Sagamore

Math 8

Quarter 4

Name _____

Teacher _____

Period _____

Unit 12

Grade 8 Mathematics Reference Sheet

CONVERSIONS

1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 5,280 feet
1 mile = 1,760 yards
1 mile = 1.609 kilometers

1 kilometer = 0.62 mile
1 pound = 16 ounces
1 pound = 0.454 kilogram
1 kilogram = 2.2 pounds
1 ton = 2,000 pounds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon = 3.785 liters
1 liter = 0.264 gallon
1 liter = 1,000 cubic centimeters

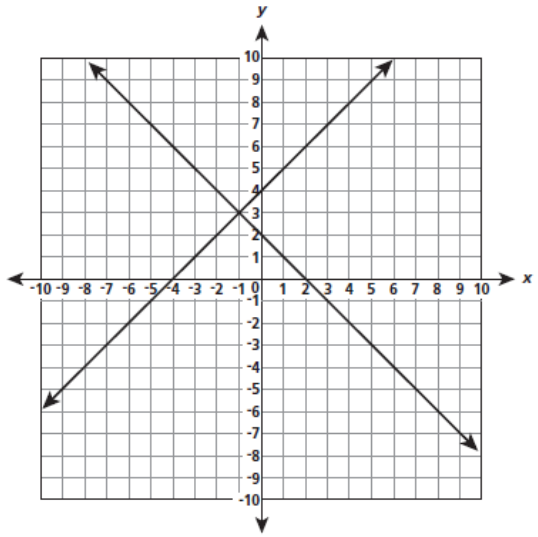
FORMULAS

Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Circle	$C = \pi d$ or $C = 2\pi r$
General Prisms	$V = Bh$
Cylinder	$V = \pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$
Cone	$V = \frac{1}{3}\pi r^2 h$
Pythagorean Theorem	$a^2 + b^2 = c^2$

Released Questions 2013

For the following questions Calculators are NOT permitted

1) Lucy graphed a system of linear equations.



What is the solution to the system of equations?

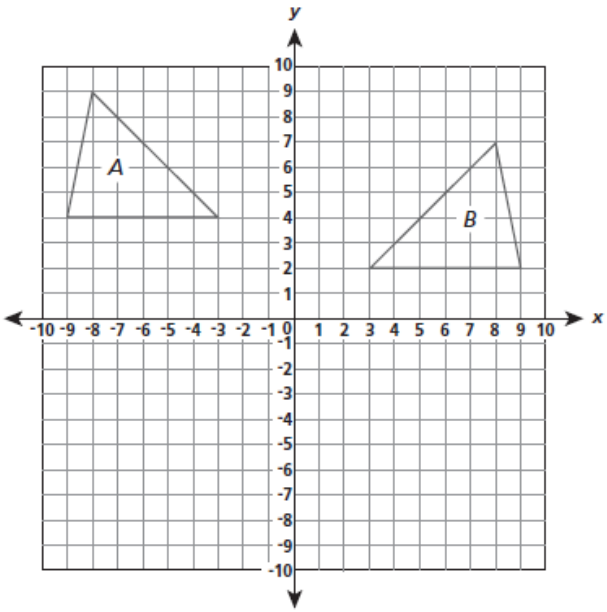
A (−4, 2)

B (−1, 3)

C (0, 2)

D (2, 4)

2) Which sequence of transformations takes $\triangle A$ to its image, $\triangle B$?



A reflection over the *x*-axis and translation 2 units down

B reflection over the *y*-axis and translation 2 units down

C translation 2 units down and 90° rotation about the origin

D translation 12 units right and 90° rotation about the origin

3) What is the solution to the equation below?

$$2(x - 3) = 2x + 5$$

A $x = 2\frac{3}{4}$

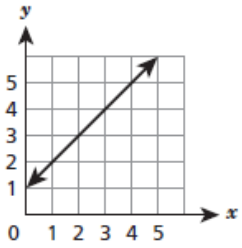
B $x = -2\frac{3}{4}$

C There is no solution.

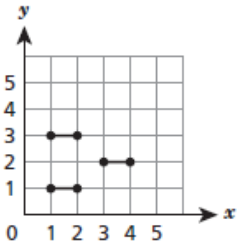
D There are infinitely many solutions.

4) Which graph below does not represent a function of x?

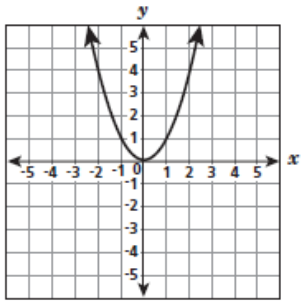
A



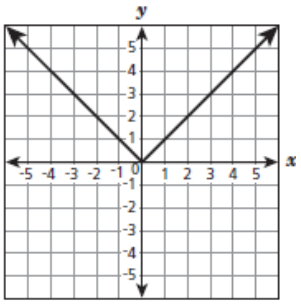
C



B



D



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5) A lab has two bacteria cultures. Culture A contains 8×10^4 bacteria, and culture B contains 4×10^6 bacteria. How do the two cultures compare in size?

A Culture A contains twice as many bacteria as culture B.

B Culture A contains $\frac{1}{2}$ as many bacteria as culture B.

C Culture A contains $\frac{1}{25}$ as many bacteria as culture B.

D Culture A contains $\frac{1}{50}$ as many bacteria as culture B.

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6) Evaluate:

$$(2.4 \times 10^4)(4.5 \times 10^3)$$

A 1.08×10^7

B 1.08×10^8

C 1.08×10^{12}

D 1.08×10^{13}

For the following questions Calculators are permitted

7) Simplify:

$$\frac{4^8}{4^{-4}}$$

A 4^{-32}

B 4^{-2}

C 4^4

D 4^{12}

---

8) Which expression is **not** equivalent to $\frac{6^3}{6^6}$?

A $\frac{1}{6^2}$

B 6^{-3}

C $\frac{1}{216}$

D $\frac{1}{6^3}$

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9) A water tank is in the shape of a right circular cylinder with a height of 20 feet and a volume of 320π cubic feet. What is the diameter, in feet, of the water tank?

A 16

B 10

C 8

D 4

---

10) Which equation does **not** represent a linear function of x?

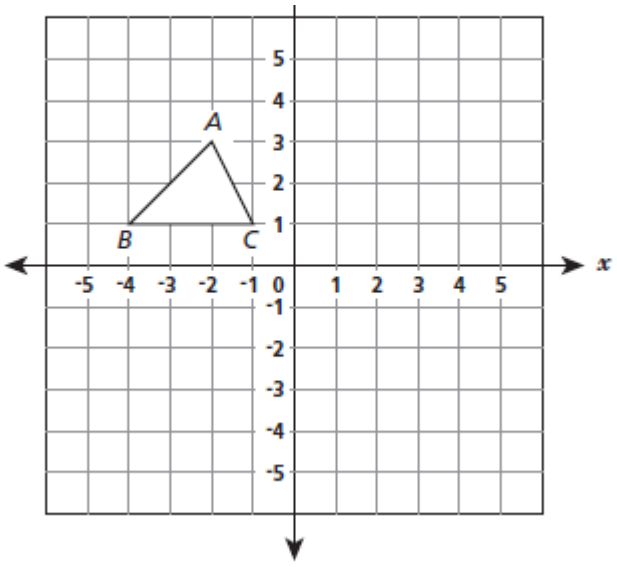
A $y = -\frac{3}{4}x$

B $y = \frac{x}{2}$

C $y = -3 + 2x$

D $y = 3x^2 - 2$

11) If $\triangle ABC$ is rotated 90° clockwise about the origin, what will be the new coordinates of vertex B?



A (−1, −4)

B (1, 4)

C (4, 1)

D (4, −1)

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12) Mr. Wallace surveyed 75 students at Poole Middle School to find out the students' favorite place to eat lunch. The results are shown below.

FAVORITE PLACE TO EAT LUNCH

	Cafeteria	Outside	Total
Boys	16	21	37
Girls	24	14	38
Total	40	35	75

Which table shows the approximate relative frequencies of Mr. Wallace's data?

A

FAVORITE PLACE TO EAT LUNCH

	Cafeteria	Outside	Total
Boys	16%	21%	37%
Girls	24%	14%	38%
Total	40%	35%	75%

C

FAVORITE PLACE TO EAT LUNCH

	Cafeteria	Outside	Total
Boys	40%	60%	49%
Girls	60%	40%	51%
Total	100%	100%	100%

B

FAVORITE PLACE TO EAT LUNCH

	Cafeteria	Outside	Total
Boys	21%	28%	49%
Girls	32%	19%	51%
Total	53%	47%	100%

D

FAVORITE PLACE TO EAT LUNCH

	Cafeteria	Outside	Total
Boys	43%	57%	100%
Girls	63%	37%	100%
Total	53%	47%	100%

Extended Response: Calculators are permitted - You must Show all work for full credit

13) Solve the equation below for d.

