + \ldots + 10$ **b.** $\frac{3}{2} + \frac{3}{4} + \frac{3}{8} + \frac{3}{16} + \frac{3}{32}$

c. $5 + 10 + 15 + 20 \ldots 5n$ **d.** $2 + 4 + 8 + 10 + 14 + 16$

2. **An example of a geometric series is ___.** 2. _____

a. $\frac{1}{2} + 1 + 1\frac{1}{2} + 2 + 2\frac{1}{2}$ **b.** $5 + 10 + 20 + 25 + 30$

c. $2 + 4 + 6 + 8 + 10$ **d.** $\frac{2}{3} + \frac{2}{6} + \frac{2}{12} + \frac{2}{24} + \frac{2}{48}$

3. $5! =$ ___.

a. 5 **b.** 20 **c.** 60 **d.** 120 3. _____

4. $\frac{8! \bullet 4!}{7! \bullet 3!} =$ ___.

a. $1\frac{11}{21}$ **b.** 14 **c.** 32 **d.** 96 4. _____

5. A representative from each of 7 nations is to sit at a round table to discuss trade relations. **The number of ways the representatives can be seated is ___.** 5. _____

a. 7 **b.** $7^2 = 49$ **c.** $6! = 720$ **d.** $7! = 5{,}040$

6. **The number of permutations that exist of the letters** W, X, Y, and Z, **taking three at a time, is ___.** 6. _____

a. 12 **b.** 4 **c.** 24 **d.** 48

7. An agriculture researcher wants to test the effect of 9 soil additives by adding 4 at a time to different rows of the same plant. **The number of different combinations she can test is ___.** 7. _____

a. 36 **b.** 120 **c.** 126 **d.** 15,120

8. **The number of different committees of** 3 **people that can be made from a group of** 4 **is ___.** 8. _____

a. 4 **b.** 8 **c.** 12 **d.** 24

9. A certain event has the probability of $\frac{3}{4}$. **The probability that the event will not occur is ___.** 9. _____

a. 1 **b.** $\frac{3}{4}$ **c.** $\frac{1}{2}$ **d.** $\frac{1}{4}$

10. The probability that a randomly selected person was born in June is $\frac{1}{12}$. **If five people are chosen at random and their birth months are noted, the probability that at least one has a June birthday is ___.** 10. _____

a. $\frac{161{,}051}{248{,}832}$ **b.** $\frac{87{,}781}{248{,}832}$ **c.** $\frac{14{,}641}{248{,}832}$ **d.** $\frac{1}{248{,}832}$

1110

Score:

1. **The graph of the parabola** $y = \frac{-x^2}{20}$ **opens ___.** 1. _____

a. upward **b.** downward **c.** to the right **d.** to the left

2. **Evaluate** $12x^2y^{-1}$ **for** $x = 3$ **and** $y = 4$. 2. _____

a. 23 **b.** 37 **c.** 27 **d.** 9

3. **Subtract** $2x^2 - 4x - 3$ **from** $x^2 - 5x - 8$. 3. _____

a. $-x^2 - x - 5$ **b.** $x^2 + 5x + 11$

c. $-x^2 - 9x - 11$ **d.** $-2x^2 - x - 5$

4. **Factor** $8x^2 + 72x + 112$ **completely.** 4. _____

a. $2(x + 8) \bullet 4(x + 14)$ **b.** $8(x + 2)(x + 14)$

c. $8(x + 9)(x + 14)$ **d.** $8(x + 7)(x + 2)$

5. **Solve** $\frac{y+4}{2y} + \frac{y-2}{3} = \frac{3y^2+10}{6y}$ **for** y. 5. _____

a. $y = 1, -2$ **b.** $y = 2, 1$ **c.** $y = 4, 2$ **d.** $y = -4, 2$

6. **Evaluate** $7i^4 - 12i^2$. 6. _____

a. 25 **b.** $-5i^2$ **c.** 17 **d.** 19

7. **Add.** $\begin{pmatrix} 2 & 8 \\ 7 & -4 \end{pmatrix} + \begin{pmatrix} 6 & -14 \\ 9 & 3 \end{pmatrix}$ 7. _____

a. $\begin{pmatrix} 8 & -6 \\ 16 & -1 \end{pmatrix}$ **b.** $\begin{pmatrix} -4 & 6 \\ -2 & 1 \end{pmatrix}$ **c.** $\begin{pmatrix} 14 & -12 \\ 5 & 10 \end{pmatrix}$ **d.** $\begin{pmatrix} 11 & 11 \\ 13 & -18 \end{pmatrix}$

8. **Find the 37th term of the sequence** 2, 5, 8, 11, 14, . . . 8. _____

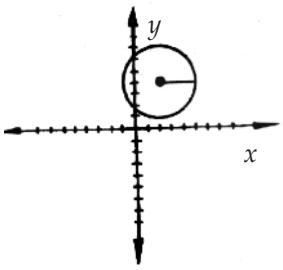
a. 74 **b.** 110 **c.** 111 **d.** 69

9. **What is the probability of drawing a yellow marble or a red marble from a bag containing** 12 yellow marbles, 16 red marbles, and 15 green marbles**?** 9. _____

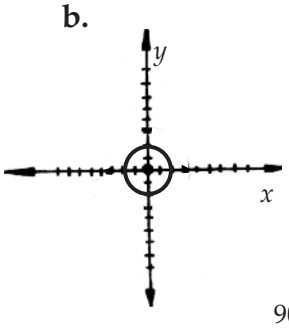
a. $\frac{12}{28}$ **b.** $\frac{16}{28}$ **c.** $\frac{28}{30}$ **d.** $\frac{28}{43}$

10. **The graph of the conic** $4x^2 + 4(y^2 - 4) = 0$ **is ___.** 10. _____

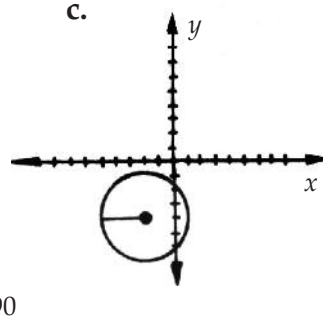
a.



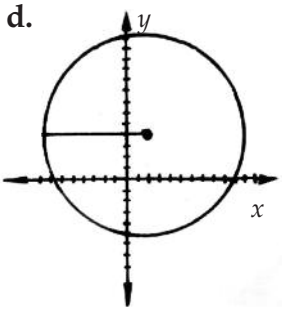
b.



c.



d.



1201

Score:

1. **The domain of the relation** $\{ (x, y) : y = \frac{2x - 5}{13x} \}$ **is ___.** 1. _____

a. $\{x: x = \frac{-5}{11}\}$ **b.** $\{y: y \in R\}$

c. $\{x: x \in R, x \neq 0\}$ **d.** $\{x:$ x is a positive number$\}$

2. **The range of the relation** $\{ (x, y) : y = |x| \}$ **is ___.**

a. $\{x: x \in R\}$ **b.** $\{y: y \geq 0\}$ 2. _____

c. $\{y: y \in R\}$ **d.** $\{y:$ y is a positive number$\}$

3. **Given the function** $G(x) = 2x^2 + 2x - 1$, $\boldsymbol{G(3)}$ **= ___.**

a. 1 and -2 **b.** 17 **c.** 23 **d.** 41 3. _____

4. **Given the function** $H(x) = x^2 - 3x + 5$, $\boldsymbol{H(a - b)}$ **= ___.**

a. $x^2 - 3x + 5$ **b.** $a^2 - b^2 - 3a + 3b$

c. $a^2 - b^2 - 3a - 3b + 5$ **d.** $a^2 - 2ab + b^2 - 3a + 3b + 5$ 4. _____

5. **Given** $f(x) = x + 4$ and $g(x) = 3x - 1$, $\boldsymbol{(f \bullet g)(x)}$ **= ___.**

a. $4x + 3$ **b.** $2x - 3$ **c.** $3x^2 + 12x + 3$ **d.** $3x + 11x - 4$ 5. _____

6. **Given** $f(x) = x + 2$ and $g(x) = \frac{1}{x - 1}$, $\frac{[g(x)]^2}{2f(x)}$ **= ___.** 6. _____

a. $\frac{2(x + 2)}{(x - 1)^2}$ **b.** $\frac{1}{2(x - 1)^2 (x + 2)}$

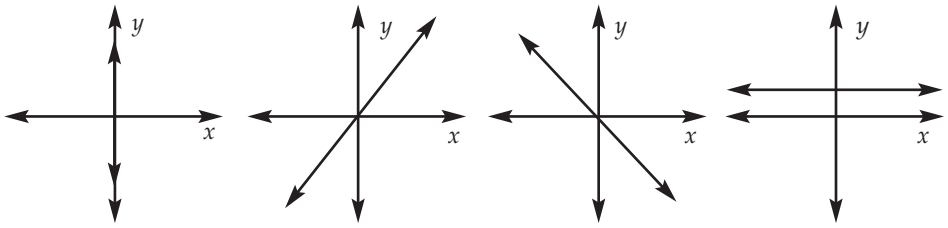
c. $\frac{2(x - 1)^2}{x + 2}$ **d.** $\frac{(x + 2)^2 (x - 1)}{2}$

7. **Given** $f(x) = x^2 + 6$ and $g(x) = 2x - 1$, $\boldsymbol{f[g(x)]}$ **= ___.**

a. $2x^2 + 11$ **b.** $2x^2 + 18$ **c.** $4x^2 - 4x$ **d.** $4x^2 - 4x + 7$ 7. _____

8. **The graph of the identity function,** $I(x) = x$ **is ___.** 8. _____

a. **b.** **c.** **d.**



9. **Given** $J = 2x + 6$, $\boldsymbol{J^{-1}}$ **= ___.** 9. _____

a. -4 **b.** $-2x - 6$ **c.** $\frac{1}{2x + 6}$ **d.** $\frac{x - 6}{2}$

10. **Given** $H = x^2 + 8$, $\boldsymbol{H^{-1}}$ **= ___.** 10. _____

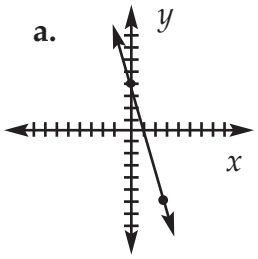
a. 9 **b.** $-x^2 - 8$ **c.** $\frac{1}{x^2 + 8}$ **d.** $\pm\sqrt{x - 8}$

1202

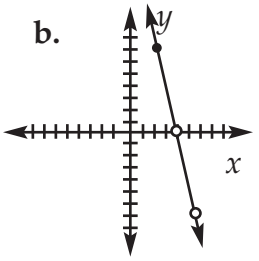
Score:

1. **The graph of** $h(x) = \frac{x^2 - 16}{x - 4}$ **is ___.** 1. _____

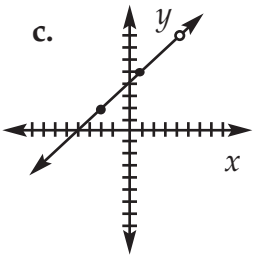
a.



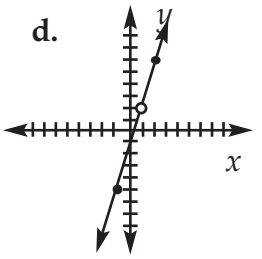
b.



c.

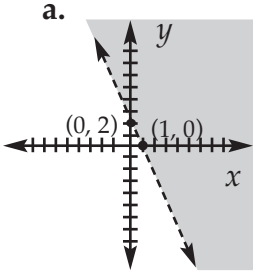


d.

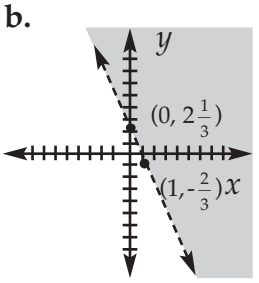


2. **The graph of** $9x + 3y - 7 > 0$ **is ___.** 2. _____

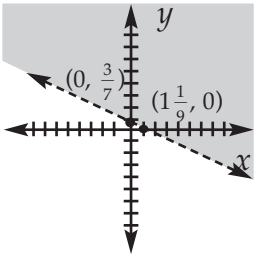
a.



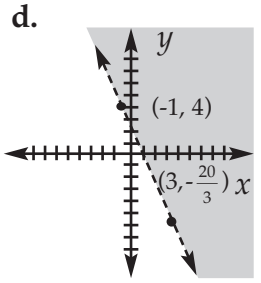
b.



c.

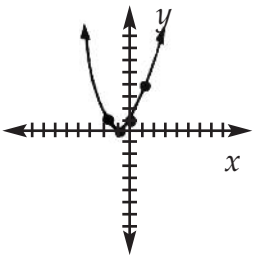


d.

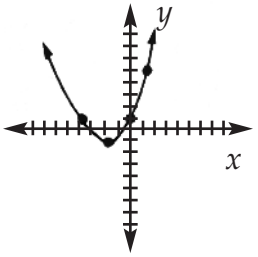


3. **The graph of** $y = x^2 + 2x + 1$ **is ___.** 3. _____

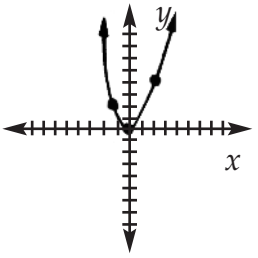
a.



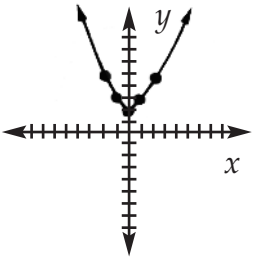
b.



c.

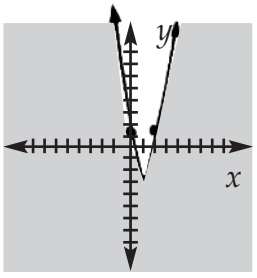


d.

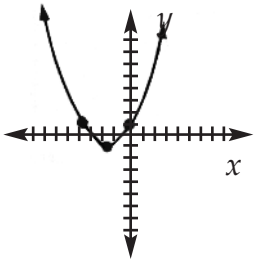


4. **The graph of** $D = \{ (x, y) : \ y \geq 2x^2 - 5x + 1\}$ **is ___.** 4. _____

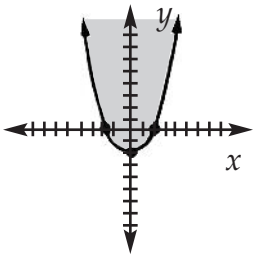
a.



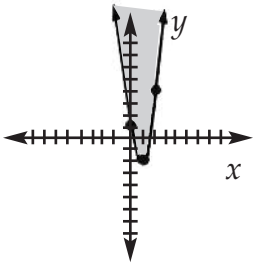
b.



c.



d.



5. Using the factor theorem **to determine whether** $(3x + 1)$ **is a factor of** $f(x) = 9x^3 + 6x^2 + 4x + 2$ **is shown by ___.** 5. _____

a.

$$
\begin{array}{r|l}
 & 3x^2 + x + 1 \qquad R\,1 \\
\hline
3x + 1 & 9x^3 + 6x^2 + 4x + 2 \\
 & \underline{9x^3 + 3x^2} \\
 & \quad 3x^2 + 4x \\
 & \quad \underline{3x^2 + x} \\
 & \qquad\quad 3x + 2 \\
 & \qquad\quad \underline{3x + 1} \\
 & \qquad\qquad\quad 1
\end{array}
$$

b. $(3x + 1)(3x^2 + x + 1) + 1$

c. $f(-\frac{1}{3}) = 9(-\frac{1}{3})^3 + 6(-\frac{1}{3})^2$

$+ 4(-\frac{1}{3}) + 2$

$= 9(-\frac{1}{27}) + 6(\frac{1}{9}) - \frac{4}{3} + 2$

$= -\frac{1}{3} + \frac{2}{3} - \frac{4}{3} + 2$

$= 1$

d.

$$
\begin{array}{r|l}
-\frac{1}{3} & 9 + 6 + 4 + 2 \\
 & \underline{-6 \;\; -5 \;\; -3 \;\; -1} \\
 & 3 + 1 + 1 + 1
\end{array}
$$

6. Using synthetic division to find $g(3)$ **if** $g(x) = 2x^3 - 3x^2 - 5x - 12$ **is shown by ___.** 6. _____

a. $g(3) = 2(3)^3 - 3(3)^2 - 5(3) - 12$

$= 2(27) - 3(9) - 15 - 12$

$= 54 - 27 - 27$

$= 0$

b.

$$
\begin{array}{r|l}
 & 2x^2 + 3x + 4 \\
\hline
x - 3 & 2x^3 - 3x^2 - 5x - 12 \\
 & \underline{2x^3 - 6x^2} \\
 & \quad 3x^2 - 5x \\
 & \quad \underline{3x^2 - 9x} \\
 & \qquad\quad 4x - 12 \\
 & \qquad\quad \underline{4x - 12} \\
 & \qquad\qquad\quad 0i
\end{array}
$$

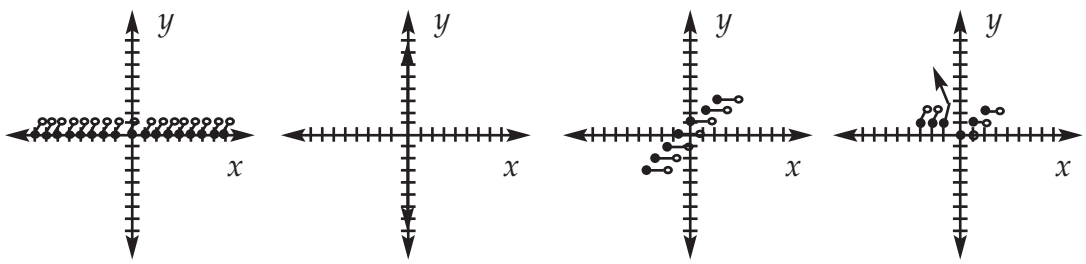
c.

$$
\begin{array}{r|l}
3 & 2 \;\; -3 \;\; -5 \;\; -12 \\
 & \underline{0 + 6 + 9 + 12} \\
 & 2 + 3 + 4 + 0
\end{array}
$$

d. $(x - 3)(2x^2 + 3x + 4)$

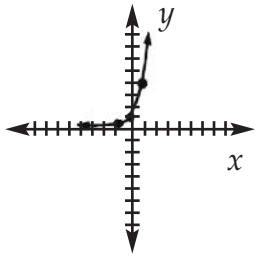
7. The graph of the greatest integer function $F(x) = x - [x]$ **is __.** 7. _____

a. **b.** **c.** **d.**

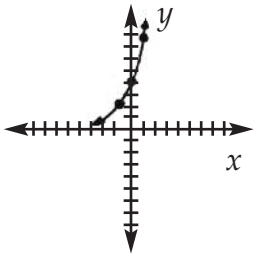


8. **The graph of the exponential function** $y = 2^{2x}$ **is ___.** 8. _____

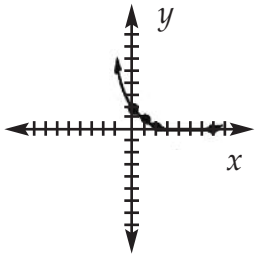
a.