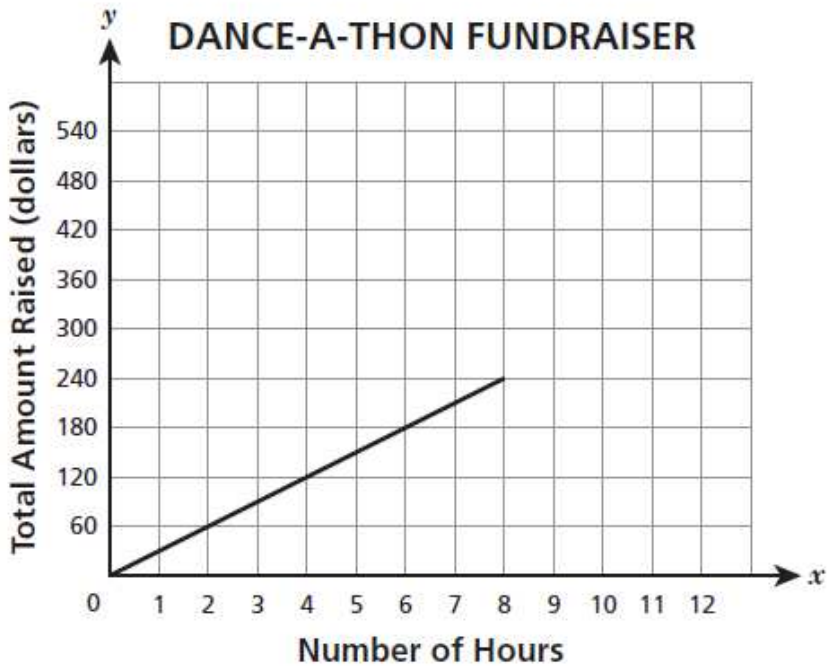
$$0.2(d - 6) = 0.3d + 5 - 3 + 0.1d$$

14) Triangle ABC was rotated 90° clockwise. Then it underwent a dilation centered at the origin with a scale factor of 4. Triangle $A'B'C'$ is the resulting image.

What parts of $\triangle A'B'C'$ are congruent to the corresponding parts of the original triangle? Explain your reasoning.

Compare the perimeters of $\triangle ABC$ and $\triangle A'B'C'$. Explain your reasoning.

15) Students organized a 12-hour "dance-a-thon" as a fundraiser for their summer camp. The graph below represents the amount of money they raised during the first 8 hours.



What was the amount of money raised per hour during the first 8 hours?

Show your work or explain how you determined your answer.

Answer $_____ per hour

During the next 4 hours of the dance-a-thon, the students raised money at twice the hourly rate of the first 8 hours.

On the coordinate plane on the previous page, complete the graph for the next 4 hours to represent the total amount of money raised at the dance-a-thon. Use words and numbers on the following lines to explain how you knew where to draw the graph.

Released Questions 2014

For the following questions Calculators are NOT permitted

1) A sequence of transformations was applied to an equilateral triangle in a coordinate plane. The transformations used were rotations, reflections, and translations. Which statement about the resulting figure is true?

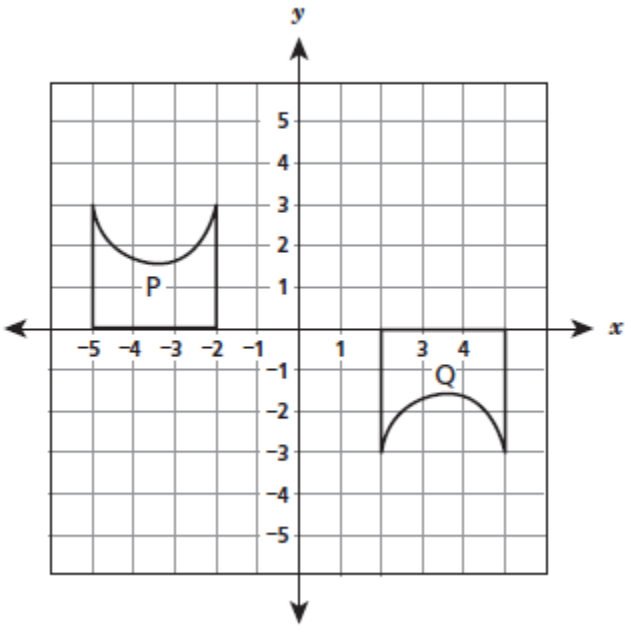
A It must be an equilateral triangle with the same side lengths as the original triangle.

B It must be an equilateral triangle, but the side lengths may differ from the original triangle.

C It may be a scalene triangle, and all the side lengths may differ from the original triangle.

D It may be an obtuse triangle with at least one side the same length as the original triangle.

2) Figure Q was the result of a sequence of transformations on figure P, both shown below.



Which sequence of transformations could take figure P to figure Q?

A reflection over the *x*-axis and translation 7 units right

B reflection over the *y*-axis and translation 3 units down

C translation 1 unit right and 180° rotation about the origin

D translation 4 units right and 180° rotation about the origin

3) Determine the product.

$$800.5 \times (2 \times 10^6)$$

A 1.7×10^7

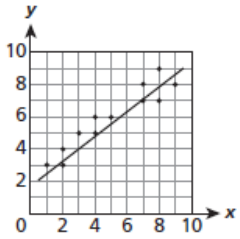
B 1.601×10^7

C 1.7×10^9

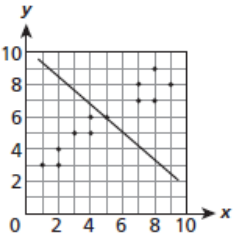
D 1.601×10^9

4) Which line represents the best fit for the scatter plot data?

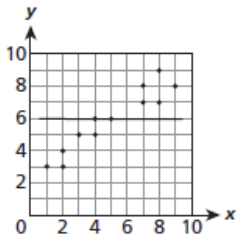
A



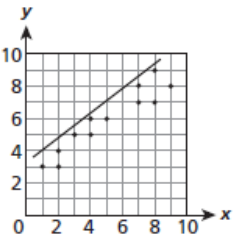
C



B



D



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5) At a given time, Saturn was 9.1×10^8 miles from the Sun and Earth was 9.3×10^7 miles from the Sun. By what distance is one planet closer to the Sun than the other planet?

A 2×10^1

B 2×10^{15}

C 8.17×10^7

D 8.17×10^8

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6) Rectangle *R* undergoes a dilation with scale factor 0.5 and then a reflection over the *y*-axis. The resulting image is Rectangle *S*. Which statement about Rectangles *R* and *S* is true?

A They are congruent and similar.

B They are similar but not congruent.

C They are congruent but not similar.

D They are neither congruent nor similar.

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7) The combined volume of all the tanks at an aquarium is 1.25×10^6 gallons. The aquarium plans to install a new dolphin tank with a volume of 250,000 gallons. What will be the total volume of all of the tanks at the aquarium after the new dolphin tank is installed?

A 1.5×10^5

B 3.75×10^5

C 1.5×10^6

D 3.75×10^6

8) The table below shows the cost of different numbers of goldfish at a pet store.

COST OF GOLDFISH

Number of Goldfish	Cost
5	$1.50
10	$3.00
15	$4.50
20	$6.00

The cost is a linear function of the number of goldfish. Which statement describes the rate of change of this function?

A The cost increases $0.30 each time 1 goldfish is added.

B The cost increases $1.50 each time 1 goldfish is added.

C The cost increases $3.00 each time 5 goldfish are added.

D The cost increases $6.00 each time 5 goldfish are added.

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9) The four tables below show relationships in which the x values represent inputs and the y values represent the corresponding outputs.

Q

x	y
–2	–3
1	3
3	–3
5	3

R

x	y
–1	–5
2	4
3	7
4	10

S

x	y
–2	3
1	3
3	3
5	3

T

x	y
3	4
4	5
3	–4
4	–5

Which table represents a relationship that is **not** a function?

A Q

B R

C S

D T

---

10) Which equation represents a linear function?

A $y = \frac{4}{x} + 1$

B $y = x^2 + 2$

C $y = \sqrt[3]{x + 1}$

D $y = -\frac{2}{3}x - \frac{1}{2}$

11) Which phrase describes a nonlinear function?

A the area of a circle as a function of the radius

B the perimeter of a square as a function of the side length

C the cost of gasoline as a function of the number of gallons purchased

D the distance traveled by a car moving at constant speed as a function of time

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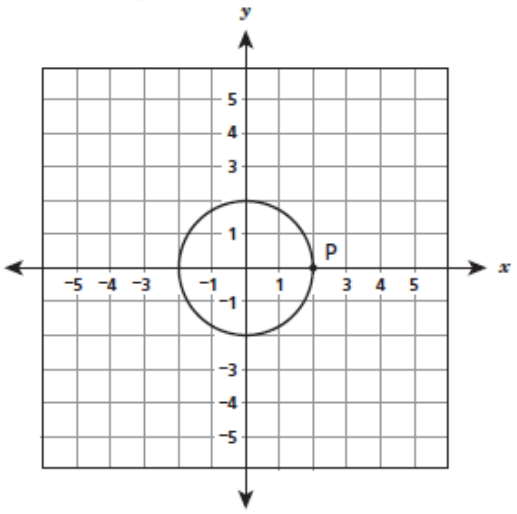
12) The circle shown below is centered at (0, 0) and passes through point P located at (2, 0).



The circle is dilated with the center of dilation at the origin and a scale factor of 0.5 and then translated up 3 units. What are the coordinates of the image of point P after this transformation?

A (4, 3)

B (1, 3)

C (1, 1.5)

D (0.5, 3)

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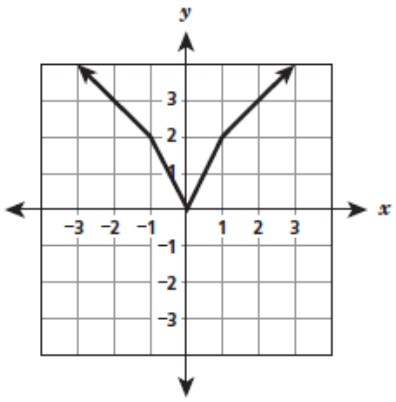
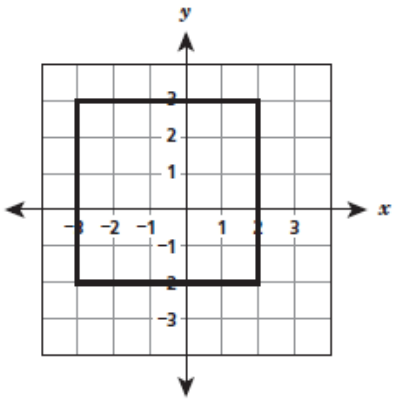
13) Which graph represents a function?

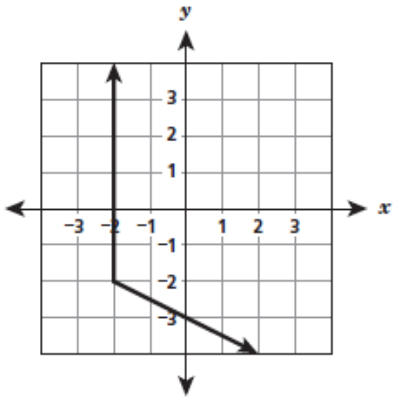
A



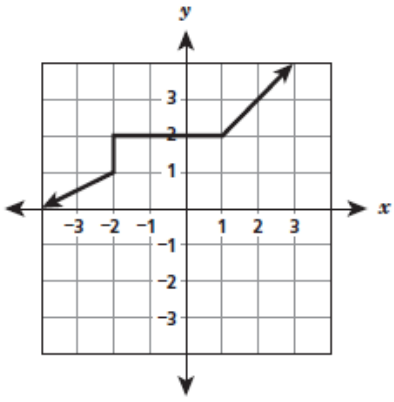
C



B



D



For the following questions Calculators are permitted

14) Which number is equivalent to $\frac{3^4}{3^2}$?

A 2

B 9

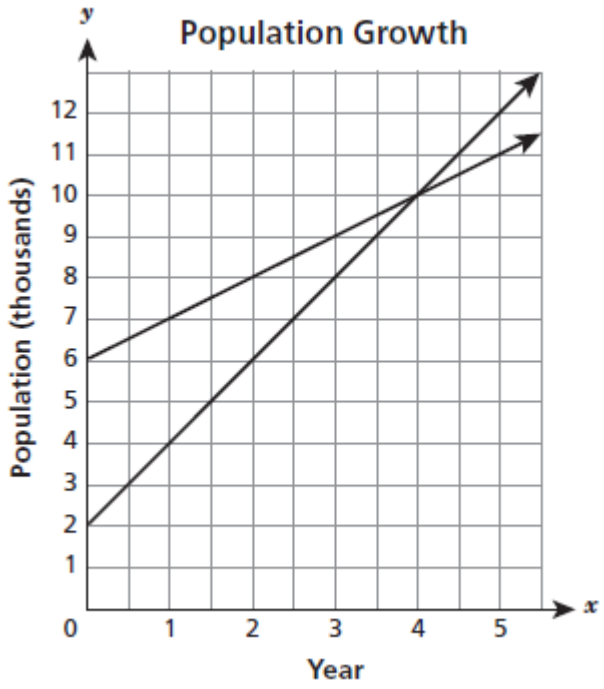
C 81

D 729

15) The population growth of two towns over a period of five years is represented by the system of equations below, both algebraically and graphically.

$y = x + 6$

$y = 2x + 2$



Which ordered pair is the solution to the system of equations?

A (2, 6)

B (4, 10)

C (6, 2)

D (10, 4)

16) Which expression is equivalent to $4^7 \times 4^{-5}$?

A 4^{12}

B 4^2

C 4^{-2}

D 4^{-35}

17) Madison created two functions.
For Function A, the value of y is two less than four times the value of x.
The table below represents Function B.

Function B

x	y
–3	–9
–1	–5
1	–1
3	3

In comparing the rates of change, which statement about Function A and Function B is true?

A Function A and Function B have the same rate of change.

B Function A has a greater rate of change than Function B has.

C Function A and Function B both have negative rates of change.

D Function A has a negative rate of change and Function B has a positive rate of change.

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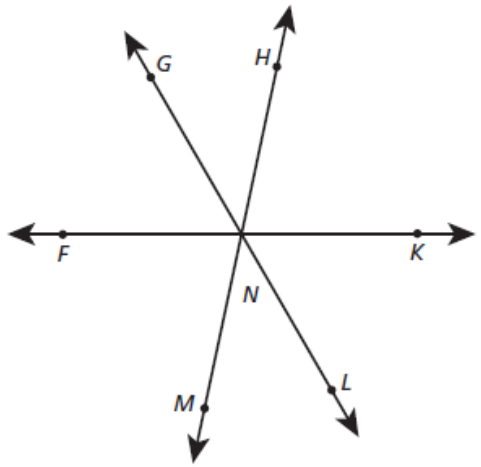
18) In the diagram below, three lines intersect at N. The measure of $\angle GNF$ is 60°, and the measure of $\angle MNL$ is 47°.



What is the measure of $\angle HNK$?

A 47°

B 60°

C 73°

D 107°

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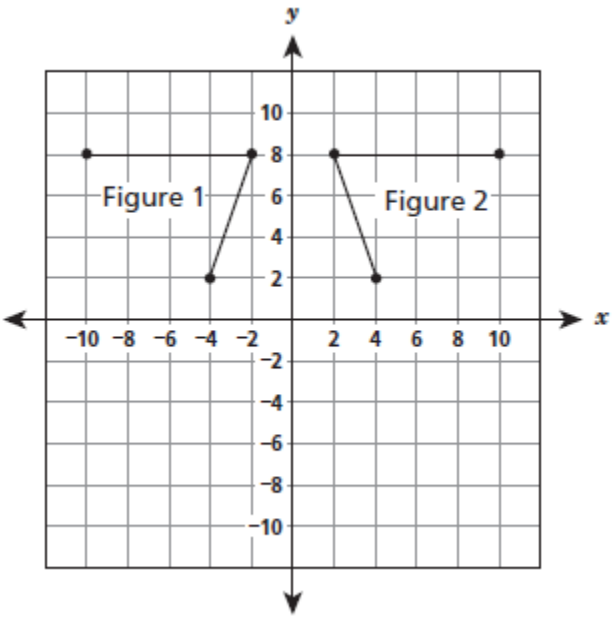
19) Figure 1 can be transformed to create Figure 2 using a single transformation.



Which transformation can be used to accomplish this?

A dilation

B rotation

C reflection

D translation

20) What is the solution to the system of equations below?

$$\begin{cases} 3x + 4y = -2 \\ 2x - 4y = -8 \end{cases}$$

A $x = 2,\ y = -2$

B $x = 6,\ y = -5$

C $x = 4,\ y = 4$

D $x = -2,\ y = 1$

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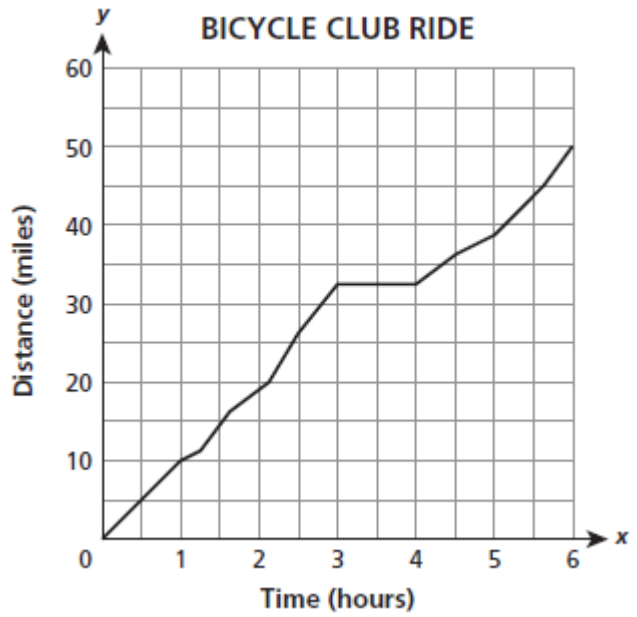
21) A bicycle club went on a six-hour ride. The graph below shows the relationship between the number of hours spent on the trails and the number of miles traveled.



Which statement best interprets information provided by the graph?

A The club members rode at a constant speed for the entire ride.

B The club members stopped for a rest during their ride.

C The number of miles traveled increased continuously throughout the ride.

D The number of miles traveled increased some of the time and decreased some of the time.

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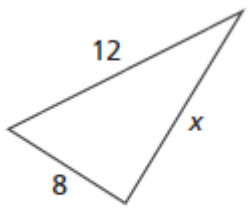
22) Which number could **not** be a value of x?



[not drawn to scale]

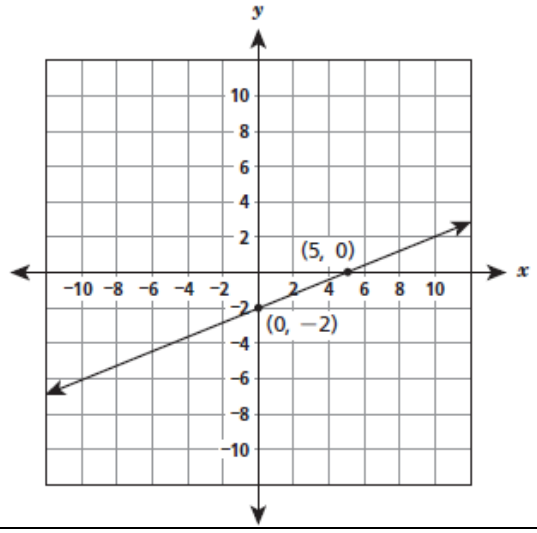
A 8

B 9

C 12

D 21

23) Which equation represents the line shown on the coordinate grid below?