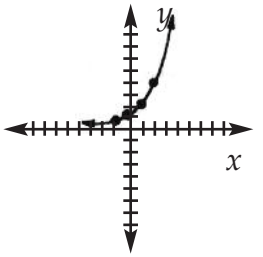
b.



c.

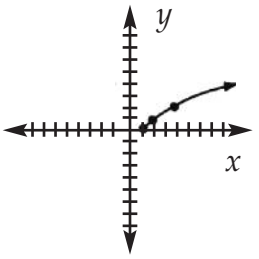


d.

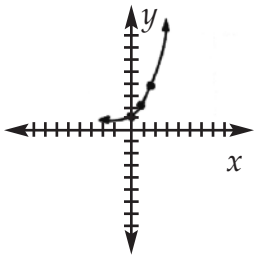


9. **The graph of the logarithmic function** $F(x) = \log_2 x$ **is ___.** 9. _____

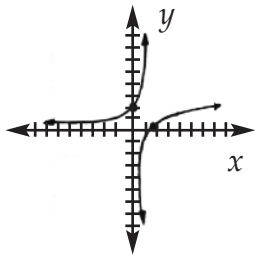
a.



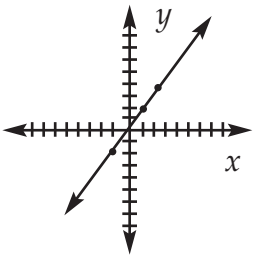
b.



c.



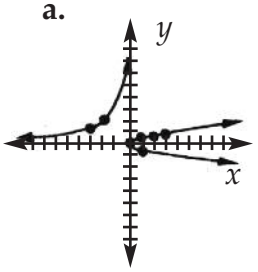
d.



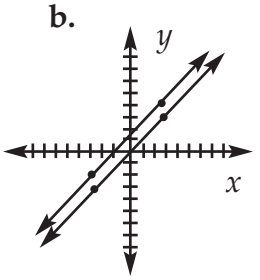
10. _____

10. **Given** $j(x) = x$ **and** $k(x) = x + 1$**, the graph of** $\frac{j}{k}$ **is ___.**

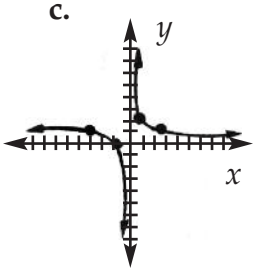
a.



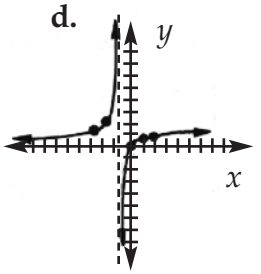
b.



c.



d.



1203

Score:

a. $(\theta, \frac{v}{r})$: ___ $\theta = \frac{v}{r}$ **b.** $(\theta, \frac{u}{r})$: ___ $\theta = \frac{u}{r}$

c. $(\theta, \frac{r}{v})$: ___ $\theta = \frac{r}{v}$ **d.** $(\theta, \frac{v}{u})$: ___ $\theta = \frac{v}{u}$

1. **Substituting** *sin, cos, or tan* **on the blank lines in the above selections, choose the correct definition for** 1a. _____ b. _____ c. _____

a. sin ___ b. cos ___ c. tan___.

2. **Using the trigonometric table** (found at the end of this section), **if** $\tan \theta = 5.769$, θ = ___. 2. _____

a. $9^0\ 50'$ **b.** $29^0\ 59'$ **c.** $80^0\ 10'$ **d.** $81^0\ 10'$

3. **Using the trigonometric table, the value of** $\sec 48^0\ 24'$ **is** ___. 3. _____

a. 1.337 **b.** 1.502 **c.** 1.506 **d.** 1.507

4. **The value of** $\tan 330^0\ 20'$ **is** ___. 4. _____

a. -0.5696 **b.** -0.5930 **c.** 0.5696 **d.** 1.756

5. **The value of** $\csc 210^0\ 17'$ **is** ___. 5. _____

a. -1.983 **b.** -1.158 **c.** -0.5285 **d.** 0.8643

6. **The value of** $(2 \cos 90^0) \bullet (\sin 270^0) + (\tan 180^0) \bullet (\cot 90^0)$ **is** ___. 6. _____

a. 0 **b.** 1 **c.** -2 **d.** undefined

7. **The value of** $\cot 90^0 + (\sec 180^0) \bullet (\csc 270^0) - \tan 0^0$ **is** ___. 7. _____

a. 1 **b.** 0 **c.** -1 **d.** undefined

8. **The value of** $(\csc 90^0 \bullet \cos 180^0)^3$ **is** ___. 8. _____

a. -1 **b.** 0 **c.** 1 **d.** undefined

9. **The value of sin** 60^0 **is** ___. 9. _____

a. $\sqrt{2}$ **b.** $\frac{\sqrt{2}}{2}$ **c.** $\frac{1}{2}$ **d.** $\frac{\sqrt{3}}{2}$

10. **Express** 36^0 **in radians:** ___. 10. _____

a. $\frac{5}{\pi}$ **b.** $\frac{\pi}{10}$ **c.** $\frac{\pi}{5}$ **d.** 5π

1204

Score:

1. **The value of** $\sin^2 \frac{\pi}{3}$ **is ___.** 1. _____

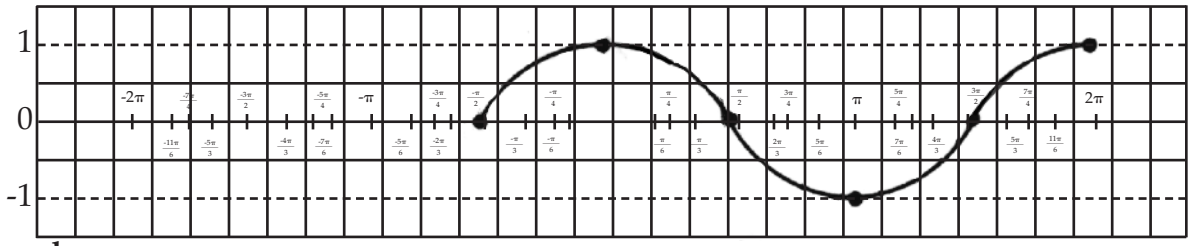
a. 0 **b.** $\frac{1}{4}$ **c.** $\frac{1}{2}$ **d.** $\frac{3}{4}$

2. **The value of** $\cos \frac{\pi}{6} + \sin \frac{5\pi}{6}$ **is ___.** 2. _____

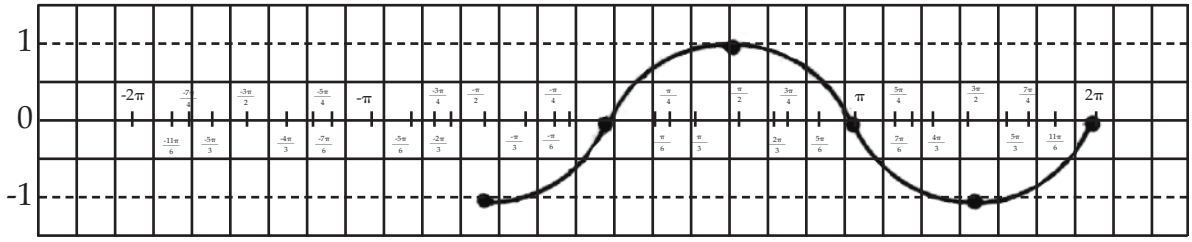
a. 0 **b.** 1 **c.** $\sqrt{3}$ **d.** $\frac{\sqrt{3}+1}{2}$

3. **The graph of** $y = \cos x, \ \frac{-\pi}{2} \leq x \leq 2\pi$ **is ___.** 3. _____

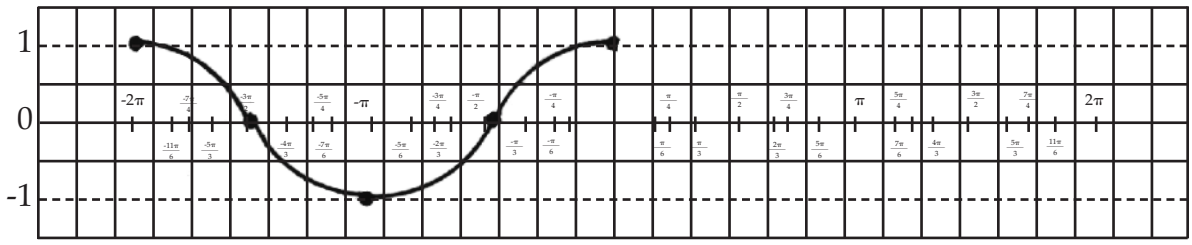
a.



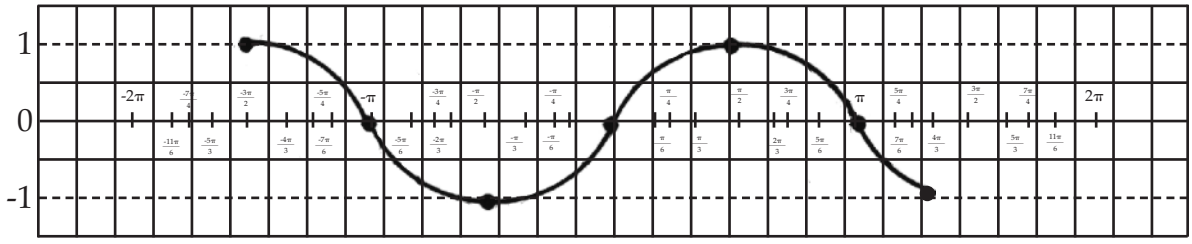
b.



c.

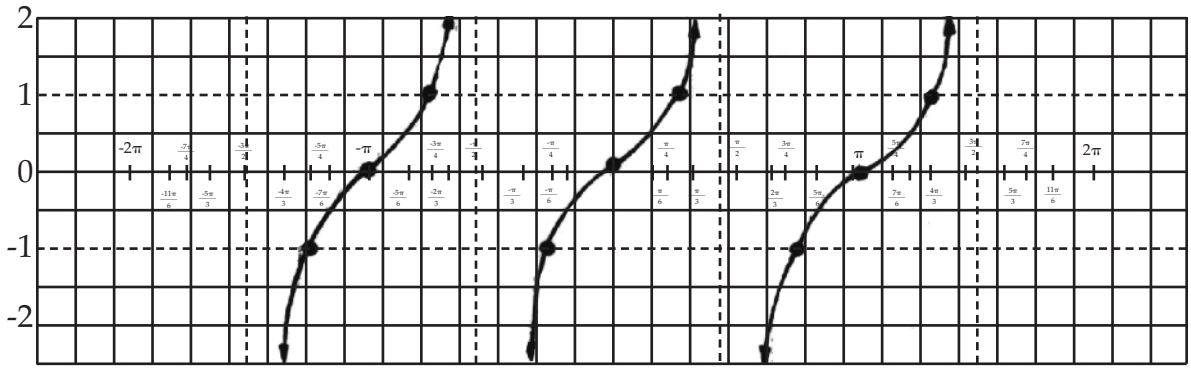


d.

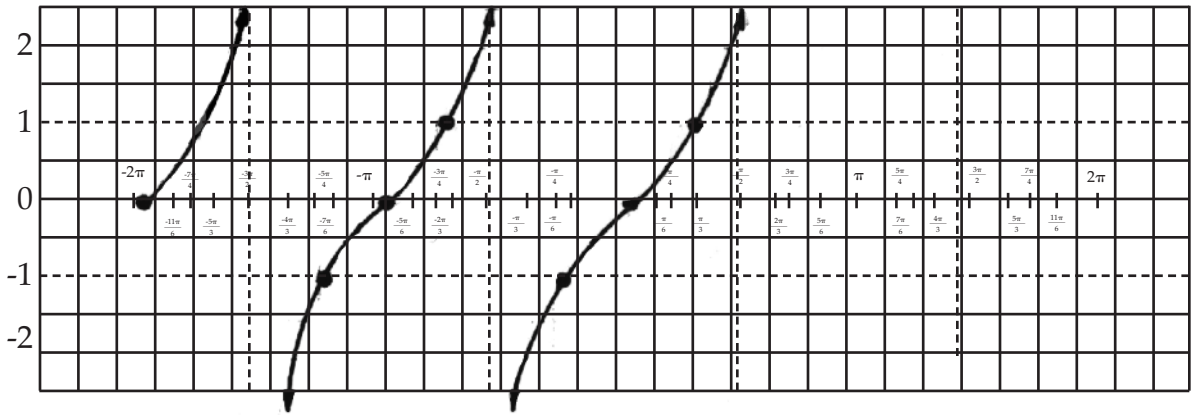


4. The graph of $y = \tan x$, $-2\pi \le x \le \frac{\pi}{2}$ **is ___.** 4. _____

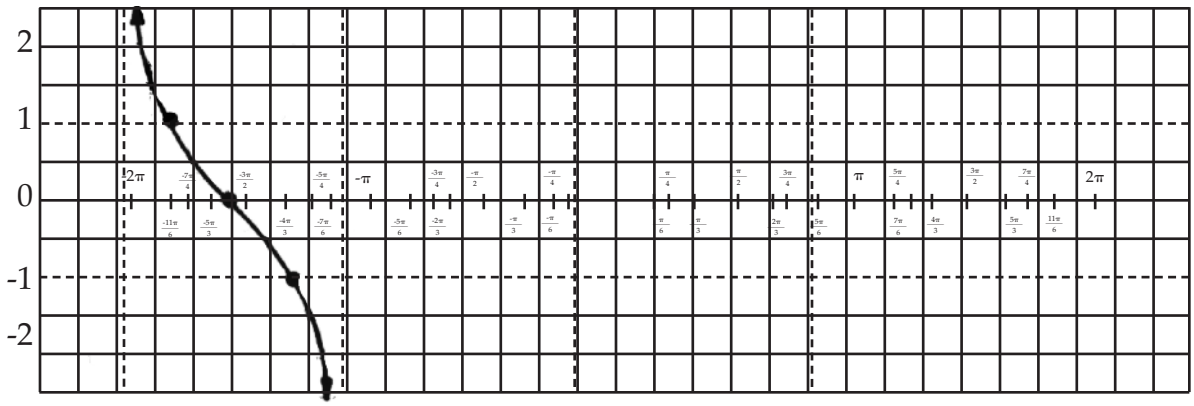
a.



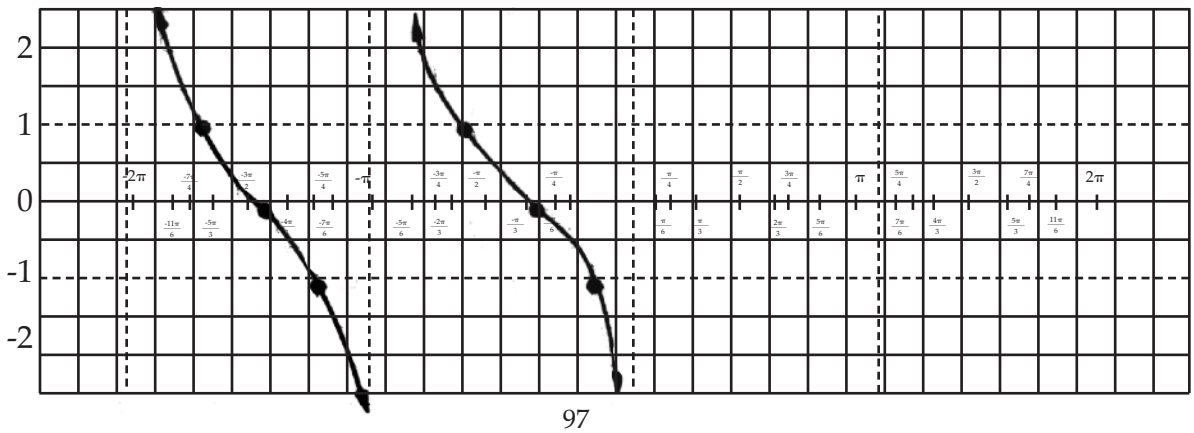
b.



c.



d.

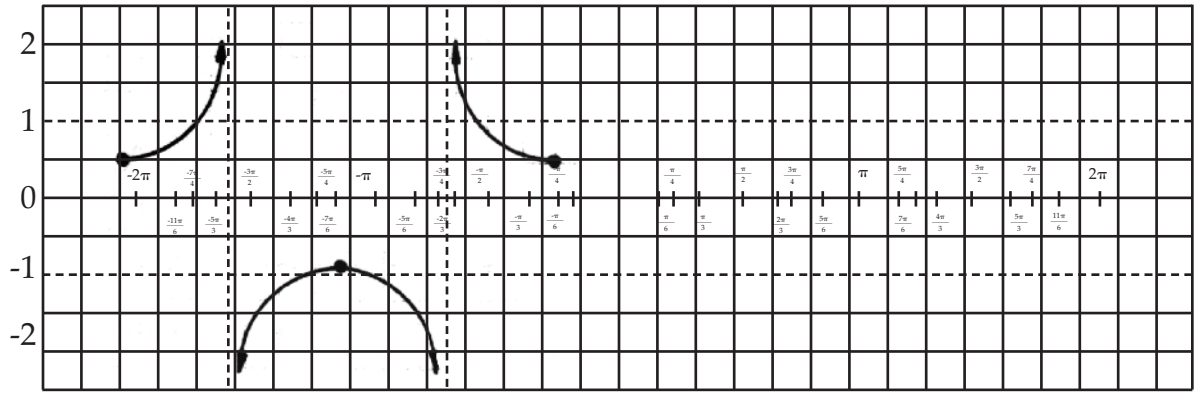


5. **The amplitude of** $y = -3 \sin x$ **is ___.** 5. _____

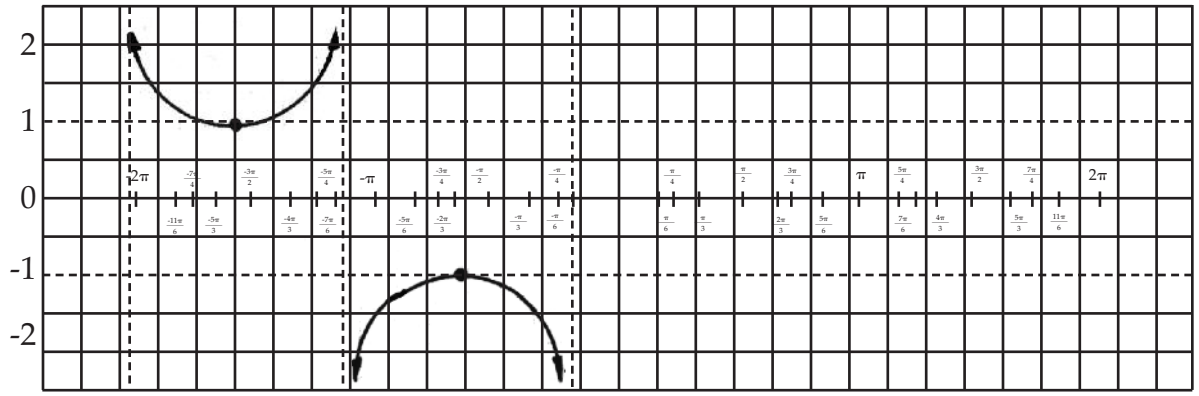
a. -3 **b.** 3 **c.** $\frac{-\pi}{2}$ **d.** 2π

6. **The graph of** $y = 2 \csc x$ **is ___.** 6. _____

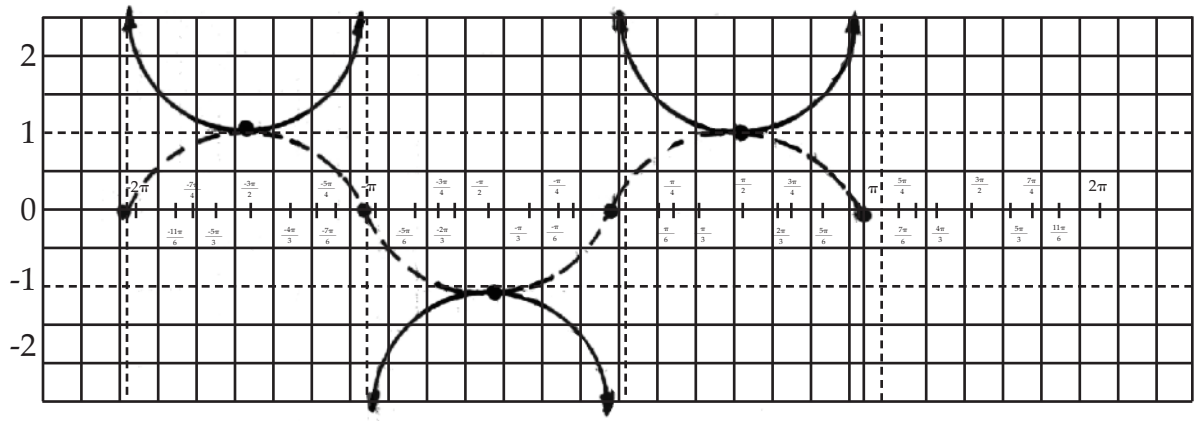
a.