A $y = \frac{2}{5}x - 2$

B $y = \frac{2}{5}x + 5$

C $y = -\frac{2}{5}x - 2$

D $y = -\frac{2}{5}x + 5$

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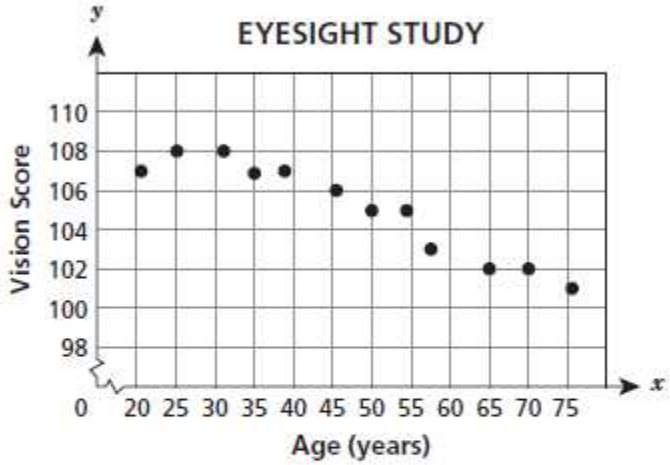
24) A researcher studied the eyesight of people at different ages. She calculated a vision score for each person in the study and plotted the data on the graph below.



The researcher used the line $y = -0.1x + 110$ to model the data. When she substituted the value $x = 65$ into this equation, what did the result tell her?

A the exact value for the vision score of a 65-year-old

B the predicted value for the vision score of a 65-year-old

C the minimum possible value for the vision score of a 65-year-old

D the maximum possible value for the vision score of a 65-year-old

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25) Annette plans to visit an amusement park where she must pay for admission and purchase tickets to go on the rides. Annette wants to find the total cost for a day at the amusement park. She wrote the equation $c = 1.50x + 12$ to predict c, the total cost for a day at the amusement park. What could the number 12 represent in Annette's equation?

A the number of rides

B the cost of admission

C the cost of each ticket

D the number of tickets

26) The table below represents a linear function.

x	y
–1	5
1	9
3	13
5	17

Which function has a greater slope and a greater y-intercept than the linear function represented in the table?

A $y = 2x + 8.5$

B $y = 3x + 7.5$

C $y = 5x + 6.5$

D $y = 10x + 5.5$

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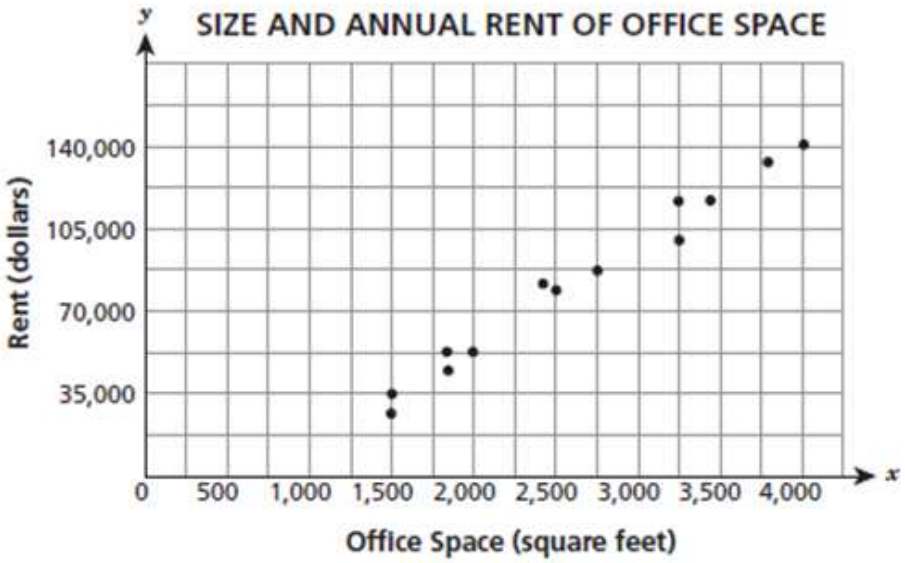
27) The scatter plot shows the sizes and annual rents of some office spaces in the downtown area of a city.



What would the line of best fit reveal about these data?

A There is a strong negative relationship between the cost of rent and the size of the office space.

B There is a strong positive relationship between the cost of rent and the size of the office space.

C There is a weak positive relationship between the cost of rent and the size of the office space.

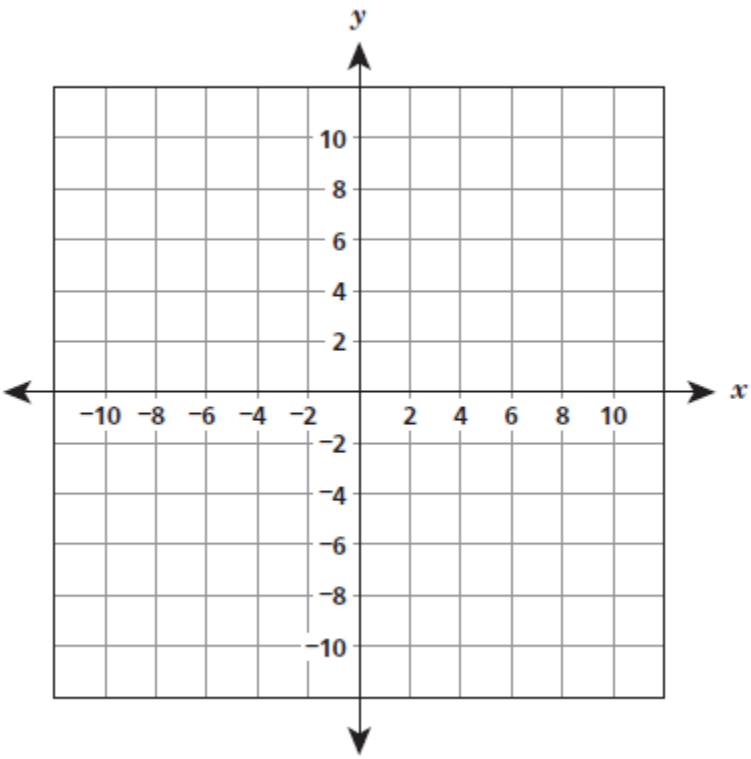
D There is a weak negative relationship between the cost of rent and the size of the office space.

Extended Response: Calculators are permitted - You must Show all work for full credit

28) Graph and label the given system of equations on the coordinate grid shown below.

$y = \frac{1}{2}x + 2$

$y = x - 1$



What is the solution to the system of equations?

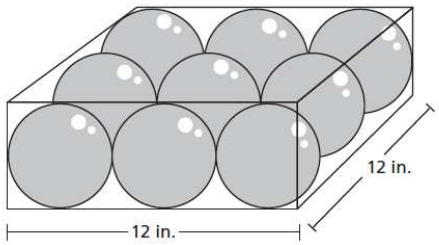
29) Does the equation below define a linear function?

$y = \frac{3}{x}$, when $x \neq 0$

Explain how you got your answer.

Answer

30) A box contains 9 identical glass spheres that are used to make snow globes. The spheres are tightly packed, as shown below.



What is the total volume, in cubic inches, of all 9 spheres? Round your answer to the nearest tenth of a cubic inch.

$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

Answer _____ cubic inches

---

31) Solve the equation below.

$$0.4\left(2x + \frac{1}{2}\right) = 3[0.2x + (-2)] - 4$$

32) The table shown below was posted on the wall at Andy's Hardware to show the price of varying lengths of chain-link fencing.

PRICE OF FENCING

Length (feet)	Price
75	$168.75
125	$281.25
175	$393.75
225	$506.25

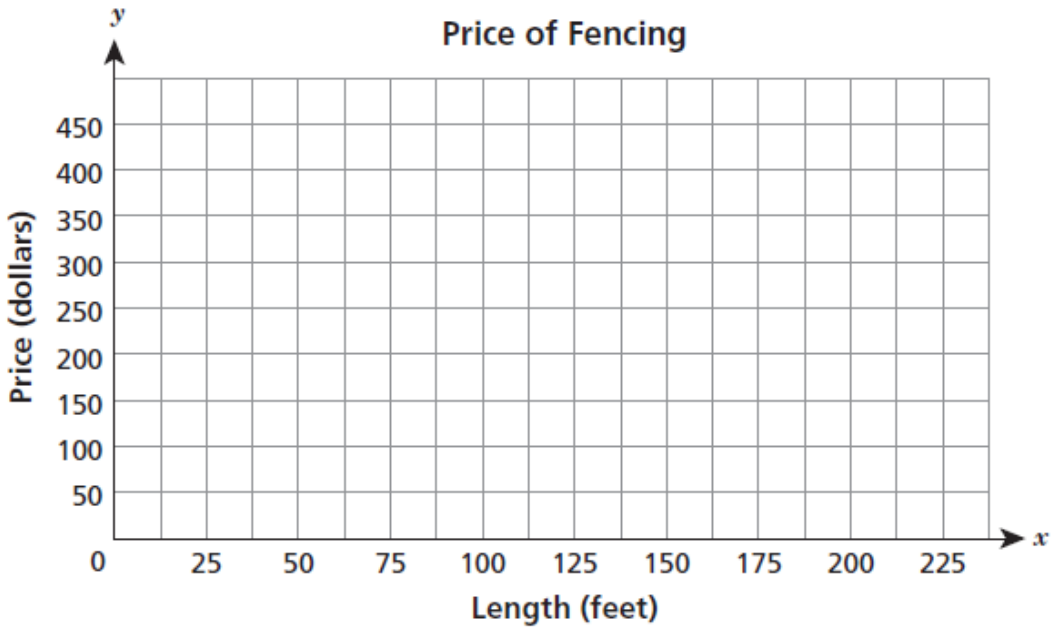
The price of the same fencing at Bargain Hardware can be determined by the equation $y = 2.50x$, where y is the price, in dollars, for x feet of fencing.

Determine the unit price for fencing, in dollars per foot, for each store.

Answers Andy's Hardware $_____ per foot

Bargain Hardware $_____ per foot

On the grid below, graph for each store the relationship between the length of the fencing and the price to verify your answers. Be sure to label each line.