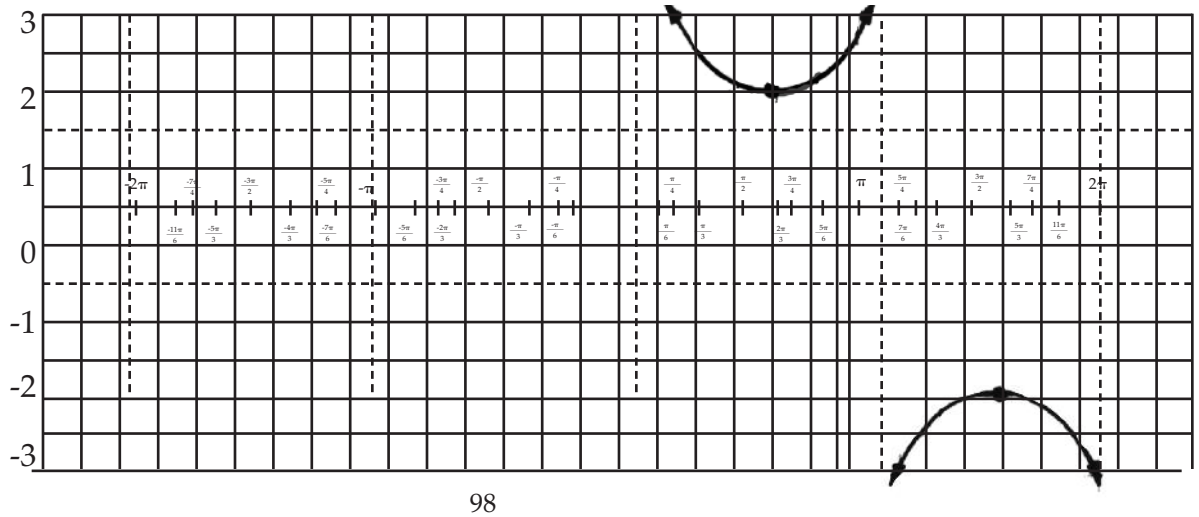
b.



c.



d.

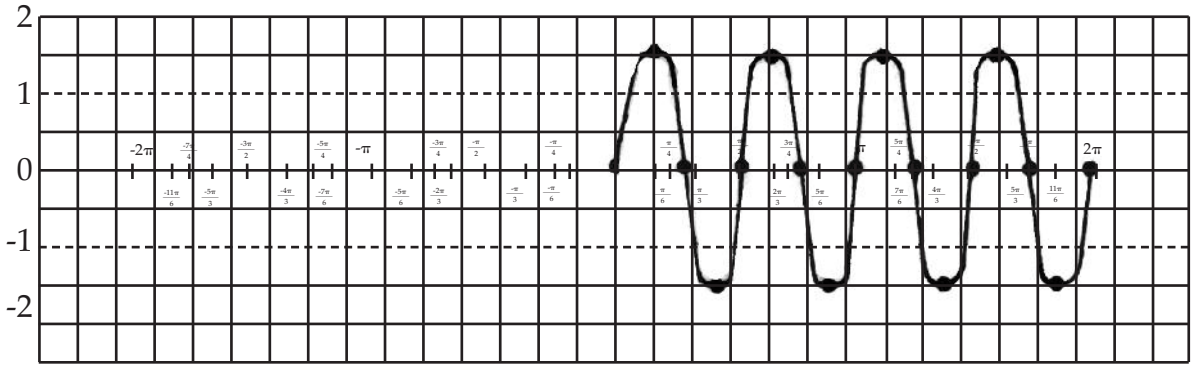


7. **The period of** $y = \sec \frac{x}{3}$ **is ___.** 7. _____

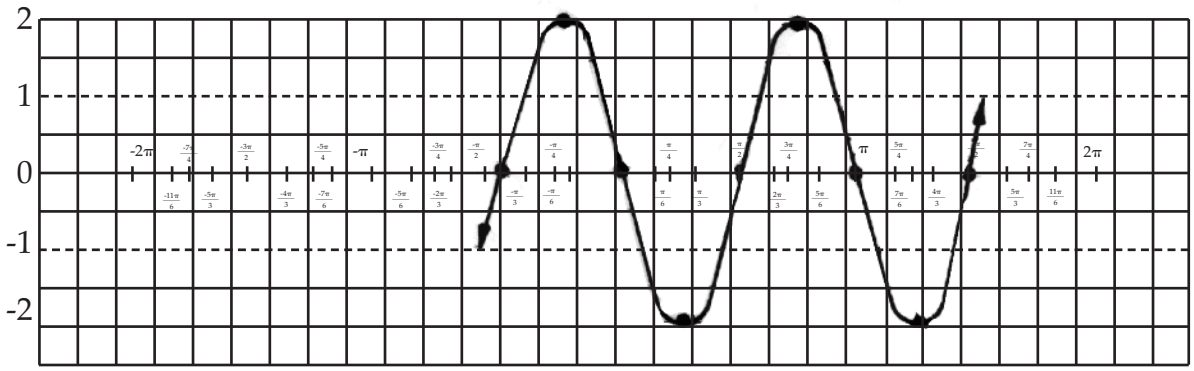
a. $\frac{1}{6\pi}$ **b.** $\frac{\pi}{3}$ **c.** 3π **d.** 6π

8. **The graph of** $y = 3 \cos 3x,\ 0 < x < 2\pi$ **is ___.** 8. _____

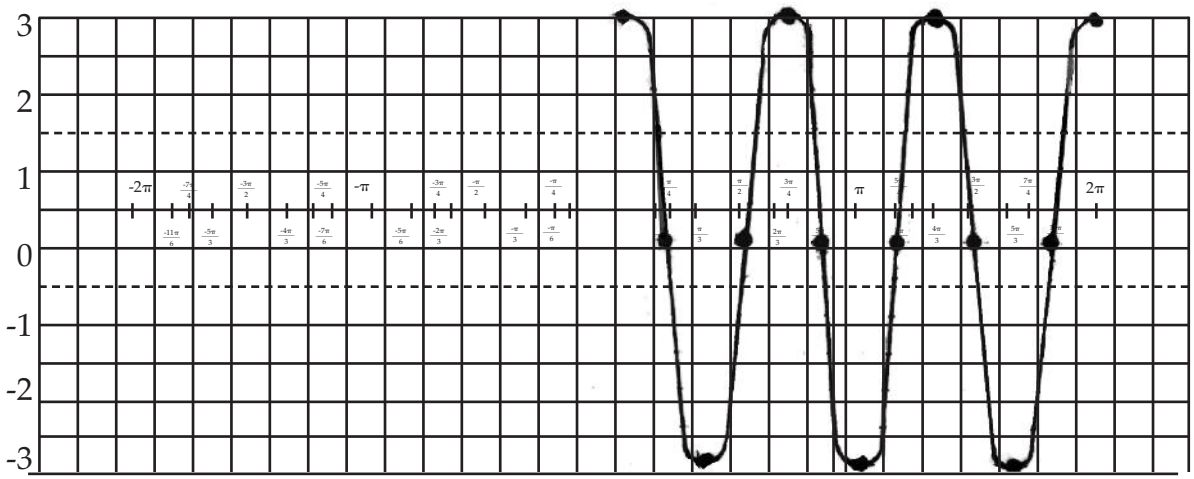
a.



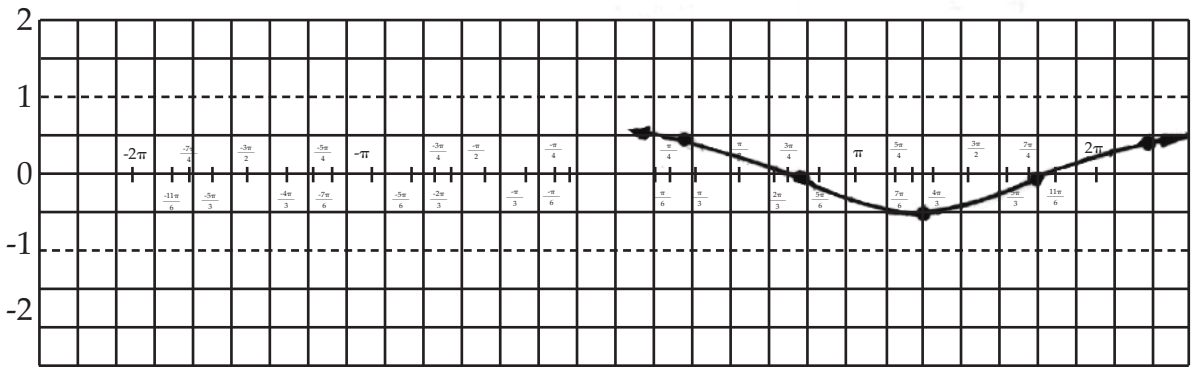
b.



c.



d.



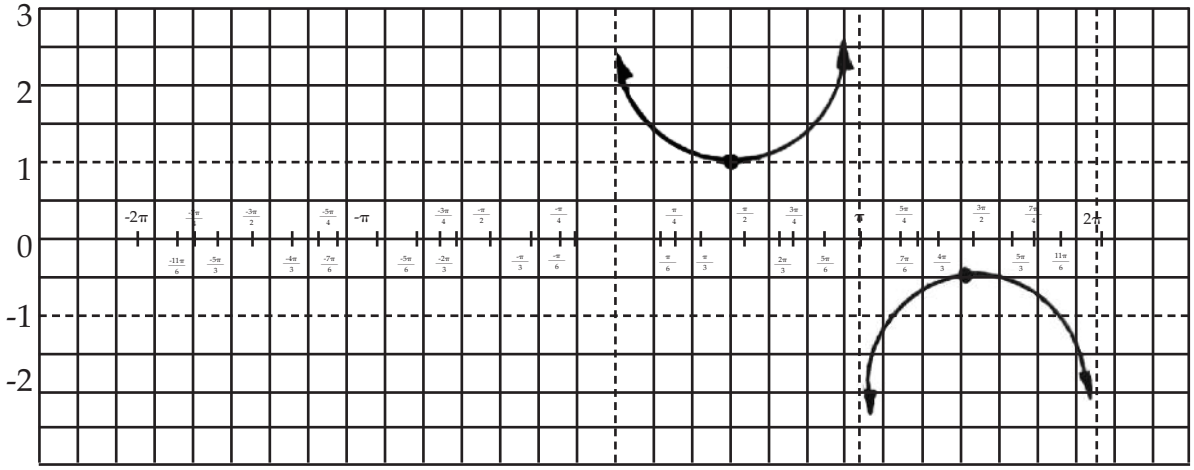
9. **The phase shift of** $F(x) = \cot(2x - 1)$ **is ___.** 9. _____

a. $\frac{\pi}{2}$ units left **b.** 1 unit left

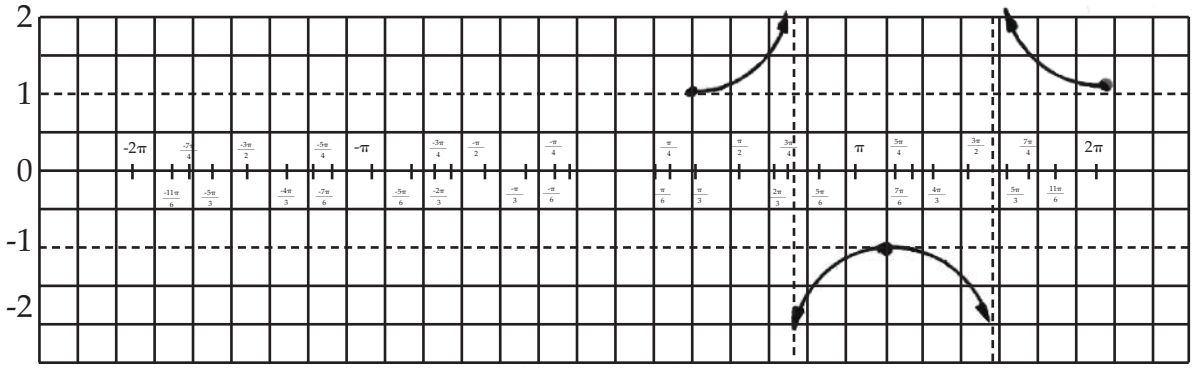
c. $\frac{1}{2}$ unit right **d.** π units right

10. **The graph of** $G(x) = \sec(x - \frac{\pi}{2})$ **is ___.** 10. _____

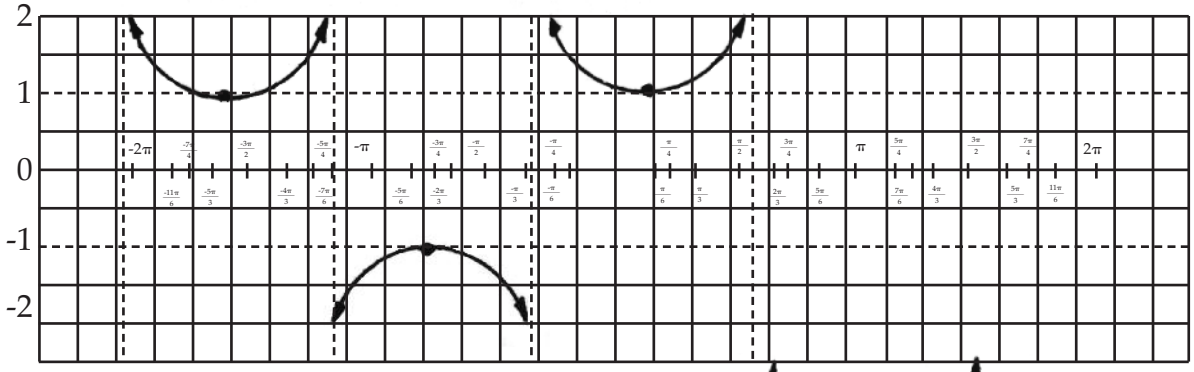
a.



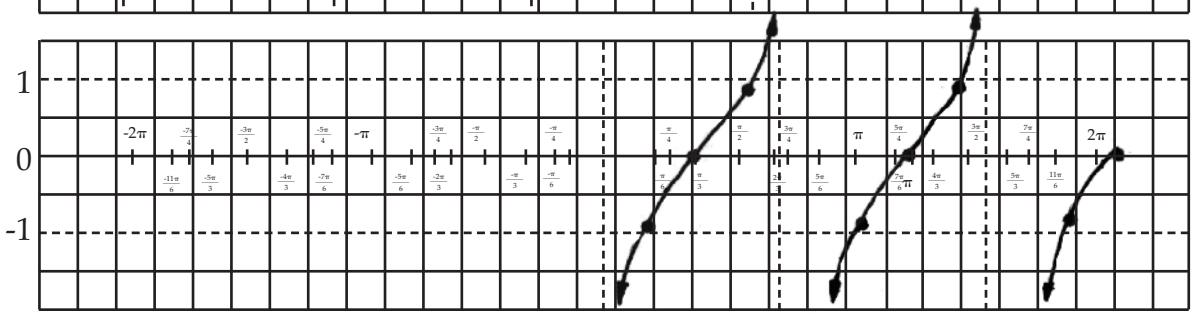
b.



c.



d.



1205

Score:

1. **The expression** $1 + \tan\theta \cot\theta - \frac{\sin\theta \csc\theta}{2}$ **simplifies to ___.** 1. _____

a. 0 **b.** 1 **c.** $1\frac{1}{2}$ **d.** 2

2. **The expression** $\frac{\sin\theta}{\cos\theta} \bullet \csc\theta + \frac{1}{\sec\theta}$ **equals ___.** 2. _____

a. $\sec\theta + \cos\theta$ **b.** $\frac{\sin^2\theta}{\cos\theta}$ **c.** $\sin\theta + \cos\theta$ **d.** $2\cos\theta$

3. **Given that α and β are first-quadrant angles,** $\sin\alpha = \frac{1}{2}$**, and** $\cos\beta = \frac{2}{3}$**, the value of** $\sin(\alpha - \beta)$ **is ___.** 3. _____

a. $-\frac{41}{12}$ **b.** $\frac{4 - 3\sqrt{5}}{12}$

c. $\frac{3\sqrt{3} + 4\sqrt{5}}{12}$ **d.** $\frac{2 - \sqrt{15}}{6}$

4. **Given that θ and ϕ are first-quadrant angles,** $\sin\theta = \frac{3}{5}$**, and** $\sin\phi = \frac{\sqrt{2}}{2}$**, the value of** $\tan(\theta + \phi)$ **is ___.** 4. _____

a. -9 **b.** $-\frac{1}{7}$ **c.** 7 **d.** $\frac{4\sqrt{2} + 3}{4 - 3\sqrt{2}}$

5. **Given that** $\cos x = \frac{\sqrt{2}}{2}$ **and** x **is a fourth-quadrant angle, the value of** $\cos 2x$ **is ___.** 5. _____

a. -1 **b.** 0 **c.** 1 **d.** 2

6. **Given that** $\cos\alpha = \frac{3}{5}$ **and α is a first quadrant angle, the value of** $\cos 2\alpha$ **is ___.** 6. _____

a $1\frac{1}{5}$ **b.** $\frac{24}{25}$ **c.** 1 **d.** $-\frac{7}{25}$

7. **Given that** $\cos x = \frac{1}{2}$ **and** x **is a fourth-quadrant angle, the value of** $\cos\frac{x}{2}$ **is ___.** 7. _____

a. $\frac{\sqrt{3}}{2}$ **b.** $\frac{1}{4}$ **c.** $\frac{\sqrt{2}}{2}$ **d.** $-\frac{1}{2}$

8. **Given that** $\sin\theta = \frac{12}{13}$ **and** θ **is a second-quadrant angle, the value of** $\sin\frac{\theta}{2}$ **is ___.** 8. _____

a. $-\frac{120}{169}$ **b.** $\frac{2\sqrt{13}}{13}$ **c.** $\frac{3\sqrt{13}}{13}$ **d.** $\frac{\sqrt{26}}{26}$

9. $\frac{2\tan x}{1+\tan^2 x} =$ ___. 9. _____

a. $\tan 2x$ **b.** $2\sin^2 x$ **c.** $2\frac{\sin^3 x}{\cos x}$ **d.** $\sin 2x$

10. **The solution to** $3\cot x + \sqrt{3} = 0$ **with domain** $0^0 \leq x \leq 360^0$ **is ___.** 10. _____

a. $x = \{60^0, 120^0\}$ **b.** $x = \{120^0, 300^0\}$

c. $x = \{150^0, 210^0\}$ **d.** $x = \{150^0, 330^0\}$

1206

Score:

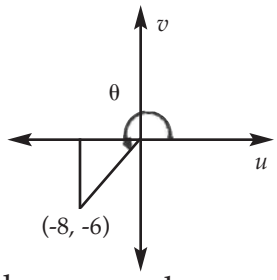
1. **Given the ordered pair** (-5, 5), **cos θ = ___.** 1. _____

a. $-\frac{\sqrt{3}}{2}$ **b.** $-\frac{\sqrt{2}}{2}$ **c.** -1 **d.** $\frac{\sqrt{2}}{2}$

2. **From the figure,** csc θ = **___.** 2. _____

a. $-\frac{5}{3}$ **b.** $-\frac{4}{3}$

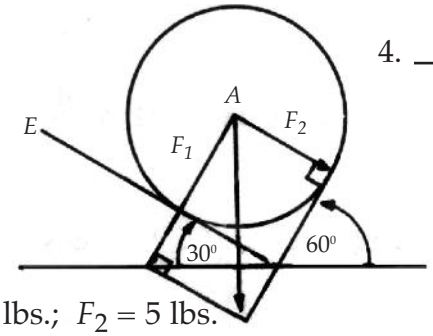
c. $-\frac{8}{5}$ **d.** $-\frac{6}{5}$



3. When a boy pulls his sled with a rope, the rope makes an angle of 40^0 with the horizontal. **If a pull of 18 pounds on the rope is needed to move the sled, the horizontal component is approximately ___.** 3. _____

a. 12 lbs. **b.** 14 lbs. **c.** 18 lbs. **d.** 23.5 lbs.

4. An iron ball weighing 10 pounds rests on two plane-surfaced boards that are inclined at 30^0 and 60^0 respectively to the horizontal.**The pressure on each board is approximately ___.** 4. _____



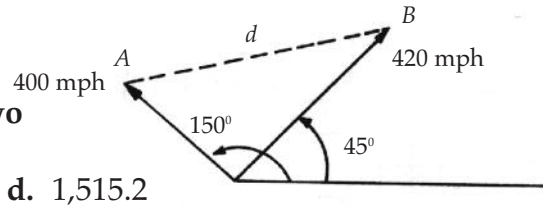
a. $F_1 = 9$ lbs.; $F_2 = 2$ lbs. **b.** $F_1 = 9$ lbs.; $F_2 = 5$ lbs.

c. $F_1 = 12$ lbs.; $F_2 = 20$ lbs. **d.** $F_1 = 20$ lbs.; $F_2 = 12$ lbs.

5. Given triangle *ABC*, $a = 3$, $b = 5$, and $c = 7$. 5. _____
To the nearest degree, ∠*B* = ___.

a. 22^0 **b.** 38^0 **c.** 120^0 **d.** 218^0

6. Two airplanes take off from an airport at the same time. One travels on a heading of 45^0 at 420 mph and the other on a heading of 150^0 at 400 mph. **After two hours, the distance between the two planes is about ___ miles.** 6. _____



a. 1,185.2 **b.** 1,252.5 **c.** 1,301.3 **d.** 1,515.2

7. **Given triangle *ABC*,** $c = 3$, $\angle A = 63^0$, $\angle C = 49^0$**; a ≐___.** 7. _____

a. 1 **b.** 4 **c.** 5 **d.** 8

8. A vertical telegraph pole is supported by two guy wires, each running from the top of the pole to the ground. One wire is 70 feet long and makes an angle of 55^0 with the ground. **If the second wire is 60 feet long, the angle it makes with the ground is ___.** 8. _____

a. 45^0 **b.** 48^0 **c.** 73^0 **d.** 82^0

9. The pilot wishes to fly on course 290^0 with an air speed of 300 knots when the wind blows from direction 224^0 at 18 knots. **The wind correction angle is ___.** 9. _____

a. $3^0\ 8'$ **b.** $5^0\ 42'$ **c.** $11^0\ 59'$ **d.** $15^0\ 14'$

10. Two submarines, one cruising at 25 knots and the other at 20 knots, left a naval base at the same moment. Three hours later they were 100 nautical miles apart. **The measure of the angle between their courses was ___.** 10. _____

a. 26^0 **b.** 95^0 **c.** 154^0 **d.** 175^0

1207

Score:

1. The general solution to $y = \cos^{-1} 1$ **is ___.** 1. _____

a. $\pm 2\pi K$ **b.** $\frac{\pi}{2} \pm 2\pi K$ or $\frac{3\pi}{2} \pm 2\pi K$

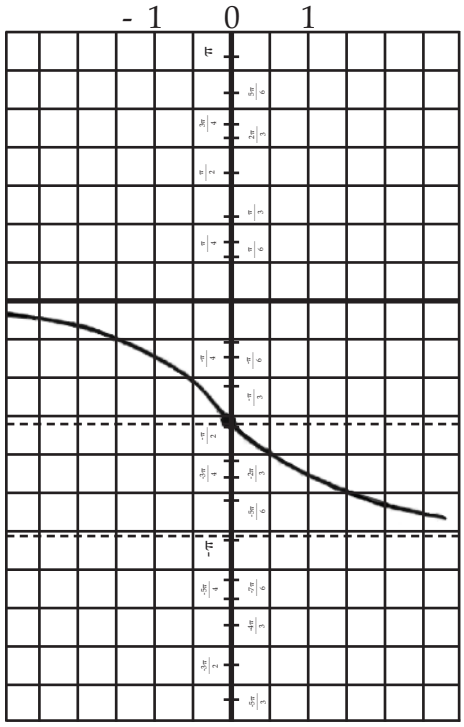
c. $\pm \frac{\pi}{6} \pm 2\pi K$ **d.** $\frac{\pi}{4} \pm \pi K$ or $\frac{3\pi}{4} \pm \pi K$

2. The general solution to arctan 0.7002 is ___. 2. _____

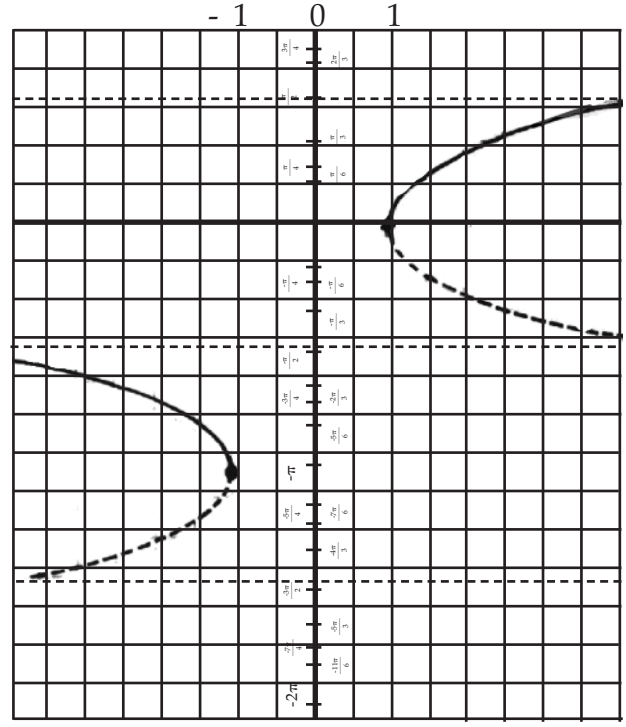
a. $35^0 \pm 360^0 K$ or $215^0 \pm 360^0 K$ **b.** $35^0 \pm 360^0 K$ or $305^0 \pm 360^0 K$ **c.** $38^0\,40' \pm 360^0 K$ or $218^0\,40' \pm 360^0 K$ **d.** $55^0 \pm 360^0 K$ or $235^0 \pm 360^0 K$

3. The graph of $y = \arctan x,\ 0 \le x \le \pi$ **is ___.** 3. _____

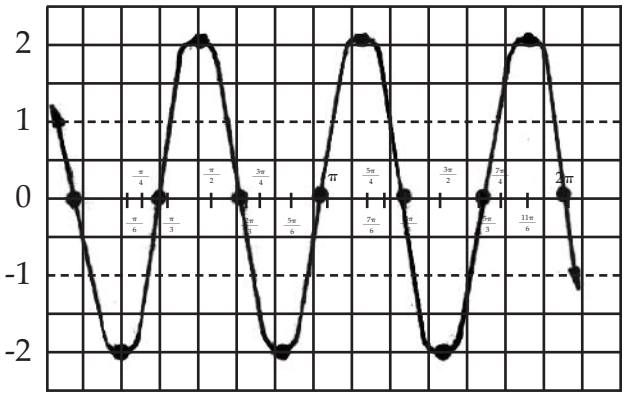
a.



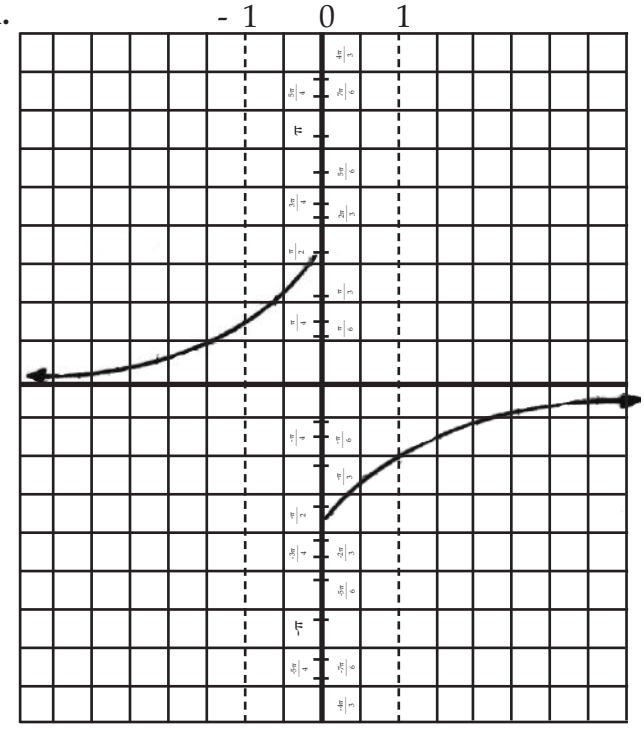
b.



c.

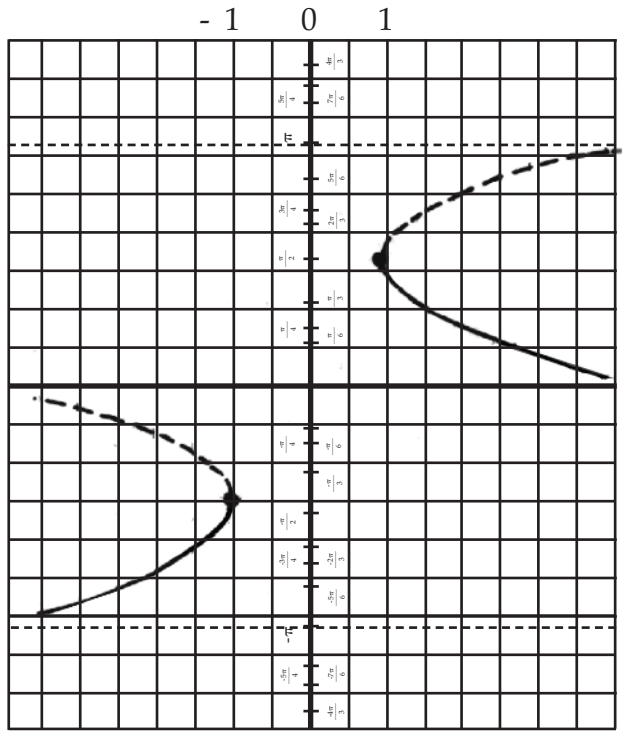


d.

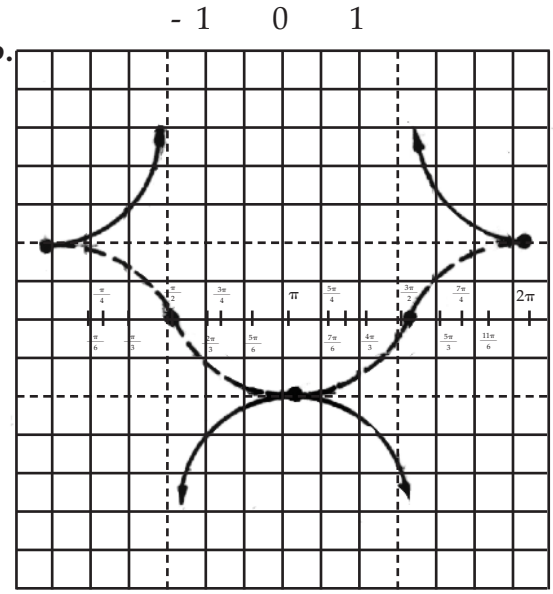


4. The graph of $y = \text{arcsec}\, x$ is ___. 4. _____

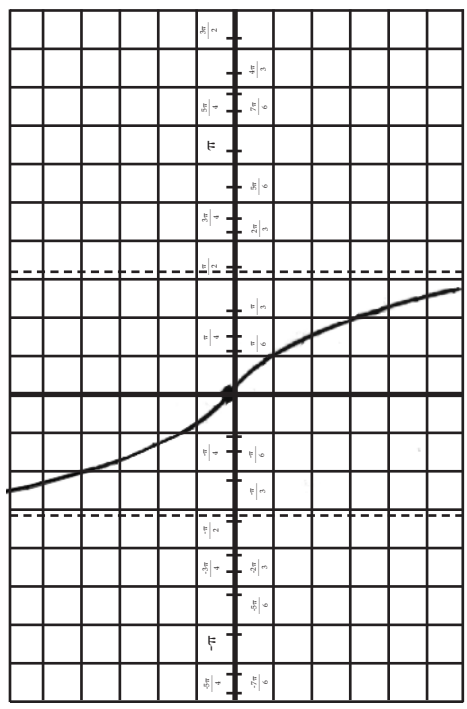
a.



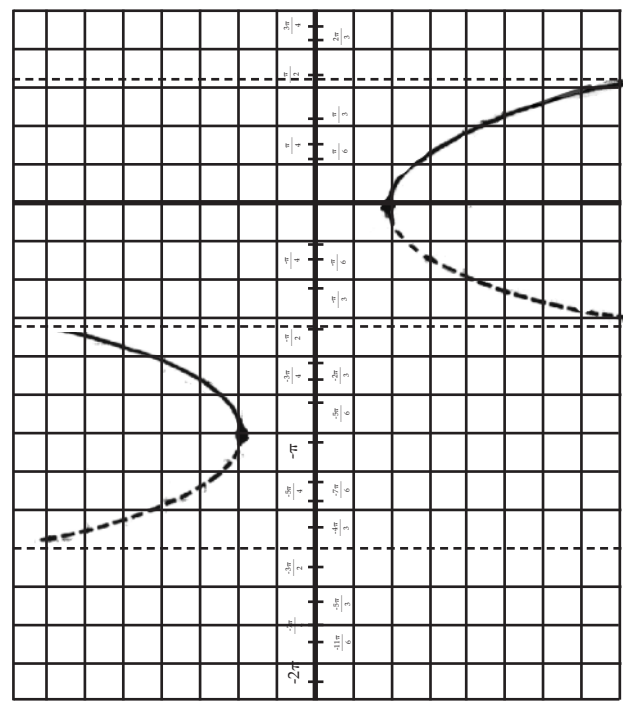
b.



c.



d.