33) Bert's cab company charges $1.00 plus an additional $3.00 per mile for a ride. Madeline's cab company charges $3.00 plus an additional $2.00 per mile for a ride. Write a system of linear equations that shows the cost in dollars, y, for a cab ride of x miles for each cab driver.

Bert's _____

Madeline's _____

At what distance, in miles, will the cost be the same for both companies?

Answer _____ miles

Which cab driver's charge will be less for a ride that is 10 miles in distance?

Answer _____

Use words and numbers to explain how you determined your answer.

_____

_____

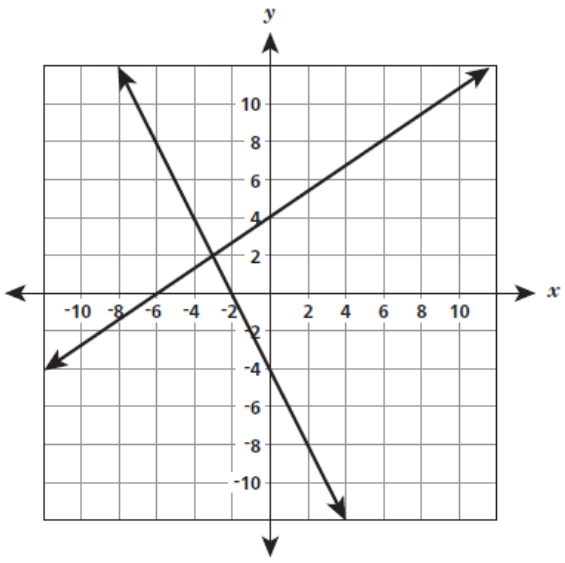
Released Questions 2015

For the following questions Calculators are NOT permitted

1) The speed of light in a vacuum is 299,792,458 meters per second. Which number, written in scientific notation, is the best approximation of the speed of light?

A 0.3×10^7 meters per second
B 0.3×10^8 meters per second
C 3.0×10^7 meters per second
D 3.0×10^8 meters per second

2) The graph of a system of linear equations is shown below.



Which ordered pair is the best estimate for
The solution of this system of linear equations?

A) (-6, -2)

B) (-3, 2)

C) (4, -4)

D) (6, 8)

3) Which equation does not represent a linear function?

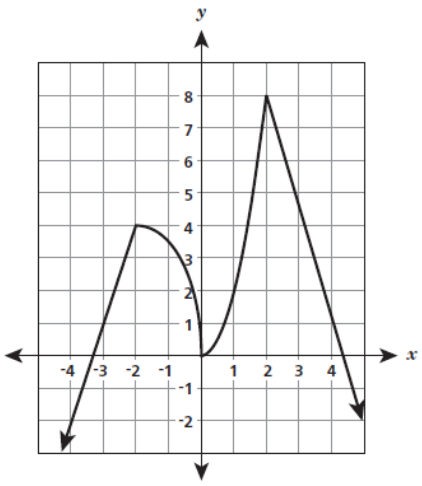
A $y = 2(x - 3)$

B $y = 2^2 - 3x$

C $y = \frac{x + 1}{5}$

D $y = 2x^2 + 3x$

4) The graph of a function is shown below.



For which interval of x is the function decreasing and nonlinear?

A between -4 and -2

B between -2 and 0

C between 0 and 2

D between 2 and 4

---

5) The cost to rent a paddleboat at the city park includes an initial fee of \$7.00, plus \$3.50 per hour. Which equation models the relationship between the total cost, y, and the number of hours, x, that the paddleboat is rented?

A $y = 3.5x + 7$

B $y = 7x + 3.5$

C $y = \frac{x}{7} + 3.5$

D $y = \frac{x}{3.5} + 7$

---

6) A solid object was sliced to form two new objects. Each of the two new objects had a circular base. Which shape could **not** have been the original object?

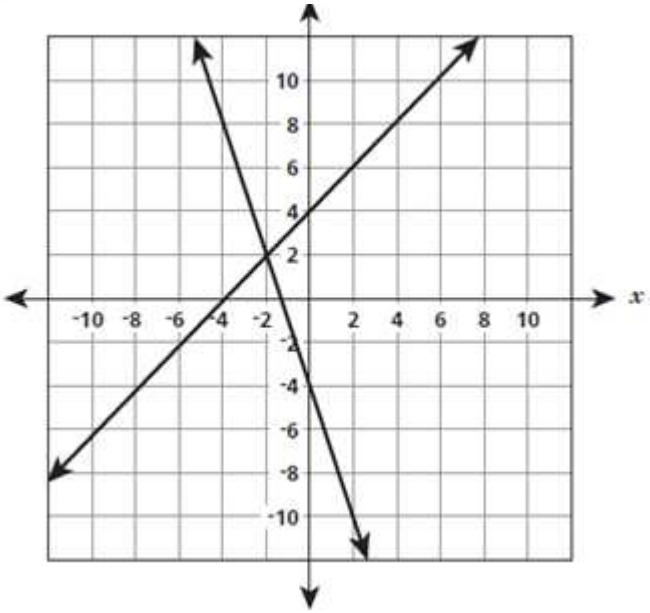
A cone

B cylinder

C prism

D sphere

7) Which statement explains why the point $(-2, 2)$ is the solution to the system of linear equations shown below?



A It lies on the graph of only one of the equations.

B It lies in the second quadrant of the coordinate plane.

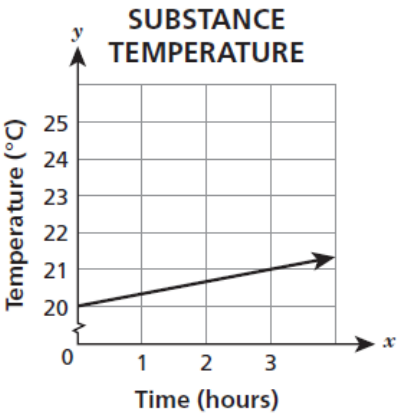
C It is the only point that satisfies both equations simultaneously.

D It is one of many points that satisfies both equations simultaneously.

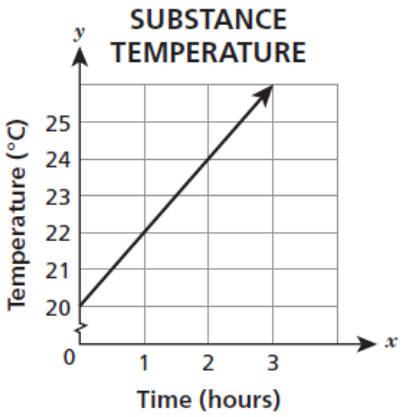
---

8) During an experiment, the temperature of a substance increased at a constant rate of three degrees Celsius (°C) per hour. Which graph represents this relationship?

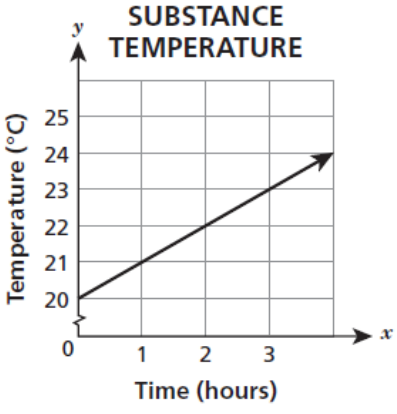
A



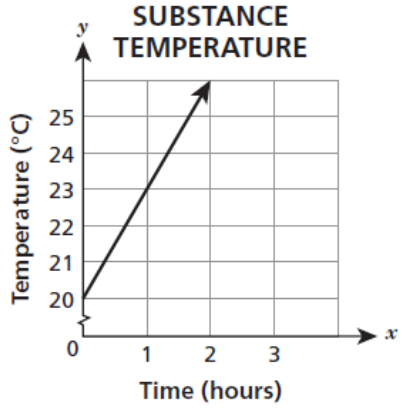
C



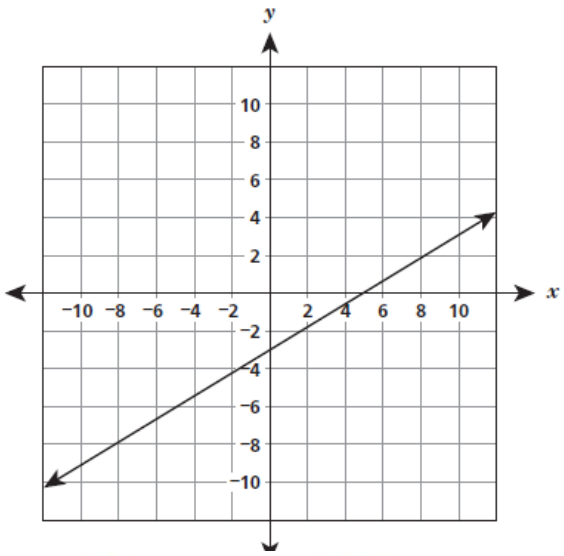
B



D



9) Function 1 is defined by the equation $y = \frac{3}{4}x + 1$, and function 2 is represented by the graph below.



Which statement about the functions is true?

A Function 1 has the greater rate of change and the greater *y*-intercept.

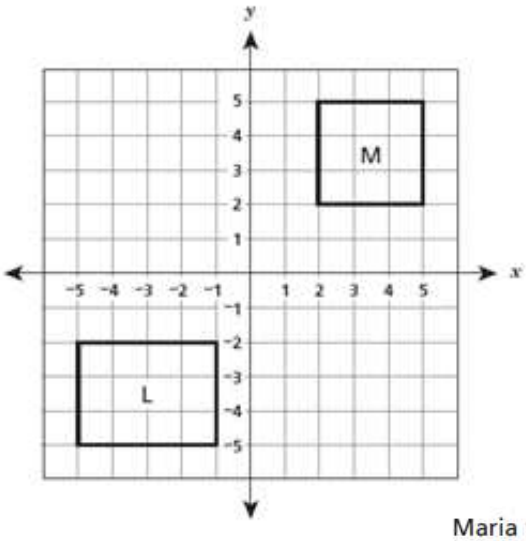
B Function 2 has the greater rate of change and the greater *y*-intercept.