5. The polar coordinates $(3, \frac{-3\pi}{4})$ expressed as Cartesian coordinates are ___. 5. _____

a. $(-\frac{3\sqrt{2}}{2}, -\frac{3\sqrt{2}}{2})$ **b.** $(-\frac{3\sqrt{2}}{2}, \frac{3\sqrt{2}}{2})$

c. $(\frac{3\sqrt{2}}{2}, -\frac{3\sqrt{2}}{2})$ **d.** $(\frac{3\sqrt{2}}{2}, \frac{3\sqrt{2}}{2})$

6. **The Cartesian coordinates** $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$ **expressed as polar coordinates are ___.** 6. _____

a. $(1, \frac{\pi}{6})$ **b.** $(1, \frac{5\pi}{6})$ **c.** $(2, \frac{\pi}{3})$ **d.** $(4, \frac{4\pi}{3})$

7. **The polar equation** $r \sin \theta = 4$ **converted to a Cartesian equation is ___.** 7. _____

a. $x = 4$ **b.** $y = 4$ **c.** $x^2 + y^2 = 2$ **d.** $x^2 + y^2 = 4$

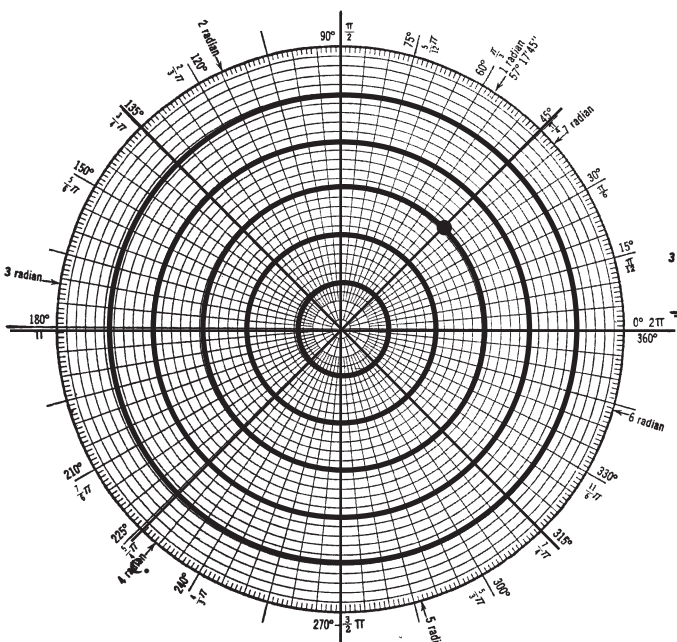
8. **The Cartesian equation** $x^2 + y^2 - 4x = 0$ **converted to a polar equation is ___.** 8. _____

a. $4 \cos \theta = 0$ **b.** $4 \cos \theta = 1$

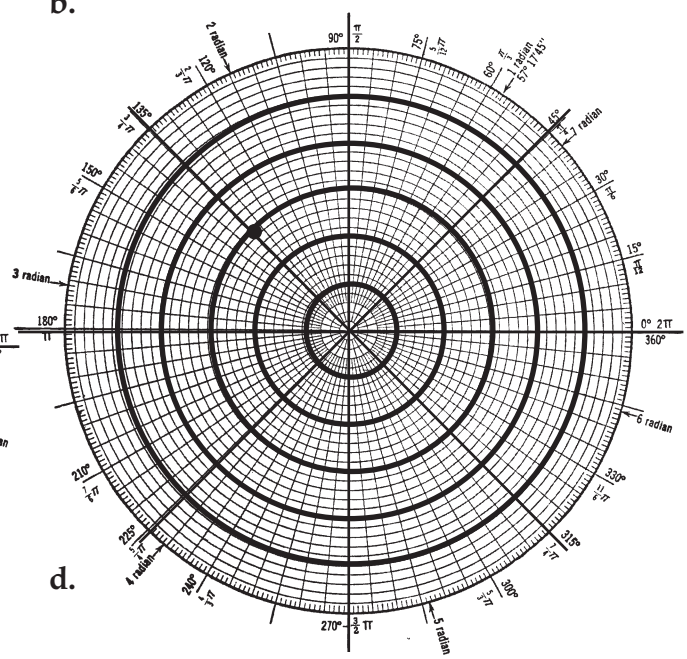
c. $r = 4 \sin \theta$ **d.** $r = 4 \cos \theta$

9. **The graph of** $(3, \frac{7\pi}{4})$ **is ___.** 9. _____

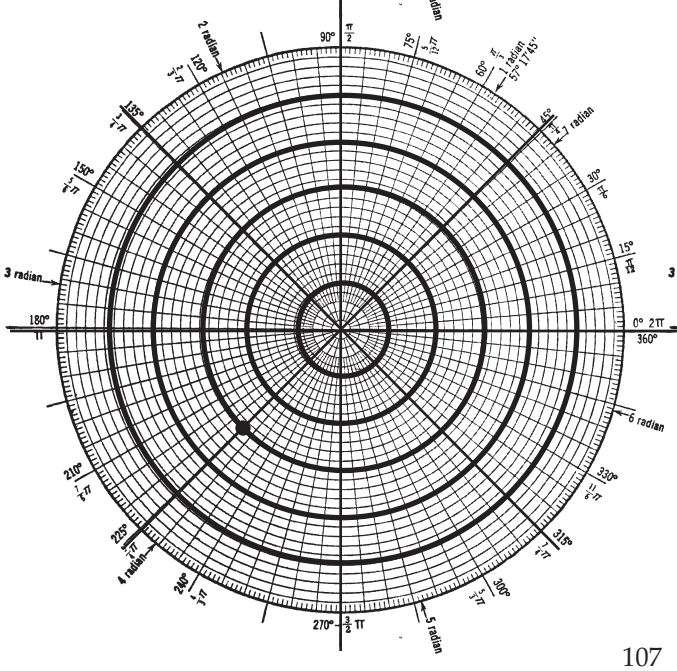
a.



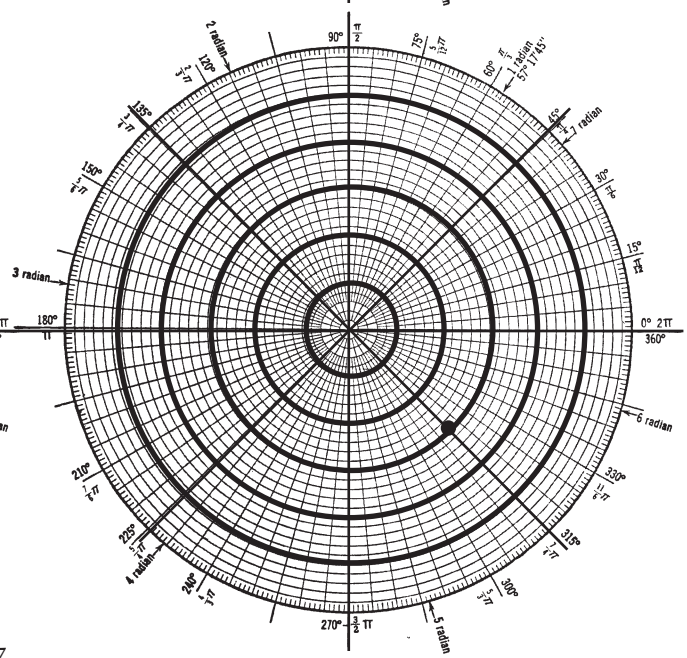
b.



c.

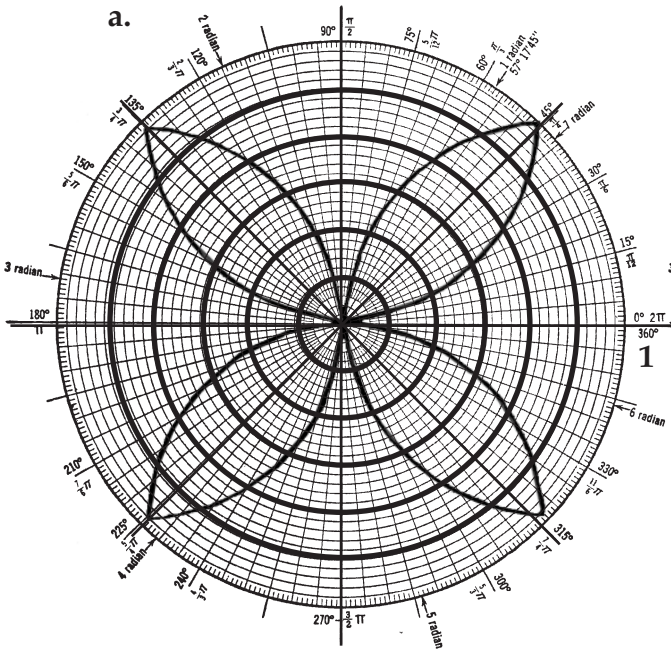


d.

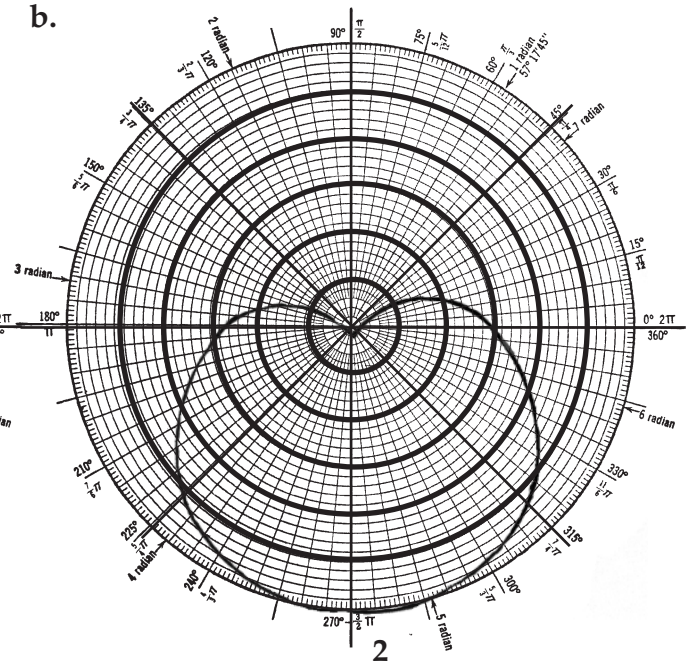


10. The graph of $r = 1 + \cos\theta$ is ___. 10. _____

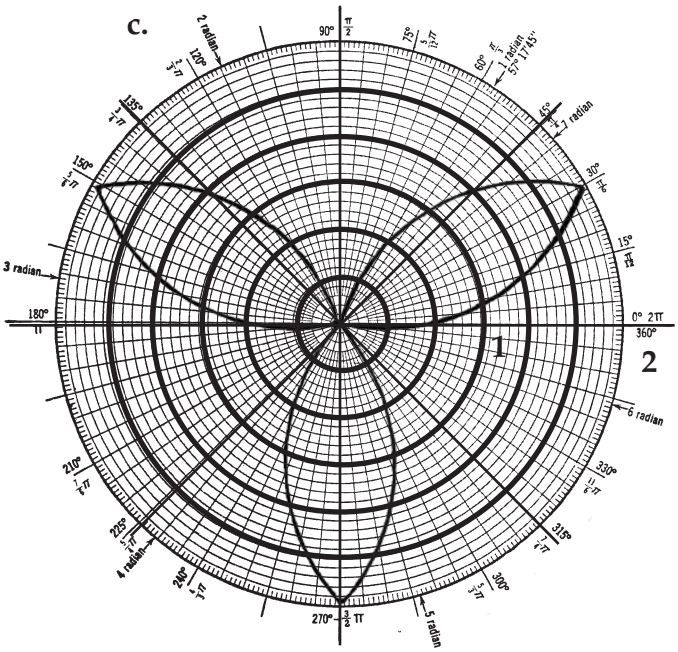
a.



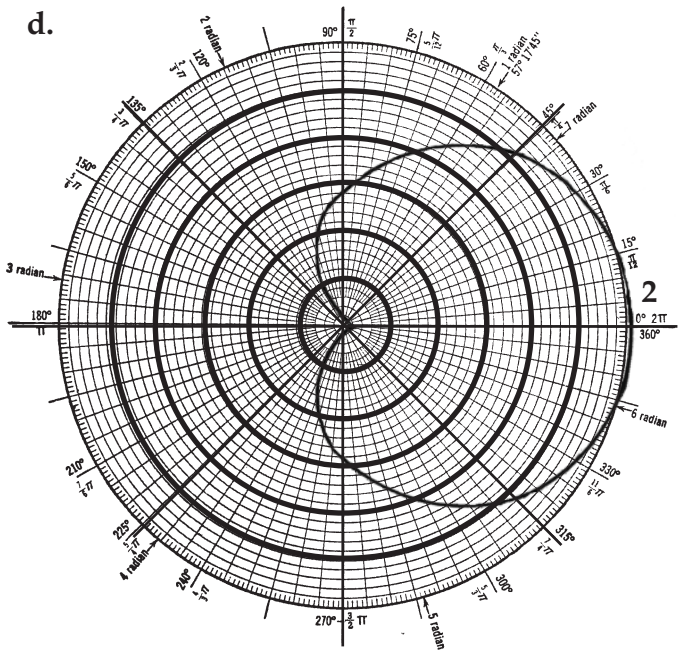
b.



c.



d.



1208

Score:

1. **The equation of** $3x^2 + 2x - 5y + 7 = 0$ **is the equation of ___.** 1. _____

   a. a circle **b.** an ellipse **c.** a parabola **d.** a hyperbola

2. **The equation** $13x^2 + 5y^2 - 6x + 3y - 5 = 0$ **is the equation of ___.** 2. _____

   a. a circle **b.** an ellipse **c.** a parabola **d.** a hyperbola

3. **The vertex, focus, and directrix of the parabola whose equation is** $y^2 = 4x$ **are ___.** 3. _____

   a. v = (4, 4) f = (5, 4) d: $x = -5$ **b.** v = (1, 2) f = (4, 0) d: $y = -4$

   c. v = (0, 0) f = (4, 0) d: $x = -4$ **d.** v = (0, 0) f = (1, 0) d: $x = -1$

4. **The center and values of** a, b, **and** c **of the hyperbola whose equation is** $\frac{(x-1)^2}{9} - \frac{(y-3)^2}{4} = 1$ **are ___.** 4. _____

   a. center = (1, 3)
   $a = 9,\ b = 4,\ c = \sqrt{97}$

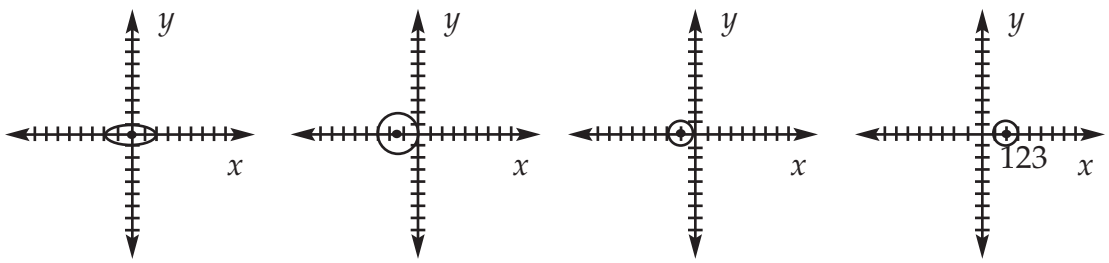
   b. center = (1, 0)
   $a = 1,\ b = 3,\ c = \sqrt{10}$

   c. center = (0, 0)
   $a = 9,\ b = 4,\ c = \sqrt{13}$

   d. center = (1, 3)
   $a = 3,\ b = 2,\ c = \sqrt{13}$

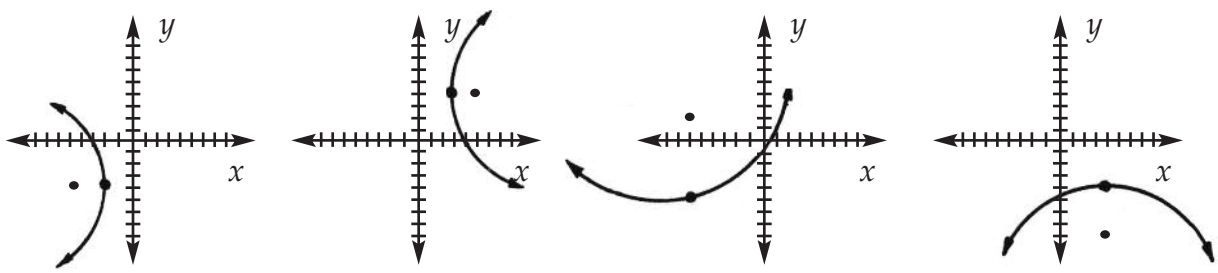
5. **The graph of** $x^2 + y^2 + 2x = 0$ **is ___.** 5. _____

a. **b.** **c.** **d.**



6. **The graph of** $(y + 4)^2 = -12(x + 2)$ **is ___.** (each mark = 4) 6. _____

a. **b.** **c.** **d.**



7. **The translation of** $2x^2 + 3y^2 - 8x + 6y - 7 = 0$ **to its new center is ___.** 7. _____

   a. $\frac{(x')^2}{9} + \frac{(y')^2}{6} = 1$

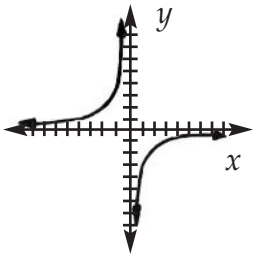
   b. $\frac{(x')^2}{7} + \frac{(y')^2}{8} = 1$

   c. $2(x' - 2)^2 + 3(y' + 1)^2 = 6$

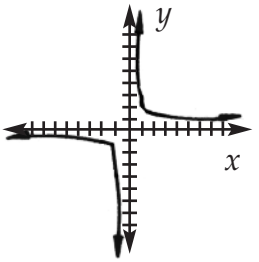
   d. $(x')^2 + (y')^2 = 1$

8. The graph of the translation of $2xy - x - y + 4 = 0$ **is ___.** 8. _____

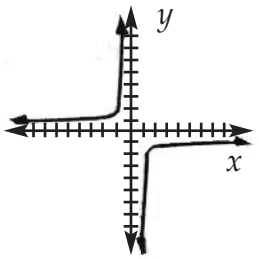
a. $2xy + 3 = 0$



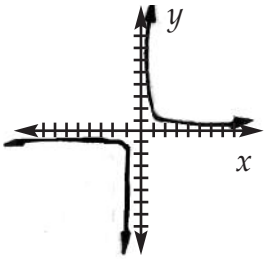
b. $3x'y' - 4 = 0$



c. $4x'y' + 7 = 0$



d. $5x'y' - 6 = 0$



9. The equation $7x^2 - 6\sqrt{3}xy + 13y^2 = 16$, **when rotated is ___.** 9. _____

a. $7(x')^2 + 13(y')^2 = \frac{8\sqrt{3}}{9}$

b. $(x')^2 + 5(y')^2 = 16$

c. $(x')^2 + 4(y')^2 = 4$

d. $3(x')^2 - 2(y')^2 = 12$

10. The equation $x^2 + 4xy + y^2 = 16$, **when transformed, is ___.** 10. _____

a. $(x')^2 + 8(y')^2 = 1$

b. $(x')^2 - (y')^2 = 1$

c. $\frac{(x')^2}{6} + \frac{(y')^2}{2} = 1$

d. $\frac{(x')^2}{\frac{16}{3}} - \frac{(y')^2}{16} = 1$

1209

Score:

1. A letter of the alphabet is chosen at random. **The probability that the letter chosen is a vowel is ___.** 1. _____

a. $\frac{2}{13}$ **b.** $\frac{5}{21}$ **c.** $\frac{5}{26}$ **d.** 5

2. From an assortment containing seven blue light bulbs, four red bulbs, and three white bulbs, a bulb is chosen at random. **The probability that it will not be red is ___.** 2. _____

a. 0.29 **b.** 0.40 **c.** 0.50 **d.** 0.71

3. An integer is chosen at random from the first 40 positive integers. **The probability that the integer chosen is divisible by** 6 **or** 8 **is ___.** 3. _____

a. 0.050 **b.** 0.250 **c.** 0.275 **d.** 0.580

4. A certain class of 160 students has 50 honor students and 70 athletes. Sixty students in the class are not honor students and are not involved in sports. **If a student is selected at random to represent the class, the probability that he is an honor student or an athlete is ___.** 4. _____

a. $\frac{1}{8}$ **b.** $\frac{1}{4}$ **c.** $\frac{7}{16}$ **d.** $\frac{5}{8}$

5. A job applicant estimates that his chance of passing a qualifying examination is $\frac{2}{3}$ and his chance of being appointed if he does pass is $\frac{1}{4}$. **The probability that he will receive the job is ___.** 5. _____

a. 0.167 **b.** 0.343 **c.** 0.833 **d.** 0.917

6. One bag contains three green marbles and five blue marbles, and a second bag contains four green marbles and six blue marbles. A person draws one marble from each bag. **The probability that both marbles are blue is ___.** 6. _____

a. 0.150 **b.** 0.375 **c.** 0.611 **d.** 1.225

7. **The value of** ${}_7P_2$ **is ___.**

a. 14 **b.** 25 **c.** 38 **d.** 42 7. _____

8. **The number of ways** 5 **men and** 5 **women can be seated at a round table if the men and women alternate is ___.** 8. _____

a. 240 **b.** 625 **c.** 2,500 **d.** 2,880

9. **The value of** ${}_{10}C_{10}$ **is ___.**

a. 1 **b.** 10 **c.** 100 **d.** 3,628,800 9. _____

10. A research scientist is testing whether drugs interact, so that two drugs might be given simultaneously. **If he is concerned with ten drugs, the number of pairs he must consider is ___.** 10. _____

a. 5 **b.** 20 **c.** 45 **d.** 90

1210

Score:

1. **Given that** $f(x) = 3x^3 + x - 1$, **evaluate the function:** $f(-2)$ 1. _____

a. 27 **b.** -27 **c.** 25 **d.** -21

2. **Evaluate the limits:** $\lim_{x \to -2} \frac{1}{x^3}$ 2. _____

a. $-\frac{1}{16}$ **b.** $\frac{1}{8}$ **c.** $-\frac{1}{8}$ **d.** $-\frac{1}{2}$

3. **Find the slope of the function:** $f(x) = 7 - 3x$ 3. _____

a. -3 **b.** -12 **c.** 6 **d.** -6

4. **Given** $g(x) = 4x - 1$ **and** $h(x) = 2x^2$, **find the function:** $g[h(x)]$ 4. _____

a. $4x^2 - 1$ **b.** $7x^2$ **c.** $8x^2 - 2x$ **d.** $8x^2 - 1$

5. **Solve** $3x^2 + x - 10 \leq 0$. 5. _____

a. $-5 \leq x \leq \frac{2}{3}$ **b.** $-2 \leq x \leq \frac{5}{3}$

c. $2 \geq x \geq -\frac{5}{3}$ **d.** $2 \leq x \leq \frac{5}{3}$

6. A circular gear turns 120^0 per hour. **Through how many radians does it turn in a 24-hour day?** 6. _____

a. 8 **b.** 16π **c.** $\frac{2}{3}\pi$ **d.** 12

7. **Solve the equation;** domain $0^0 \leq \theta \leq 360^0$. **Answer to the nearest whole degree:** $2 \sin \theta - \sqrt{3} = 0$. 7. _____

a. $\theta = 60^0, 120^0$ **b.** $\theta = 40^0, 80^0$ **c.** $\theta = 120^0, 360^0$ **d.** $\theta = 90^0$

8. A rock weighing 25 pounds rests on a hill that makes an angle of 30^0 with the horizontal. **How much of the friction force is needed to prevent the rock from rolling down the hill?** 8. _____

a. 10 lbs. **b.** 12.5 lbs. **c.** 15 lbs. **d.** 18 lbs.