C Function 1 has the greater rate of change, and function 2 has the greater *y*-intercept.

D Function 2 has the greater rate of change, and function 1 has the greater *y*-intercept.

---

10) Figure L and figure M are shown on the grid below.



Maria wants to transform figure L to figure M using only rotations, reflections, and translations. Which statement is true?

A The transformation can be done with a reflection followed by a rotation.

B The transformation can be done with a reflection followed by a translation.

C The transformation cannot be done because figure L is not congruent to figure M.

D The transformation cannot be done because figures L and M are in different quadrants.

For the following questions Calculators are permitted

11) Jenny wants to rent a truck for one day. She contacted two companies. Laguna's Truck Rentals charges $20 plus $2 per mile. Salvatori's Truck Rentals charges $3 per mile. After how many miles will the total cost for both companies be the same?

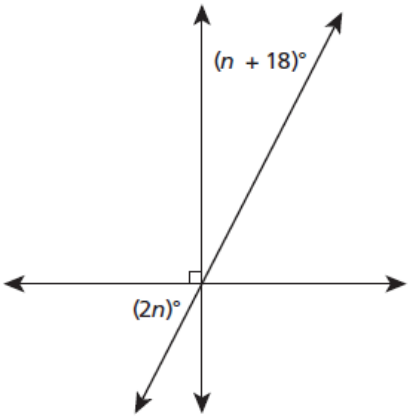
A 4

B 6

C 20

D 60

12) What is the value of n in the diagram below?



[not drawn to scale]

A 18

B 24

C 42

D 48

13) Triangle M is similar to triangle N. Triangle M has two angles with measures of 32° and 93°. Which two angle measures could be included in triangle N?

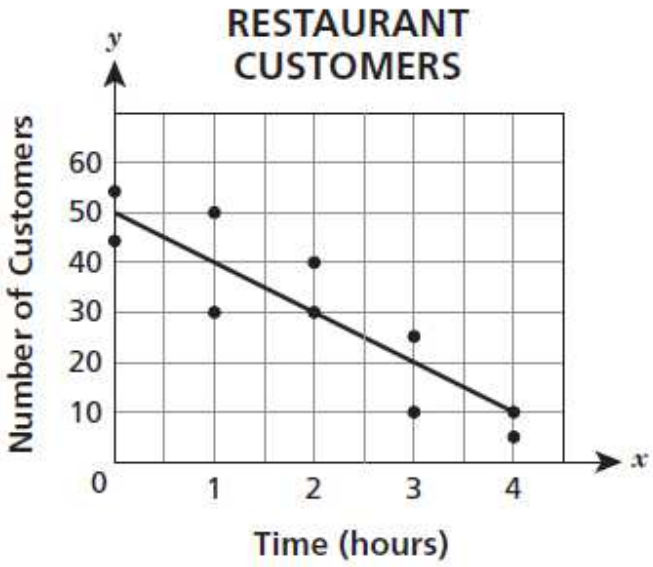
A 32° and 58°

B 32° and 74°

C 93° and 55°

D 93° and 87°

14) The scatter plot below shows the numbers of customers in a restaurant for four hours of the dinner service on two different Saturday nights. The line shown models this relationship, and $x = 0$ represents 7 p.m.



What does the value of the *y*-intercept represent?

A the average number of customers at 7 p.m.

B the average number of customers at 11 p.m.

C the average change in the number of customers each hour

D the average change in the number of customers during four hours of the dinner service

---

15) Which exponential expression is equal to $2^{-5} \cdot 2^{8}$?

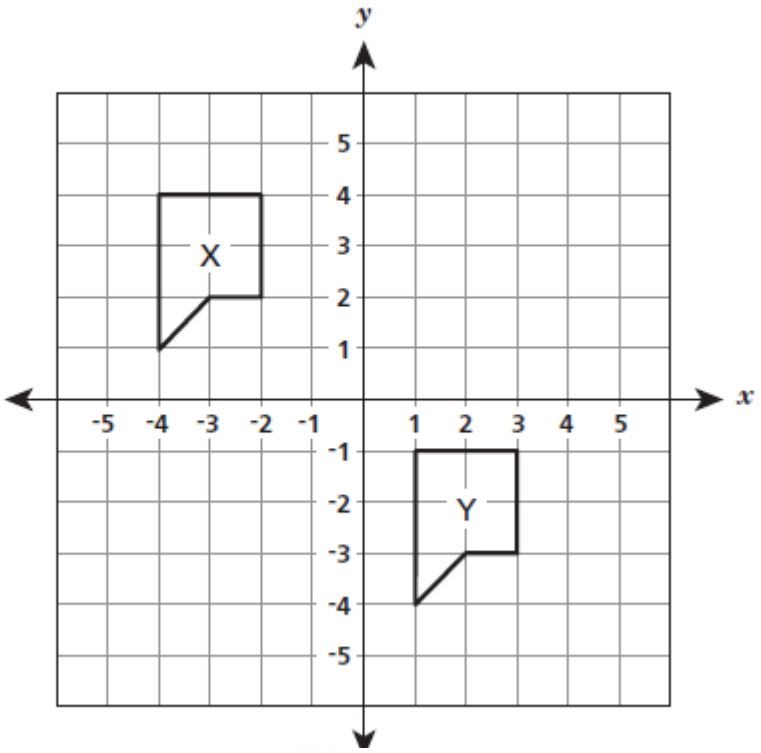
A $\frac{2^2}{2^{-1}}$

B $\left(2^3\right)^{-1}$

C $\frac{2^{-2}}{2^{-1}}$

D $\left(2^{-1}\right)^3$

16) Figure X and figure Y are shown on the coordinate grid below.



Which statement about figures X and Y must be true?

A A series of translations will transform figure X to figure Y, and the figures will be congruent.

B A 180° clockwise rotation will transform figure X to figure Y, and the figures will be congruent.

C A series of translations will transform figure X to figure Y, but the figures will not be congruent.

D A 180° clockwise rotation will transform figure X to figure Y, but the figures will not be congruent.

---

17) A cone has a radius of 1.2 inches and a height of 2.9 inches. What is the volume, to the nearest tenth of a cubic inch, of the cone?

A 3.6

B 4.4

C 10.6

D 13.1

18) A line contains the points (4, 2) and (0, −1). What is the equation of the line?

A $y = 2x - 6$

B $y = \frac{3}{4}x - 1$

C $y = \frac{1}{4}x + 1$

D $y = \frac{4}{3}x - \frac{10}{3}$

---

19) A system of equations is shown below.

$$5x + 3y = -6$$
$$2x + y = -4$$

Which statement about the ordered pair (−6, 8) is true?

A It is the only solution to the system.

B It is not a solution to either equation.

C It is one of many solutions to the system.

D It is a solution to the first but not the second equation.

---

20) What is the equation of the line that passes through point (4, 12) and has a *y*-intercept of −2?

A $y = \frac{5}{2}x - 2$

B $y = \frac{7}{2}x - 2$

C $y = 2x - 2$

D $y = 6x - 2$

21) A cylinder has a diameter of 14 centimeters and a volume of 112π cubic centimeters. What is the height, in centimeters, of the cylinder?

A 16

B 4

C $\frac{16}{7}$

D $\frac{4}{7}$

---

22) The winning time for the men's 400-meter race in each of the Olympic Games from 1976 to 1996 can be modeled by the equation $y = -0.054x + 44.54$, where x is the number of years after 1976 and y is the winning time in seconds. If the relationship continues, which equation could be used to predict the winning time in the year 2020?

A $y = -0.054(1976) + 44.54$

B $y = -0.054(2020) + 44.54$

C $y = -0.054(24) + 44.54$

D $y = -0.054(44) + 44.54$

---

23) An above-ground swimming pool in the shape of a cylinder has a diameter of 18 feet and a height of 4.5 feet. If the pool is filled with water to 6 inches from the top of the pool, what is the volume, to the nearest cubic foot, of the water in the pool?

A 226

B 452

C 1,018

D 4,072

Extended Response: Calculators are permitted - You must Show all work for full credit

24) Determine the number of solutions that exist to the equation below.

$$8(j - 4) = 2(4j - 16)$$

Show your work.