9. **Express the Cartesian equation in polar equation form:** 9. _____

$2x - 3y + 4 = 0$

a. $r(2 \cos \theta - 3 \sin \theta) + 4 = 0$ **b.** $r(3 \cos \theta - 2 \sin \theta) + 4 = 0$

c. $r(3 \sin \theta - 2 \cos \theta) - 4 = 0$ **d.** $r(\cos \theta - \sin \theta) + 4 = 0$

10. **In how many ways can 6 campers sit around a campfire?** 10. _____

a. 25 **b.** 600 **c.** 30 **d.** 120

VALUES OF TRIGONOMETRIC FUNCTIONS

m∠θ Degrees	Radians	sin θ	csc θ	tan θ	cot θ	sec θ	cos θ		
0° 00′	.0000	.0000	Undefined	.0000	Undefined	1.000	1.0000	1.5708	90° 00′
10′	.0029	.0029	343.8	.0029	343.8	1.000	1.0000	1.5679	50′
20′	.0058	.0058	171.9	.0058	171.9	1.000	1.0000	1.5650	40′
30′	.0087	.0087	114.6	.0087	114.6	1.000	1.0000	1.5621	30′
40′	.0116	.0116	85.95	.0116	85.94	1.000	.9999	1.5592	20′
50′	.0145	.0145	68.76	.0145	68.75	1.000	.9999	1.5563	10′
1° 00′	.0175	.0175	57.30	.0175	57.29	1.000	.9998	1.5533	89° 00′
10′	.0204	.0204	49.11	.0204	49.10	1.000	.9998	1.5504	50′
20′	.0233	.0233	42.98	.0233	42.96	1.000	.9997	1.5475	40′
30′	.0262	.0262	38.20	.0262	38.19	1.000	.9997	1.5446	30′
40′	.0291	.0291	34.38	.0291	34.37	1.000	.9996	1.5417	20′
50′	.0320	.0320	31.26	.0320	31.24	1.001	.9995	1.5388	10′
2° 00′	.0349	.0349	28.65	.0349	28.64	1.001	.9994	1.5359	88° 00′
10′	.0378	.0378	26.45	.0378	26.43	1.001	.9993	1.5330	50′
20′	.0407	.0407	24.56	.0407	24.54	1.001	.9992	1.5301	40′
30′	.0436	.0436	22.93	.0437	22.90	1.001	.9990	1.5272	30′
40′	.0465	.0465	21.49	.0466	21.47	1.001	.9989	1.5243	20′
50′	.0495	.0494	20.23	.0495	20.21	1.001	.9988	1.5213	10′
3° 00′	.0524	.0523	19.11	.0524	19.08	1.001	.9986	1.5184	87° 00′
10′	.0553	.0552	18.10	.0553	18.07	1.002	.9985	1.5155	50′
20′	.0582	.0581	17.20	.0582	17.17	1.002	.9983	1.5126	40′
30′	.0611	.0610	16.38	.0612	16.35	1.002	.9981	1.5097	30′
40′	.0640	.0640	15.64	.0641	15.60	1.002	.9980	1.5068	20′
50′	.0669	.0669	14.96	.0670	14.92	1.002	.9978	1.5039	10′
4° 00′	.0698	.0698	14.34	.0699	14.30	1.002	.9976	1.5010	86° 00′
10′	.0727	.0727	13.76	.0729	13.73	1.003	.9974	1.4981	50′
20′	.0756	.0756	13.23	.0758	13.20	1.003	.9971	1.4952	40′
30′	.0785	.0785	12.75	.0787	12.71	1.003	.9969	1.4923	30′
40′	.0814	.0814	12.29	.0816	12.25	1.003	.9967	1.4893	20′
50′	.0844	.0843	11.87	.0846	11.83	1.004	.9964	1.4864	10′
5° 00′	.0873	.0872	11.47	.0875	11.43	1.004	.9962	1.4835	85° 00′
10′	.0902	.0901	11.10	.0904	11.06	1.004	.9959	1.4806	50′
20′	.0931	.0929	10.76	.0934	10.71	1.004	.9957	1.4777	40′
30′	.0960	.0958	10.43	.0963	10.39	1.005	.9954	1.4748	30′
40′	.0989	.0987	10.13	.0992	10.08	1.005	.9951	1.4719	20′
50′	.1018	.1016	9.839	.1022	9.788	1.005	.9948	1.4690	10′
6° 00′	.1047	.1045	9.567	.1051	9.514	1.006	.9945	1.4661	84° 00′
10′	.1076	.1074	9.309	.1080	9.255	1.006	.9942	1.4632	50′
20′	.1105	.1103	9.065	.1110	9.010	1.006	.9939	1.4603	40′
30′	.1134	.1132	8.834	.1139	8.777	1.006	.9936	1.4573	30′
40′	.1164	.1161	8.614	.1169	8.556	1.007	.9932	1.4544	20′
50′	.1193	.1190	8.405	.1198	8.345	1.007	.9929	1.4515	10′
7° 00′	.1222	.1219	8.206	.1228	8.144	1.008	.9925	1.4486	83° 00′
10′	.1251	.1248	8.016	.1257	7.953	1.008	.9922	1.4457	50′
20′	.1280	.1276	7.834	.1287	7.770	1.008	.9918	1.4428	40′
30′	.1309	.1305	7.661	.1317	7.596	1.009	.9914	1.4399	30′
40′	.1338	.1334	7.496	.1346	7.429	1.009	.9911	1.4370	20′
50′	.1367	.1363	7.337	.1376	7.269	1.009	.9907	1.4341	10′
8° 00′	.1396	.1392	7.185	.1405	7.115	1.010	.9903	1.4312	82° 00′
10′	.1425	.1421	7.040	.1435	6.968	1.010	.9899	1.4283	50′
20′	.1454	.1449	6.900	.1465	6.827	1.011	.9894	1.4254	40′
30′	.1484	.1478	6.765	.1495	6.691	1.011	.9890	1.4224	30′
40′	.1513	.1507	6.636	.1524	6.561	1.012	.9886	1.4195	20′
50′	.1542	.1536	6.512	.1554	6.435	1.012	.9881	1.4166	10′
9° 00′	.1571	.1564	6.392	.1584	6.314	1.012	.9877	1.4137	81° 00′
		cos θ	sec θ	cot θ	tan θ	csc θ	sin θ	Radians	Degrees m∠θ

VALUES OF TRIGONOMETRIC FUNCTIONS

m∠θ Degrees	Radians	sin θ	csc θ	tan θ	cot θ	sec θ	cos θ		
9° 00′	.1571	.1564	6.392	.1584	6.314	1.012	.9877	1.4137	81° 00′
10′	.1600	.1593	6.277	.1614	6.197	1.013	.9872	1.4108	50′
20′	.1629	.1622	6.166	.1644	6.084	1.013	.9868	1.4079	40′
30′	.1658	.1650	6.059	.1673	5.976	1.014	.9863	1.4050	30′
40′	.1687	.1679	5.955	.1703	5.871	1.014	.9858	1.4021	20′
50′	.1716	.1708	5.855	.1733	5.769	1.015	.9853	1.3992	10′
10° 00′	.1745	.1736	5.759	.1763	5.671	1.015	.9848	1.3963	80° 00′
10′	.1774	.1765	5.665	.1793	5.576	1.016	.9843	1.3934	50′
20′	.1804	.1794	5.575	.1823	5.485	1.016	.9838	1.3904	40′
30′	.1833	.1822	5.487	.1853	5.396	1.017	.9833	1.3875	30′
40′	.1862	.1851	5.403	.1883	5.309	1.018	.9827	1.3846	20′
50′	.1891	.1880	5.320	.1914	5.226	1.018	.9822	1.3817	10′
11° 00′	.1920	.1908	5.241	.1944	5.145	1.019	.9816	1.3788	79° 00′
10′	.1949	.1937	5.164	.1974	5.066	1.019	.9811	1.3759	50′
20′	.1978	.1965	5.089	.2004	4.989	1.020	.9805	1.3730	40′
30′	.2007	.1994	5.016	.2035	4.915	1.020	.9799	1.3701	30′
40′	.2036	.2022	4.945	.2065	4.843	1.021	.9793	1.3672	20′
50′	.2065	.2051	4.876	.2095	4.773	1.022	.9787	1.3643	10′
12° 00′	.2094	.2079	4.810	.2126	4.705	1.022	.9781	1.3614	78° 00′
10′	.2123	.2108	4.745	.2156	4.638	1.023	.9775	1.3584	50′
20′	.2153	.2136	4.682	.2186	4.574	1.024	.9769	1.3555	40′
30′	.2182	.2164	4.620	.2217	4.511	1.024	.9763	1.3526	30′
40′	.2211	.2193	4.560	.2247	4.449	1.025	.9757	1.3497	20′
50′	.2240	.2221	4.502	.2278	4.390	1.026	.9750	1.3468	10′
13° 00′	.2269	.2250	4.445	.2309	4.331	1.026	.9744	1.3439	77° 00′
10′	.2298	.2278	4.390	.2339	4.275	1.027	.9737	1.3410	50′
20′	.2327	.2306	4.336	.2370	4.219	1.028	.9730	1.3381	40′
30′	.2356	.2334	4.284	.2401	4.165	1.028	.9724	1.3352	30′
40′	.2385	.2363	4.232	.2432	4.113	1.029	.9717	1.3323	20′
50′	.2414	.2391	4.182	.2462	4.061	1.030	.9710	1.3294	10′
14° 00′	.2443	.2419	4.134	.2493	4.011	1.031	.9703	1.3265	76° 00′
10′	.2473	.2447	4.086	.2524	3.962	1.031	.9696	1.3235	50′
20′	.2502	.2476	4.039	.2555	3.914	1.032	.9689	1.3206	40′
30′	.2531	.2504	3.994	.2586	3.867	1.033	.9681	1.3177	30′
40′	.2560	.2532	3.950	.2617	3.821	1.034	.9674	1.3148	20′
50′	.2589	.2560	3.906	.2648	3.776	1.034	.9667	1.3119	10′
15° 00′	.2618	.2588	3.864	.2679	3.732	1.035	.9659	1.3090	75° 00′
10′	.2647	.2616	3.822	.2711	3.689	1.036	.9652	1.3061	50′
20′	.2676	.2644	3.782	.2742	3.647	1.037	.9644	1.3032	40′
30′	.2705	.2672	3.742	.2773	3.606	1.038	.9636	1.3003	30′
40′	.2734	.2700	3.703	.2805	3.566	1.039	.9628	1.2974	20′
50′	.2763	.2728	3.665	.2836	3.526	1.039	.9621	1.2945	10′
16° 00′	.2793	.2756	3.628	.2867	3.487	1.040	.9613	1.2915	74° 00′
10′	.2822	.2784	3.592	.2899	3.450	1.041	.9605	1.2886	50′
20′	.2851	.2812	3.556	.2931	3.412	1.042	.9596	1.2857	40′
30′	.2880	.2840	3.521	.2962	3.376	1.043	.9588	1.2828	30′
40′	.2909	.2868	3.487	.2994	3.340	1.044	.9580	1.2799	20′
50′	.2938	.2896	3.453	.3026	3.305	1.045	.9572	1.2770	10′
17° 00′	.2967	.2924	3.420	.3057	3.271	1.046	.9563	1.2741	73° 00′
10′	.2996	.2952	3.388	.3089	3.237	1.047	.9555	1.2712	50′
20′	.3025	.2979	3.357	.3121	3.204	1.048	.9546	1.2683	40′
30′	.3054	.3007	3.326	.3153	3.172	1.049	.9537	1.2654	30′
40′	.3083	.3035	3.295	.3185	3.140	1.049	.9528	1.2625	20′
50′	.3113	.3062	3.265	.3217	3.108	1.050	.9520	1.2595	10′
18° 00′	.3142	.3090	3.236	.3249	3.078	1.051	.9511	1.2566	72° 00′
		cos θ	sec θ	cot θ	tan θ	csc θ	sin θ	Radians	Degrees m∠θ

VALUES OF TRIGONOMETRIC FUNCTIONS

m∠θ Degrees	Radians	sin θ	csc θ	tan θ	cot θ	sec θ	cos θ		
18° 00′	.3142	.3090	3.236	.3249	3.078	1.051	.9511	1.2566	72° 00′
10′	.3171	.3118	3.207	.3281	3.047	1.052	.9502	1.2537	50′
20′	.3200	.3145	3.179	.3314	3.018	1.053	.9492	1.2508	40′
30′	.3229	.3173	3.152	.3346	2.989	1.054	.9483	1.2479	30′
40′	.3258	.3201	3.124	.3378	2.960	1.056	.9474	1.2450	20′
50′	.3287	.3228	3.098	.3411	2.932	1.057	.9465	1.2421	10′
19° 00′	.3316	.3256	3.072	.3443	2.904	1.058	.9455	1.2392	71° 00′
10′	.3345	.3283	3.046	.3476	2.877	1.059	.9446	1.2363	50′
20′	.3374	.3311	3.021	.3508	2.850	1.060	.9436	1.2334	40′
30′	.3403	.3338	2.996	.3541	2.824	1.061	.9426	1.2305	30′
40′	.3432	.3365	2.971	.3574	2.798	1.062	.9417	1.2275	20′
50′	.3462	.3393	2.947	.3607	2.773	1.063	.9407	1.2246	10′
20° 00′	.3491	.3420	2.924	.3640	2.747	1.064	.9397	1.2217	70° 00′
10′	.3520	.3448	2.901	.3673	2.723	1.065	.9387	1.2188	50′
20′	.3549	.3475	2.878	.3706	2.699	1.066	.9377	1.2159	40′
30′	.3578	.3502	2.855	.3739	2.675	1.068	.9367	1.2130	30′
40′	.3607	.3529	2.833	.3772	2.651	1.069	.9356	1.2101	20′
50′	.3636	.3557	2.812	.3805	2.628	1.070	.9346	1.2072	10′
21° 00′	.3665	.3584	2.790	.3839	2.605	1.071	.9336	1.2043	69° 00′
10′	.3694	.3611	2.769	.3872	2.583	1.072	.9325	1.2014	50′
20′	.3723	.3638	2.749	.3906	2.560	1.074	.9315	1.1985	40′
30′	.3752	.3665	2.729	.3939	2.539	1.075	.9304	1.1956	30′
40′	.3782	.3692	2.709	.3973	2.517	1.076	.9293	1.1926	20′
50′	.3811	.3719	2.689	.4006	2.496	1.077	.9283	1.1897	10′
22° 00′	.3840	.3746	2.669	.4040	2.475	1.079	.9272	1.1868	68° 00′
10′	.3869	.3773	2.650	.4074	2.455	1.080	.9261	1.1839	50′
20′	.3898	.3800	2.632	.4108	2.434	1.081	.9250	1.1810	40′
30′	.3927	.3827	2.613	.4142	2.414	1.082	.9239	1.1781	30′
40′	.3956	.3854	2.595	.4176	2.394	1.084	.9228	1.1752	20′
50′	.3985	.3881	2.577	.4210	2.375	1.085	.9216	1.1723	10′
23° 00′	.4014	.3907	2.559	.4245	2.356	1.086	.9205	1.1694	67° 00′
10′	.4043	.3934	2.542	.4279	2.337	1.088	.9194	1.1665	50′
20′	.4072	.3961	2.525	.4314	2.318	1.089	.9182	1.1636	40′
30′	.4102	.3987	2.508	.4348	2.300	1.090	.9171	1.1606	30′
40′	.4131	.4014	2.491	.4383	2.282	1.092	.9159	1.1577	20′
50′	.4160	.4041	2.475	.4417	2.264	1.093	.9147	1.1548	10′
24° 00′	.4189	.4067	2.459	.4452	2.246	1.095	.9135	1.1519	66° 00′
10′	.4218	.4094	2.443	.4487	2.229	1.096	.9124	1.1490	50′
20′	.4247	.4120	2.427	.4522	2.211	1.097	.9112	1.1461	40′
30′	.4276	.4147	2.411	.4557	2.194	1.099	.9100	1.1432	30′
40′	.4305	.4173	2.396	.4592	2.177	1.100	.9088	1.1403	20′
50′	.4334	.4200	2.381	.4628	2.161	1.102	.9075	1.1374	10′
25° 00′	.4363	.4226	2.366	.4663	2.145	1.103	.9063	1.1345	65° 00′
10′	.4392	.4253	2.352	.4699	2.128	1.105	.9051	1.1316	50′
20′	.4422	.4279	2.337	.4734	2.112	1.106	.9038	1.1286	40′
30′	.4451	.4305	2.323	.4770	2.097	1.108	.9026	1.1257	30′
40′	.4480	.4331	2.309	.4806	2.081	1.109	.9013	1.1228	20′
50′	.4509	.4358	2.295	.4841	2.066	1.111	.9001	1.1199	10′
26° 00′	.4538	.4384	2.281	.4877	2.050	1.113	.8988	1.1170	64° 00′
10′	.4567	.4410	2.268	.4913	2.035	1.114	.8975	1.1141	50′
20′	.4596	.4436	2.254	.4950	2.020	1.116	.8962	1.1112	40′
30′	.4625	.4462	2.241	.4986	2.006	1.117	.8949	1.1083	30′
40′	.4654	.4488	2.228	.5022	1.991	1.119	.8936	1.1054	20′
50′	.4683	.4514	2.215	.5059	1.977	1.121	.8923	1.1025	10′
27° 00′	.4712	.4540	2.203	.5095	1.963	1.122	.8910	1.0996	63° 00′
		cos θ	sec θ	cot θ	tan θ	csc θ	sin θ	Radians	Degrees m∠θ