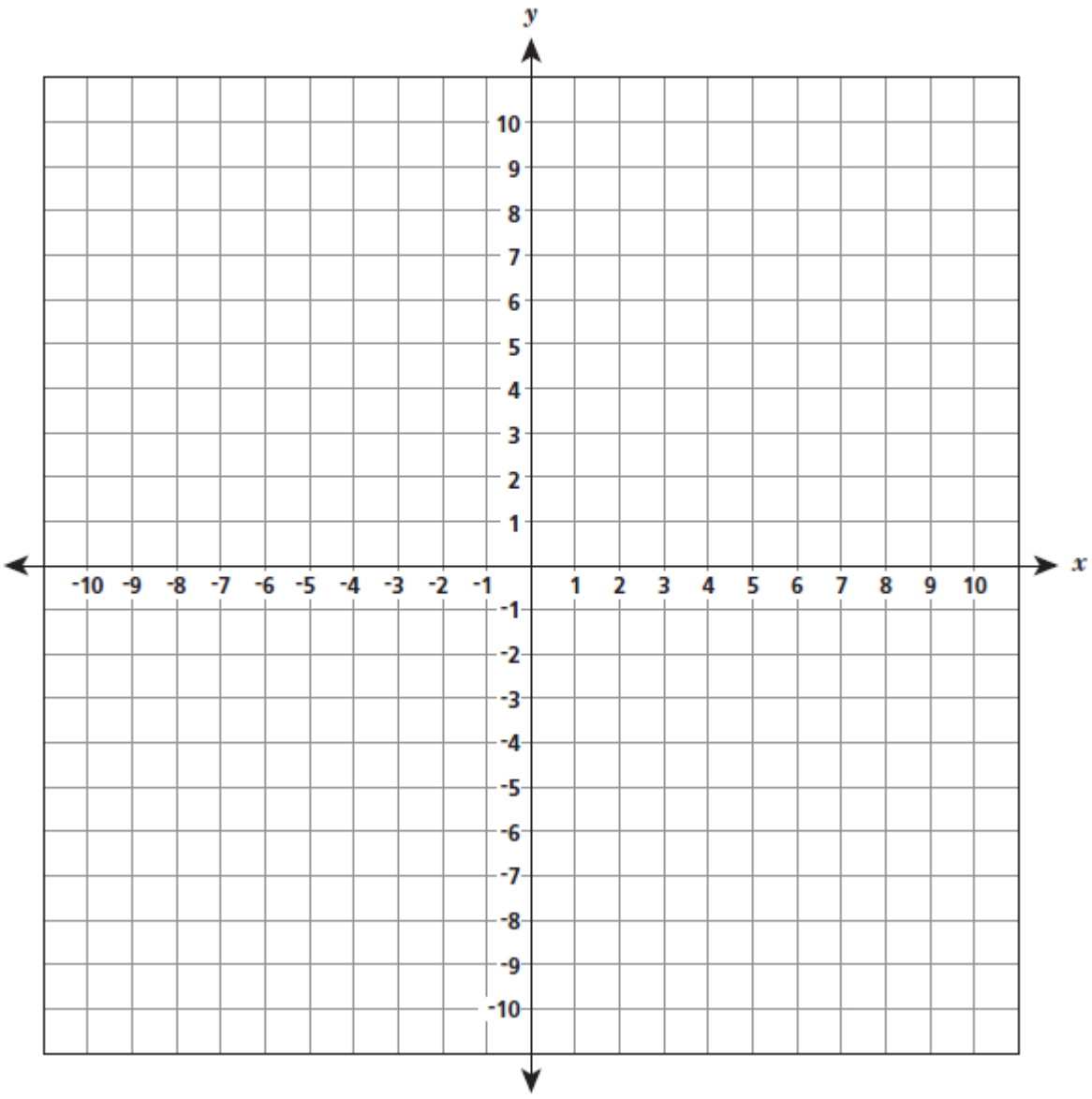
25) Determine the solution to the system of equations below.

$$x - 3y = 1$$
$$3x - 5y = 11$$

Show your work.

26) A certain function is defined as "multiply the input by $-\frac{3}{4}$, then add 2."

Graph the function on the coordinate plane below.



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27) What, if any, are the solutions to the equation $3(0.5x - 4) = \frac{3}{2}x - 1.2$?

Show your work.

28) The table below shows a relation between x and y.

x	y
–4	16
–2	4
0	0
2	4
4	16
6	36

Susie said the relation above is also a function. Explain why Susie is correct or incorrect.

_____

_____

_____

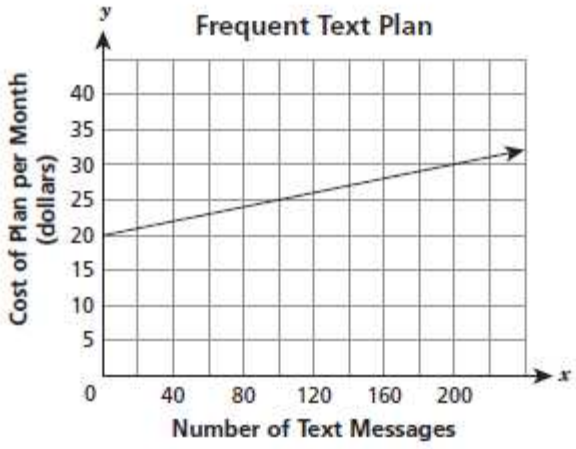
_____

29) A customer is comparing two different text message plans at Cellular Bargains. He wants to find out which plan allows the most text messages for the same cost.

The Pay Per Text Plan charges $10 per month and $0.10 for each text message. Write a function that models this plan, stating what your variables represent.

Answer _____

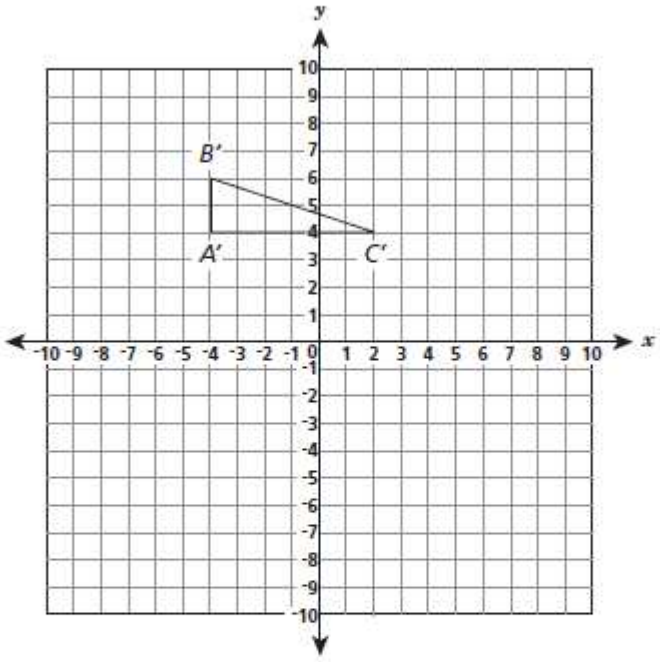
The Frequent Text Plan is modeled by the graph shown below.



How many text messages would result in the same cost per month for the two plans?

Show your work.

30) When $\triangle ABC$ was dilated by a scale factor of 2, centered at the origin, the result was its image $\triangle A'B'C'$ shown on the coordinate plane below. The vertices of $\triangle A'B'C'$ are $A'(-4, 4)$, $B'(-4, 6)$, and $C'(2, 4)$.



What are the coordinates of the vertices of $\triangle ABC$?

Vertices A (____ , ____) B (____ , ____) C (____ , ____)

Explain how you determined the coordinates of the vertices of $\triangle ABC$.

_____

_____

Are $\triangle ABC$ and $\triangle A'B'C'$ congruent to each other, similar to each other, or neither? Explain how you determined your answer.

_____

_____

_____

_____

_____

31) Quadrilateral *ABCD* is graphed on a coordinate plane.

- Abby reflected *ABCD* over the *x*-axis and then rotated it 90° clockwise about the origin. She labeled the final image *EFGH*.
- Manny dilated *ABCD* by a scale factor of 3 and then translated the resulting figure 2 units left. He labeled the final image *PQRS*.

Identify a pair of quadrilaterals from the three quadrilaterals *ABCD*, *EFGH*, and *PQRS* that are congruent.

Answer _____

Identify a pair of quadrilaterals from the three quadrilaterals *ABCD*, *EFGH*, and *PQRS* that are similar but not congruent.

Answer _____

Describe a transformation on Abby's quadrilateral *EFGH* that would make the resulting image *E'F'G'H'* congruent to Manny's quadrilateral *PQRS*.

_____

_____

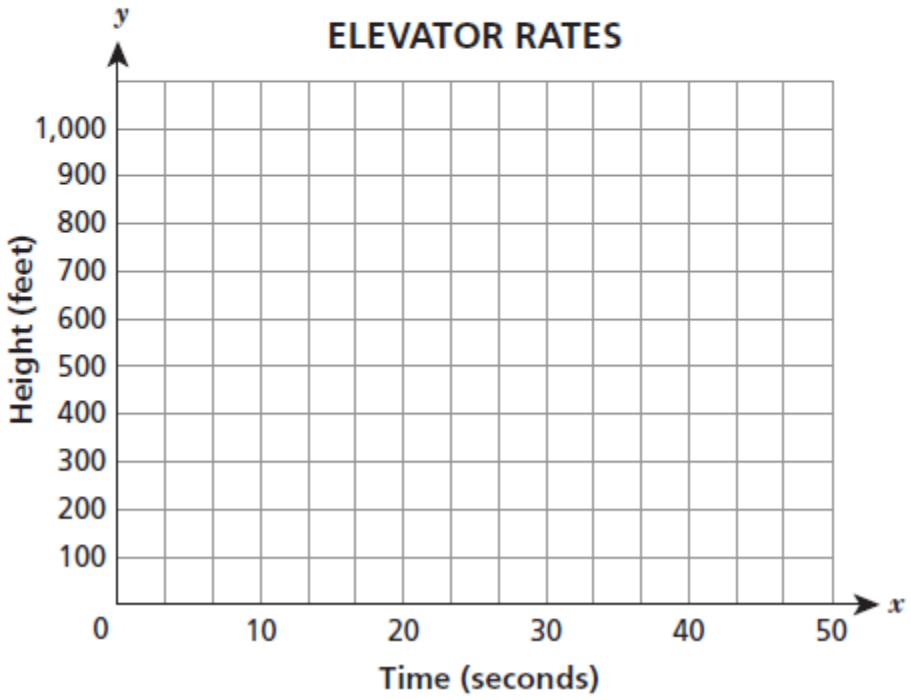
_____

_____

32) The express elevator in the Empire State Building in New York City travels nonstop from the ground floor to the top floor at a rate of 1,400 feet per minute.

The express elevator in the John Hancock Center in Chicago travels nonstop from the ground floor to the observatory on the top floor at a rate represented by the equation $y = 30x$, where y is the height, in feet, and x is the number of seconds.

Graph the two relationships on the grid below to compare the rates of the two elevators.