VALUES OF TRIGONOMETRIC FUNCTIONS

m∠θ Degrees	Radians	sin θ	csc θ	tan θ	cot θ	sec θ	cos θ		
27° 00′	.4712	.4540	2.203	.5095	1.963	1.122	.8910	1.0996	63° 00′
10′	.4741	.4566	2.190	.5132	1.949	1.124	.8897	1.0966	50′
20′	.4771	.4592	2.178	.5169	1.935	1.126	.8884	1.0937	40′
30′	.4800	.4617	2.166	.5206	1.921	1.127	.8870	1.0908	30′
40′	.4829	.4643	2.154	.5243	1.907	1.129	.8857	1.0879	20′
50′	.4858	.4669	2.142	.5280	1.894	1.131	.8843	1.0850	10′
28° 00′	.4887	.4695	2.130	.5317	1.881	1.133	.8829	1.0821	62° 00′
10′	.4916	.4720	2.118	.5354	1.868	1.134	.8816	1.0792	50′
20′	.4945	.4746	2.107	.5392	1.855	1.136	.8802	1.0763	40′
30′	.4974	.4772	2.096	.5430	1.842	1.138	.8788	1.0734	30′
40′	.5003	.4797	2.085	.5467	1.829	1.140	.8774	1.0705	20′
50′	.5032	.4823	2.074	.5505	1.816	1.142	.8760	1.0676	10′
29° 00′	.5061	.4848	2.063	.5543	1.804	1.143	.8746	1.0647	61° 00′
10′	.5091	.4874	2.052	.5581	1.792	1.145	.8732	1.0617	50′
20′	.5120	.4899	2.041	.5619	1.780	1.147	.8718	1.0588	40′
30′	.5149	.4924	2.031	.5658	1.767	1.149	.8704	1.0559	30′
40′	.5178	.4950	2.020	.5696	1.756	1.151	.8689	1.0530	20′
50′	.5207	.4975	2.010	.5735	1.744	1.153	.8675	1.0501	10′
30° 00′	.5236	.5000	2.000	.5774	1.732	1.155	.8660	1.0472	60° 00′
10′	.5265	.5025	1.990	.5812	1.720	1.157	.8646	1.0443	50′
20′	.5294	.5050	1.980	.5851	1.709	1.159	.8631	1.0414	40′
30′	.5323	.5075	1.970	.5890	1.698	1.161	.8616	1.0385	30′
40′	.5352	.5100	1.961	.5930	1.686	1.163	.8601	1.0356	20′
50′	.5381	.5125	1.951	.5969	1.675	1.165	.8587	1.0327	10′
31° 00′	.5411	.5150	1.942	.6009	1.664	1.167	.8572	1.0297	59° 00′
10′	.5440	.5175	1.932	.6048	1.653	1.169	.8557	1.0268	50′
20′	.5469	.5200	1.923	.6088	1.643	1.171	.8542	1.0239	40′
30′	.5498	.5225	1.914	.6128	1.632	1.173	.8526	1.0210	30′
40′	.5527	.5250	1.905	.6168	1.621	1.175	.8511	1.0181	20′
50′	.5556	.5275	1.896	.6208	1.611	1.177	.8496	1.0152	10′
32° 00′	.5585	.5299	1.887	.6249	1.600	1.179	.8480	1.0123	58° 00′
10′	.5614	.5324	1.878	.6289	1.590	1.181	.8465	1.0094	50′
20′	.5643	.5348	1.870	.6330	1.580	1.184	.8450	1.0065	40′
30′	.5672	.5373	1.861	.6371	1.570	1.186	.8434	1.0036	30′
40′	.5701	.5398	1.853	.6412	1.560	1.188	.8418	1.0007	20′
50′	.5730	.5422	1.844	.6453	1.550	1.190	.8403	.9977	10′
33° 00′	.5760	.5446	1.836	.6494	1.540	1.192	.8387	.9948	57° 00′
10′	.5789	.5471	1.828	.6536	1.530	1.195	.8371	.9919	50′
20′	.5818	.5495	1.820	.6577	1.520	1.197	.8355	.9890	40′
30′	.5847	.5519	1.812	.6619	1.511	1.199	.8339	.9861	30′
40′	.5876	.5544	1.804	.6661	1.501	1.202	.8323	.9832	20′
50′	.5905	.5568	1.796	.6703	1.492	1.204	.8307	.9803	10′
34° 00′	.5934	.5592	1.788	.6745	1.483	1.206	.8290	.9774	56° 00′
10′	.5963	.5616	1.781	.6787	1.473	1.209	.8274	.9745	50′
20′	.5992	.5640	1.773	.6830	1.464	1.211	.8258	.9716	40′
30′	.6021	.5664	1.766	.6873	1.455	1.213	.8241	.9687	30′
40′	.6050	.5688	1.758	.6916	1.446	1.216	.8225	.9657	20′
50′	.6080	.5712	1.751	.6959	1.437	1.218	.8208	.9628	10′
35° 00′	.6109	.5736	1.743	.7002	1.428	1.221	.8192	.9599	55° 00′
10′	.6138	.5760	1.736	.7046	1.419	1.223	.8175	.9570	50′
20′	.6167	.5783	1.729	.7089	1.411	1.226	.8158	.9541	40′
30′	.6196	.5807	1.722	.7133	1.402	1.228	.8141	.9512	30′
40′	.6225	.5831	1.715	.7177	1.393	1.231	.8124	.9483	20′
50′	.6254	.5854	1.708	.7221	1.385	1.233	.8107	.9454	10′
36° 00′	.6283	.5878	1.701	.7265	1.376	1.236	.8090	.9425	54° 00′
		cos θ	sec θ	cot θ	tan θ	csc θ	sin θ	Radians	Degrees m∠θ

VALUES OF TRIGONOMETRIC FUNCTIONS

m∠θ Degrees	Radians	sin θ	csc θ	tan θ	cot θ	sec θ	cos θ		
36° 00′	.6283	.5878	1.701	.7265	1.376	1.236	.8090	.9425	54° 00′
10′	.6312	.5901	1.695	.7310	1.368	1.239	.8073	.9396	50′
20′	.6341	.5925	1.688	.7355	1.360	1.241	.8056	.9367	40′
30′	.6370	.5948	1.681	.7400	1.351	1.244	.8039	.9338	30′
40′	.6400	.5972	1.675	.7445	1.343	1.247	.8021	.9308	20′
50′	.6429	.5995	1.668	.7490	1.335	1.249	.8004	.9279	10′
37° 00′	.6458	.6018	1.662	.7536	1.327	1.252	.7986	.9250	53° 00′
10′	.6487	.6041	1.655	.7581	1.319	1.255	.7969	.9221	50′
20′	.6516	.6065	1.649	.7627	1.311	1.258	.7951	.9192	40′
30′	.6545	.6088	1.643	.7673	1.303	1.260	.7934	.9163	30′
40′	.6574	.6111	1.636	.7720	1.295	1.263	.7916	.9134	20′
50′	.6603	.6134	1.630	.7766	1.288	1.266	.7898	.9105	10′
38° 00′	.6632	.6157	1.624	.7813	1.280	1.269	.7880	.9076	52° 00′
10′	.6661	.6180	1.618	.7860	1.272	1.272	.7862	.9047	50′
20′	.6690	.6202	1.612	.7907	1.265	1.275	.7844	.9018	40′
30′	.6720	.6225	1.606	.7954	1.257	1.278	.7826	.8988	30′
40′	.6749	.6248	1.601	.8002	1.250	1.281	.7808	.8959	20′
50′	.6778	.6271	1.595	.8050	1.242	1.284	.7790	.8930	10′
39° 00′	.6807	.6293	1.589	.8098	1.235	1.287	.7771	.8901	51° 00′
10′	.6836	.6316	1.583	.8146	1.228	1.290	.7753	.8872	50′
20′	.6865	.6338	1.578	.8195	1.220	1.293	.7735	.8843	40′
30′	.6894	.6361	1.572	.8243	1.213	1.296	.7716	.8814	30′
40′	.6923	.6383	1.567	.8292	1.206	1.299	.7698	.8785	20′
50′	.6952	.6406	1.561	.8342	1.199	1.302	.7679	.8756	10′
40° 00′	.6981	.6428	1.556	.8391	1.192	1.305	.7660	.8727	50° 00′
10′	.7010	.6450	1.550	.8441	1.185	1.309	.7642	.8698	50′
20′	.7039	.6472	1.545	.8491	1.178	1.312	.7623	.8668	40′
30′	.7069	.6494	1.540	.8541	1.171	1.315	.7604	.8639	30′
40′	.7098	.6517	1.535	.8591	1.164	1.318	.7585	.8610	20′
50′	.7127	.6539	1.529	.8642	1.157	1.322	.7566	.8581	10′
41° 00′	.7156	.6561	1.524	.8693	1.150	1.325	.7547	.8552	49° 00′
10′	.7185	.6583	1.519	.8744	1.144	1.328	.7528	.8523	50′
20′	.7214	.6604	1.514	.8796	1.137	1.332	.7509	.8494	40′
30′	.7243	.6626	1.509	.8847	1.130	1.335	.7490	.8465	30′
40′	.7272	.6648	1.504	.8899	1.124	1.339	.7470	.8436	20′
50′	.7301	.6670	1.499	.8952	1.117	1.342	.7451	.8407	10′
42° 00′	.7330	.6691	1.494	.9004	1.111	1.346	.7431	.8378	48° 00′
10′	.7359	.6713	1.490	.9057	1.104	1.349	.7412	.8348	50′
20′	.7389	.6734	1.485	.9110	1.098	1.353	.7392	.8319	40′
30′	.7418	.6756	1.480	.9163	1.091	1.356	.7373	.8290	30′
40′	.7447	.6777	1.476	.9217	1.085	1.360	.7353	.8261	20′
50′	.7476	.6799	1.471	.9271	1.079	1.364	.7333	.8232	10′
43° 00′	.7505	.6820	1.466	.9325	1.072	1.367	.7314	.8203	47° 00′
10′	.7534	.6841	1.462	.9380	1.066	1.371	.7294	.8174	50′
20′	.7563	.6862	1.457	.9435	1.060	1.375	.7274	.8145	40′
30′	.7592	.6884	1.453	.9490	1.054	1.379	.7254	.8116	30′
40′	.7621	.6905	1.448	.9545	1.048	1.382	.7234	.8087	20′
50′	.7650	.6926	1.444	.9601	1.042	1.386	.7214	.8058	10′
44° 00′	.7679	.6947	1.440	.9657	1.036	1.390	.7193	.8029	46° 00′
10′	.7709	.6967	1.435	.9713	1.030	1.394	.7173	.7999	50′
20′	.7738	.6988	1.431	.9770	1.024	1.398	.7153	.7970	40′
30′	.7767	.7009	1.427	.9827	1.018	1.402	.7133	.7941	30′
40′	.7796	.7030	1.423	.9884	1.012	1.406	.7112	.7912	20′
50′	.7825	.7050	1.418	.9942	1.006	1.410	.7092	.7883	10′
45° 00′	.7854	.7071	1.414	1.000	1.000	1.414	.7071	.7854	45° 00′
		cos θ	sec θ	cot θ	tan θ	csc θ	sin θ	Radians	Degrees m∠θ

LIFEPAC®

MATH

Placement Tests Answer Key

700-1200

Math 701: Integers

Answer Key

1. **b.**

2. **d.**

3. **a.**

The difference between |-13| and |5| is 8. Since |-13| has the larger absolute value, the result is negative.

4. **c.**

Subtracting -7 is the same as adding +7.

5. **d.**

(-6)(-6) = 36

Multiplying two negative factors results in a positive product.

6. **a., b.**

7. **b.**

8. **c.**

$5 - 2 \cdot 3 + 4$

$= 5 - 6 + 4$

$= -1 + 4$

$= 3$

9. **a.**

10. **b.**

Math 702: Fractions

Answer Key

1. **d.**

You can make two groups of 7 and have 1 left over, making the mixed number $2\frac{1}{7}$.

2. **b.**

The fractions $\frac{4}{10}$, $\frac{6}{15}$, and $\frac{8}{20}$ can all be simplified to $\frac{2}{5}$.

3. **c.**

4. **d.**

The factors of 28 are 1, 2, 4, 7, 14, and 28.

The factors of 42 are 1, 2, 3, 6, 7, 14, 21, and 42.

The largest factor these numbers have in common is 14.

5. **c.**

6. **b.**

$\frac{7}{13} + \frac{11}{26}$

$= \frac{14}{26} + \frac{11}{26}$

$= \frac{25}{26}$

7. **b.**

$\frac{20}{6} - \frac{2}{3}$

$= \frac{20}{6} - \frac{4}{6}$

$= \frac{16}{6}$

$= 2\frac{4}{6}$

$= 2\frac{2}{3}$

8. **d.**

9. **c.**

10. **c.**

Math 703: Decimals

Answer Key

1. **a.**

The second number after the decimal tells us that 4.576 is larger.

2. **a.**

259.98**9**91 rounds up to 259.99.

3. **d.**

0.82 + 0.70 + 0.25 = $1.77

4. **d.**

72.25 - 51.5 = 20.75

5. **a.**

6. **b.**

$$0.312 = \frac{312}{1000} = \frac{312 \div 8}{1000 \div 8} = \frac{39}{125}$$

7. **d.**

8. **8.2 cm**

$$\text{length} = \frac{20.5}{2.5}$$

length = 20.5 ÷ 2.5 = 8.2

9. **c.**

10. **b.**

Move the decimal point three places to the left.

Math 704: Patterns and Equations

Answer Key

1. **c.**

2. **b.**

$(-2)^2 - (-8) + 1$

$= 4 - (-8) + 1$

$= 4 + 8 + 1$

$= 12 + 1$

$= 13$

3. **c.**

There is no common difference or common ratio between each pair of consecutive numbers.

4. **a.**

The inputs are the first part of each ordered pair.

5. **c.**

All ordered pairs must satisfy the function rule:

$x = -3; y = 1$

$1 = (-3) + 4$

$1 = 1$

$x = 0; y = 4$

$4 = (0) + 4$

$4 = 4$

$x = 2; y = 6$

$6 = (2) + 4$

$6 = 6$

6. **c.**

$$w - 9\frac{1}{2} + 9\frac{1}{2} = 15 + 9\frac{1}{2}$$

$$w = 24\frac{1}{2}$$

7. **d.**

$4 \cdot \frac{n}{4} = -12.4 \cdot 4$

$n = -49.6$

8. **b.**

9. **b.**

$25 + 0.15m = 71.8$

$25 - 25 + 0.15m = 71.8 - 25$

$0.15m = 46.8$

$\frac{0.15m}{0.15} = \frac{46.8}{0.15}$

$m = 312$

10. **b.**

Math 705: Ratios and Proportions

Answer Key

1. **c.**

2. **b.**

3. **c.**

4. **c.**

5. **a.**

6. **d.**

7. **b.**

8. **d.**

9. **c.**

10. **d.**

Math 706: Probability and Graphing

Answer Key

1. **a.**
2. **b.**
3. **c.**
4. **d.**
5. **a.**
6. **c.**
7. **b.**
8. **b.**
9. **b.**
10. **c.**

Math 707: Data Analysis

Answer Key

1. **a., b., e.**

   Mode:

   The numbers 3, 8, and 9 all appear twice in the list.

   Median:

   Put the list in order from smallest to largest:

   1, 2, 3, 3, 4, 5, 6, 8, 8, 9, 9, 10

   There is an even number of items, so the median is the mean of the two middle values:

   $$\frac{5+6}{2} = \frac{11}{2} = 5.5$$

   Mean:

   $$\frac{1+2+3+3+4+5+6+8+8+9+9+10}{12}$$

   $$= \frac{68}{12} = 5.\overline{6}$$

2. **b.**

   range = highest value - lowest value

   range = 45 - 12

   range = 33

3. **a.**

   The interquartile range is the difference between the upper and lower quartiles, which is 18 - 15, or 3.

4. **a.**

   Count the leaves that come before a 75 in the plot.

5. **d.**

   Add the bars from the last two intervals:

   10 + 4 = 14

6. **a.**

   Including the 8 that enjoy both country and jazz, 32 enjoy country. So 32 - 8, or 24, enjoy just country. And 14 - 8, or 6, enjoy just jazz.

7. **c.**

8. **c.**

9. **a.**

   $0.24 \cdot 360° = 86.4°$

10. **b.**

Math 708: Geometry

Answer Key

1. **c.**
2. **c.**
3. **b.**
4. **d.**
5. **b.**
6. **a.**
7. **c.**
8. **b.**
9. **d.**
10. **b.**

Math 709: Measurement and Area

Answer Key

1. **b.**

$37 = 18 + 11 + x$

$37 = 29 + x$

$8 = x$

2. **b.**

$C = (3.14)(8) = 25.12.$

3. **a.**

$42 = 6h$

4. **d.**

$A = \frac{1}{2}(10)(5) = 25$

5. **a.**

$A = (3.14)(9)^2 = (3.14)(81) = 254.34$

6. **c.**

$A = \frac{1}{2}(8 + 4)(3) = \frac{1}{2}(12)(3) = 18$

7. **c.**

Area changes by the square of the change in dimensions:

$3^2 = 9$

8. **b.**

9. **d.**

$\sqrt{50}$ lies between $\sqrt{49}$ and $\sqrt{64}$, or 7 and 8.

10. **a.**

$6^2 + 8^2 = c^2$

$36 + 64 = c^2$

$100 = c^2$

$10 = c$

Math 710: Surface Area and Volume

Answer Key

1. **a.**

2. **d.**

3. **b.**

$31.4 + 12.56 = 43.96$

4. **a.**

$SA = 2(15)(15) + 2(15)(15) + 2(15)(15)$

$SA = 450 + 450 + 450$

$SA = 1{,}350$

5. **c.**

$V = (3)(4)(1) = 12$

6. **d.**

$SA = 2B + Ph$

$SA = 2(6) + (12)(7)$

$SA = 12 + 84$

$SA = 96$

7. **c.**

$V = Bh$

$V = (7)(11)$

$V = 77$

8. **a.**

$SA = 25.12 + 87.92$

$SA = 113.04$

9. **d.**

$V = \pi r^2 h$

$V = (3.14)(2 \text{ in.})^2(7 \text{ in.})$

$V = (3.14)(4 \text{ in.}^2)(7 \text{ in.})$

$V = 87.92 \text{ in.}^3$

10. **a.**

The dimensions are three times larger, so the surface area is 3^2, or 9 times larger.

Pre-Algebra Math 801: The Real Number System

Answer Key

1. **a., c, f.**

$4^0 = 1$

$5^{-1} = 1/5$

2. **b., d., f.**

$4.2 \times 10^{-3} = 0.0042$

$1/4 = 0.25$

3. **d., a., e., c., b.**

4. **c.**

5. **d.**

x is between 4^2 and 5^2, or between 16 and 25.

6. **c.**

The square root of a number that is not a perfect square is irrational. 32 is not a perfect square.

7. **b.**

$\sqrt{3}$ is between 1 and 2.

$5^{-1} = 1/5$

8. **c.**

$9^8 \div 9^n = 9^{8-4} = 9^4$

9. **b.**

The whole numbers include counting numbers and 0.

$|-2| = 2$

$-15/5 = -3$

$\sqrt{36} = 6$

$9^0 = 1$

10. **d.**

Pre-Algebra Math 802: Modeling Problems in Integers

Answer Key

1. **a.**

2. **a.**

$$\frac{-6-4(-3)}{-2+1}$$
$$=\frac{-6-(-12)}{-2+1}$$
$$=\frac{-6+12}{-2+1}$$
$$=\frac{6}{-1}$$
$$=-6$$

3. **b.**

$f(3) = -5(3) - 2$

$f(3) = -15 - 2$

$f(3) = -15 + -2$

$f(3) = -17$

4. **b.**

$11x = 33$

$\frac{11x}{11} = \frac{33}{11}$

$x = 3$

$\frac{x}{3} = 3$

$(3)\frac{x}{3} = 3(3)$

$x = 9$

$x - 2 = 1$

$x - 2 + 2 = 1 + 2$

$x = 3$

$x + 9 = 12$

$x + 9 - 9 = 12 - 9$

$x = 3$

5. **c.**

$4x - 11 = 33$

$4x - 11 + 11 = 33 + 11$

$4x = 44$

$4x/4 = 44/4$

$x = 11$

$2x + 8 = 8$

$2x + 8 - 8 = 8 - 8$

$2x = 0$

$2x/2 = 0/2$

$x = 0$

$4x - 7 = 13$

$4x - 7 + 7 = 13 + 7$

$4x = 20$

$4x/4 = 20/4$

$x = 5$

$3x - 22 = 11$

$3x - 22 + 22 = 11 + 22$

$3x = 33$

$3x/3 = 33/3$

$x = 11$

$5x + 3 = 18$

$5x + 3 - 3 = 18 - 3$

$5x = 15$

$5x/5 = 15/5$

$x = 3$

6. **b.**

$-2x^2y$, if $x = -4$ and $y = 1$

$-2(-4)^2(1)$

$-2(16)(1)$

$-32(1)$

-32

7. **d.**

8. **d.**

9. **d.**

10. **d.**

Pre-Algebra Math 803: Modeling Problems with Rational Numbers

Answer Key

1. **a.**

Twelve will go into 32 twice, with 8 leftover.

And, $-2\frac{8}{12}$ simplifies to $-2\frac{2}{3}$.

2. **d.**

Closed circle on -3 and shade to the right.

3. **c.**

$-4a + 5 \le -7$

$-4a + 5 - 5 \le -7 - 5$

$-4a \le -12$

$$\frac{-4a}{-4} \le \frac{-12}{-4}$$

$a \ge 3$

4. **b.**

"More than" means "greater than".

5. **a.**

Find the GCF.

$27 = 3 \cdot 3 \cdot 3$

$36 = 2 \cdot 2 \cdot 3 \cdot 3$

$54 = 2 \cdot 3 \cdot 3 \cdot 3$

$GCF = 3 \cdot 3 = 9$

6. **c.**

$$\frac{7}{9}\left(-\frac{3}{14}\right)$$

$$\frac{{}^{1}\cancel{7}}{{}_{3}\cancel{9}}\left(-\frac{\cancel{3}^{1}}{\cancel{14}_{2}}\right) = -\frac{1}{6}$$

7. **d.**

$22.5 + x = -47.37$

$22.5 - 22.5 + x = -47.37 - 22.5$

$x = -69.87$

8. **d.**

-4.326 + (-0.32) ÷ 0.4

-4.326 + (-0.8) = -5.126

9. **c.**

The GCF of $32ab^3$ and $40a^2$ is $8a$.

10. **a.**

$$\frac{14x^3y^2}{35xy^4z^2} = \frac{2x^2}{5y^2z^2}$$

Pre-Algebra Math 804: Proportional Reasoning

Answer Key

1. **a.**

4% = 0.04

3/8= 0.375

2/5= 0.4

2. **d.**

$5.00/4 = $1.25/1

$7.44/6 =$1.24/1

$3.60/3 = $1.20/1

3. **b.**

Amount of discount: $14 - $10 = $4

Percent of discount: 4/14= 0.2857...

4. **b.**

4/2 = 5/*x*

5. **d.**

Small triangle/Large triangle

6. **d.**

Convert kilometers to meters:

66 km/x = 1 km/1,000 m

x = (66)(1,000)

x = 66,000

Convert hours to seconds:

66,000 m/1 hr · 1 hr/3,600 sec =

66,000/3,600 = 18.3333/1 sec

7. **b.**

In a proportion, the products of cross multiplication must be equal.

8. **d.**

Convert feet to inches:

x/4 ft = 12 in./1 ft

x = (4)(12) = 48 in

Find the scale: 2/48 reduces to 1/24.

9. **c., d., f.**

2/9= 3:13.5

2/8= 3:12

6:26 = 3:13

12/52= 3:13

5/24= 3:14.4

1.5 to 6.5 = 3:13

Pre-Algebra Math 805: More with Functions

Answer Key

1. **5**

$4x - 14 + 6 = 12$

$4x - 8 = 12$

$+8 \quad +8$

$4x = 20$

$4x/4 = 20/4$

$x = 5$

2. **13**

$2(x - 4) + 2(8) = 34$

$2x - 8 + 16 = 34$

$2x + 8 = 34$

$-8 \quad -8$

$2x = 26$

$2x/2 = 26/2$

$x = 13$

3. **2**

The equation is in the slope-intercept form so the slope is 2. This would also be the slope of a parallel line.

4. **b.**

$2x^2 + 7x - 4x - 6x^2$

$2x^2 - 6x^2 + 7x - 4x$

$-4x^2 + 7x - 4x$

$-4x^2 + 3x$

5. **a.**

If the base of the exponent is greater than 1, the function will produce exponential growth. The only equation with a base greater than 1 is $y = 0.5(3)^x$.

6. **b.**

7, 21, 63, 189, ... has a common ratio so it is a geometric sequence.

7. **c.**

$-4(-2y + 3) = 20$

$8y - 12 = 20$

$+ 12 + 12$

$8y = 32$

$8y/8 = 32/8$

$y = 4$

8. **a.**

$y = 2^x$

$y = 2^0$

$y = 1$ then (0, 1)

9. **c.**

$m = (y_2 - y_1)/(x_2 - x_1)$

$m = (8 - 4)/(5 - 3)$

$m = 4/2$

$m = 2$

10. **d.**

Pre-Algebra Math 806: Measurement

Answer Key

1. **c.**

$12 + 13 > 13$

$25 > 13$

It's an isosceles triangle.

2. **b.**

$x + 2x + 89° + 76° = 360°$

$3x + 165° = 360°$

$3x = 195°$

$x = 65°$

$2x = 2(65°) = 130°$

3. **d.**

$x + 7 + 3x - 5 = 90°$

$4x + 2 = 90°$

$4x = 88°$

$x = 22°$

4. **b.**

$x + 2x + 3x = 180°$

$6x = 180°$

$x = 30°$

$3x = 3(30°) = 90°$

5. **a.**

6. **c.**

$a^2 + b^2 = c^2$

$9^2 + 16^2 = 20^2$

$81 + 256 = 400$

$337 \neq 400$

7. **b.**

A heptagon has five triangles in its interior at 180° each. So, 5(180°) = 900°.

8. **a.**

Intercepted arcs measure twice the inscribed angle.

2(116°) = 232°

9. **a., d., e., f., g.**

Pre-Algebra Math 807: Plane Geometry

Answer Key

1. **doubled**

2. **d.**

Add all the sides to find the perimeter.

3. **b.**

(-8) + (-2) = -10; -10 ÷ 2 = -5

-5 + 2 = -3; -3 ÷ 2 = -1.5

4. **c.**

$(6)^2 + (3)^2 = c^2$

$36 + 9 = c^2$

$45 = c^2$

$\sqrt{45} = c$

5. **a.**

Vertical line of reflection along the *y*-axis.

6. **c.**

Convert yards to feet: 4 yd = 12 ft

A = (6 ft)(12 ft) = 72 ft^2

7. **b.**

In a 270° rotation, the coordinates are switched, and the *x*-coordinate changes sign.

8. **d.**

12 ft · 4 ft = 48 ft^2; 2(12 ft) + 2(4 ft) = 24 ft + 8 ft = 32 ft

Pre-Algebra Math 808: Measures of Solid Figures

Answer Key

1. **a.**

2. **7**

V + F = E + 2

10 + F = 15 + 2

10 + F = 17

F = 7

3. **b.**

$V = lwh$

V = (15)(15)(15)

V = 3,375 in.^{3}

4. **b.**

$V = \frac{1}{3}\pi r^{2h}$

$V = \frac{1}{3}(3.14)(8^2)(20)$

$V = \frac{1}{3}(3.14)(64)(20)$

V = 1,339.73 ft^3

5. **1,205.76**

$V = \frac{1}{3}\pi r^{2h} + \pi r^{2h}$

$V = \frac{1}{3}(3.14)(4^2)(12) + (3.14)(4^2)(20)$

$V = \frac{1}{3}(3.14)(16)(12) + (3.14)(16)(20)$

V = 200.96 + 1,004.8

V = 1,205.76 cm^3

6. **d.**

$SA = 4\pi r^2$

$SA = 4(3.14)(11^2)$

SA = 4(3.14)(121)

SA = 1,519.76 cm^2

7. **b.**

SA = $2lw + 2lh + 2wh$

SA = 2(7)(12) + 2(7)(25) + 2(12)(25)

SA = 168 + 350 + 600

SA = 1,118 in.^{2}

8. **b.**

SA = 2([(9)(12)]/2) + 15(19) + 9(19) + 2(7)(12) + 2(7)(19) + (12)(19)

SA = 2(54) + 15(19) + 9(19) + 2(7)(12) + 2(7)(19) + (12)(19)

SA = 108 + 285 + 171 + 168 + 266 + 228

SA = 1,226 in.^{2}

Pre-Algebra Math 809: Data Analysis

Answer Key

1. **b.**

2. **b.**

A self-selected sample allows members of a population to volunteer to participate.

3. **c.**

The lower extreme is the first point, which is located at 8.2.

4. **c.**

6/69 = 0.09; 0.09 · 360 = 32°

5. **b.**

At 2 hours, the family will be 75 miles from home.

6. **b.**

25% + 38% + 19% = 82% = 0.82 · 32 = 26.24 ≈ 26

7. **c.**

Range = 50, Median = 15, 50 - 15 = 35

8. **a.**

A circle graph allows the reader to see a visual of the individual category compared to the whole.

9. **c.**

A line of best fit has approximately the same number of points above it as it does below it.

10. **c.**

The mode is the frequency of 4.

Pre-Algebra Math 810: Probability

Answer Key

1. **No, Adam**

you = P(2-5) = 10/36 = 5/18

Adam = P(6-8) = 16/36 = 4/9

Alana = P(9-12) = 10/36 = 5/18

The game is not fair. Adam has the best advantage.

2. **a.**

P(black) = 7/30

3. **1,680**

${}_8P_4 = 8 \cdot 7 \cdot 6 \cdot 5 = 1{,}680$

4. **b.**

P(A or B) = P(A) + P(B) = 9/25 + 9/25= 18/25

5. **1/4**

Odds(green) = 1/4

6. **d.**

exp P(1) = 4/50 = 2/25

7. **c.**

${}_8C_3 = 8!/[3!(8 - 3)!] = 8!/[3!5!]$

$= (8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1)/(3 \cdot 2 \cdot 1 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1) = (8 \cdot 7 \cdot 6)/(3 \cdot 2 \cdot 1) = 336/6 = 56$

8. **a.**

P(heads and heads and heads and heads) = $1/2 \cdot 1/2 \cdot 1/2 \cdot 1/2 \cdot 1/2 = 1/32$

9. **b.**

${}_{12}P_3 = 12!/(12 - 3)! = 12!/9! = 12 \cdot 11 \cdot 10 = 1{,}320$

10. **a.**

${}_5C_3 = 5!/[3!(5 - 3)!] = 5!/[3!2!]$

$= (5 \cdot 4)/(2 \cdot 1) = 20/2 = 10$

901

1. d.
2. c.
3. a.
4. b.
5. c.
6. d.
7. a.
8. d.
9. c.
10. b.

902

1. a.
2. c.
3. b.
4. a.
5. a.
6. d.
7. c.
8. b.
9. d.
10. d.

903

1. b.
2. c.
3. b.
4. a.
5. d.
6. b.
7. c.
8. a.
9. b.
10. d.

904

1. b.
2. c.
3. a.
4. b.
5. d.
6. c.
7. d.
8. b.
9. a.
10. c.

905

1. b.
2. b.
3. c.
4. b.
5. c.
6. b.
7. a.
8. d.
9. d.
10. d.

906

1. a.
2. d.
3. b.
4. d.
5. a.
6. c.
7. c.
8. d.
9. b.
10. a.

907

1. c.
2. c.
3. d.
4. b.
5. a.
6. d.
7. a.
8. b.
9. d.
10. a.

908

1. a.
2. d.
3. c.
4. c.
5. a.
6. b.
7. d.
8. a.
9. d.
10. c.

909

1. d.
2. c.
3. b.
4. c.
5. c.
6. b.
7. c.
8. a.
9. a.
10. b.

910

1. a.
2. b.
3. b.
4. d.
5. a.
6. d.
7. c.
8. a.
9. d.
10. c.

1001

1. d.
2. d.
3. a.
4. a.
5. d.
6. c.
7. b.
8. b.
9. b.
10. c.

1002

1. b.
2. a.
3. b. / a.
4. c.
5. b.
6. d.
7. c.
8. c.
9. a.
10. b.

1003

1. d.
2. c.
3. c.
4. c.
5. d.
6. a.
7. d.
8. b.
9. d.
10. a.

1004

1. c.
2. d.
3. b.
4. c.
5. b.
6. d.
7. a.
8. c.
9. b.
10. d.

1005

1. b.
2. a.
3. d.
4. b.
5. b.
6. d.
7. d.
8. c.
9. a.
10. d.

1006

1. d.
2. b.
3. a.
4. b.
5. c.
6. d.
7. d.
8. c.
9. d.
10. d.

1007

1. c.
2. d.
3. b.
4. c.
5. d.
6. d.
7. c.
8. a.
9. a.
10. d.

1008

1. a.
2. b.
3. c.
4. b.
5. d.
6. c.
7. d.
8. b.
9. a.
10. a.

1009

1. d.
2. a.
3. c.
4. b.
5. a.
6. d.
7. d.
8. c.
9. c.
10. b.

1010

1. d.
2. b.
3. a.
4. a.
5. d.
6. c.
7. b.
8. a.
9. b.
10. b.

1101

1. c.
2. a.
3. c.
4. d.
5. a.
6. b.
7. a.
8. b.
9. b.
10. c.

1102

1. d.
2. d.
3. a.
4. c.
5. c.
6. d.
7. a.
8. b.
9. b.
10. d.

1103

1. c.
2. a.
3. b.
4. c.
5. d.
6. c.
7. c.
8. d.
9. d.
10. a.

1104

1. d.
2. c.
3. a.
4. b.
5. a.
6. b.
7. c.
8. b.
9. b.
10. d.

1105

1. a.
2. d.
3. b.
4. a.
5. c.
6. b.
7. c.
8. a.
9. c.
10. d.

1106

1. a.
2. b.
3. c.
4. d.
5. a.
6. c.
7. d.
8. a.
9. c.
10. d.

1107

1. d.
2. c.
3. a.
4. b.
5. a.
6. c.
7. b.
8. d.
9. b.
10. a.

1108

1. d.
2. c.
3. a.
4. a.
5. b.
6. c.
7. d.
8. c.
9. b.
10. a.

1109

1. a.
2. d.
3. d.
4. c.
5. c.
6. b.
7. c.
8. a.
9. d.
10. b.

1110

1. b.
2. c.
3. a.
4. d.
5. a.
6. d.
7. a.
8. b.
9. d.
10. b.

1201

1. c.
2. b.
3. c.
4. d.
5. d.
6. b.
7. d.
8. b.
9. d.
10. d.

1202

1. c.
2. b.
3. a.
4. d.
5. c.
6. c.
7. a.
8. a.
9. b.
10. d.

1203

1. a. a.
b. b.
c. d.
2. c.
3. c.
4. a.
5. a.
6. a.
7. c.
8. a.
9. d.
10. c.

1204

1. d.
2. d.
3. a.
4. b.
5. b.
6. d.
7. d.
8. c.
9. c.
10. a.

1205

1. c.
2. a.
3. d.
4. c.
5. b.
6. d.
7. a.
8. c.
9. d.
10. b.

1206

1. b.
2. a.
3. b.
4. b.
5. b.
6. c.
7. b.
8. c.
9. a.
10. b.

1207

1. a.
2. a.
3. d.
4. d.
5. a.
6. b.
7. b.
8. d.
9. d.
10. d.

1208

1. c.
2. b.
3. d.
4. d.
5. c.
6. a.
7. a.
8. c.
9. c.
10. d.

1209

1. c.
2. d.
3. b.
4. d.
5. a.
6. b.
7. d.
8. d.
9. a.
10. c.

1210

1. b.
2. c.
3. a.
4. d.
5. b.
6. b.
7. a.
8. b.
9. a.
10. d.

_____ _____
Student Name Age

_____ _____
Date Grade Last Completed

	700	800	900	1000	1100	1200
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
TOTAL SCORE	_____	_____	_____	_____	_____	_____

GRADE LEVEL PLACEMENT: A student can be placed academically using the rule that he/she has successfully passed the test for any given level if he/she achieves a **Total Score of 70 points or more**.

This student places at grade level _____.

LEARNING GAPS: Learning gaps can be easily identified with the placement test. If a student receives **points of 6 or less** on any individual test, he/she has not shown mastery of the skills in that particular LIFEPAC. If desired, these LIFEPACs may be ordered and completed before the student begins his assigned grade level curriculum.

Learning gap LIFEPACs for this student are _____ _____ _____ _____
_____ _____ _____ _____

It is not unusual for a student to place at more than one level in various subjects when beginning the LIFEPAC curriculum. For example, a student may be placed at 9th level in Bible, mathematics, science and social studies but 8th level in language arts. The majority of school time should be concentrated on the areas of lower achievement with the ultimate goal of equal skill mastery in all subjects at the same grade level.

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