Which elevator travels at a faster rate?

Using the information from the graph, explain how you got your answer.

Answer

For the following questions Calculators are NOT permitted

1) Mr. Thomsen is buying two types of gift cards to give as prizes to employees at a company meeting. He will buy restaurant gift cards that each cost $50. He will also buy movie theater gift cards that each cost $20. He has $450 to buy a total of 15 gift cards. How many of each type of gift card can Mr. Thomsen buy?

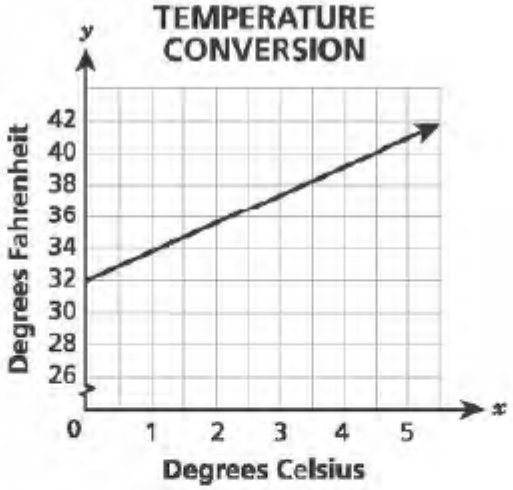
A He can buy 5 restaurant gift cards and 10 movie theater gift cards.

B He can buy 8 restaurant gift cards and 7 movie theater gift cards.

C He can buy 10 restaurant gift cards and 5 movie theater gift cards.

D He can buy 12 restaurant gift cards and 3 movie theater gift cards.

2) The relationship between temperature in degrees Fahrenheit and degrees Celsius is shown in the graph below.



What is the meaning of the *y*-intercept?

A the change in degrees Fahrenheit for every change of one degree Celsius

B the change in degrees Celsius for every change of one degree Fahrenheit

C the temperature in degrees Fahrenheit when the temperature is zero degrees Celsius

D the temperature in degrees Celsius when the temperature is zero degrees Fahrenheit

3) Kevin moved from a city to a small town. The population of the city is 6×10^5, which is about 15 times as great as the small town. Which expression could represent the approximate population of the small town?

A 4×10^3

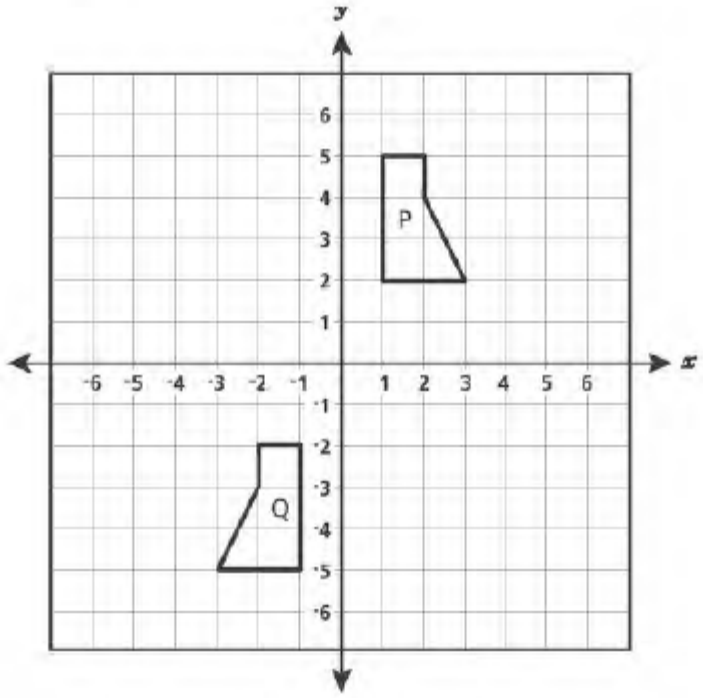
B 4×10^4

C 9×10^5

D 9×10^6

---

4) Pentagon P and pentagon Q, shown below, are congruent.



Which sequence could be used to transform pentagon P to pentagon Q?

A a 180° clockwise rotation about the origin

B a translation four units left and then a reflection over the *x*-axis

C a reflection over the *y*-axis and then a translation seven units down

D a translation seven units down and then a 90° clockwise rotation about the origin

---

5) A cylinder and a cone have congruent heights and radii. What is the ratio of the volume of the cone to the volume of the cylinder?

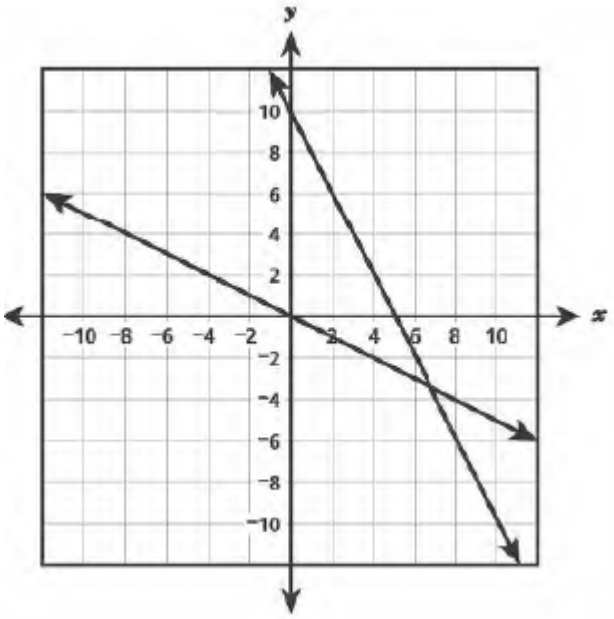
A 1 : 1

B 1 : 3

C 1 : 6

D 1 : 9

6) The graph of a system of equations is shown below.



What system of equations represents the graph?

A $y = -2x + 10$
$y = -\frac{1}{3}x$

B $y = -2x + 10$
$y = -\frac{1}{2}x$

C $y = -\frac{1}{2}x + 10$
$y = -2x$

D $y = -\frac{1}{3}x + 10$
$y = -2x$

---

7) Which of the equations listed below are linear equations?

Equation I: $C = 2\pi r$

Equation II: $A = \pi r^2$

Equation III: $V = \frac{4}{3}\pi r^3$

A equation I only

B equation II only

C equations I and III

D equations II and III

---

8) Simplify.

$5^{-8} \times 5^4$

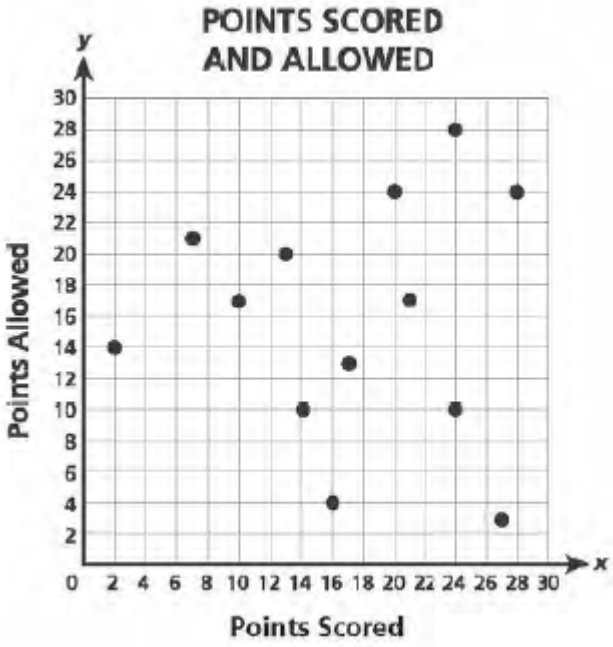
A $\frac{1}{5^4}$

B $\frac{1}{5^{32}}$

C -5^2

D -5^{12}

9) The scatter plot below shows the points scored and the points allowed by the Bulldogs football team for several games.



Which association (correlation) best describes the data?

A no association (correlation)

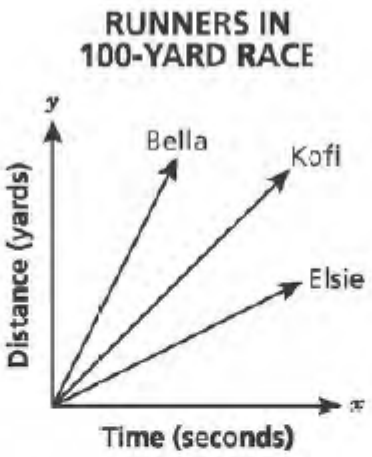
B positive association (correlation)

C negative association (correlation)

D nonlinear association (correlation)

---

10) The graph below shows the relationship between the distances run and the time for three people in a 100-yard race.



The relationship between the distance run and the time for Kofi can be represented by the equation $y = 15.55x$, where he ran y yards in x seconds. Which two equations could be used to represent this relationship for Bella and Elsie?

A Bella: $y = 15.15x$; Elsie: $y = 15.85x$

B Bella: $y = 15.85x$; Elsie: $y = 15.65x$

C Bella: $y = 15.45x$; Elsie: $y = 15.15x$

D Bella: $y = 15.85x$; Elsie: $y = 15.15x$

11) Which table of values represents a linear function?

A

x	y
0	0
1	1
4	16
9	81

C

x	y
0	0
1	2
4	8
9	18

B

x	y
0	1
1	3
4	9
9	20

D

x	y
0	0
1	2
4	4
9	6

---

12) What is the value of t that satisfies the equation below?

$$3(t + 4) - 2(2t + 3) = -4$$

A $-\frac{11}{3}$

B $-\frac{4}{5}$

C 10

D 11

---

13) Ellentown College has approximately 3×10^3 students and Pengrove University has approximately 30,000 students. How many times as much is the number of students at Pengrove University as the number of students at Ellentown College?

A 1

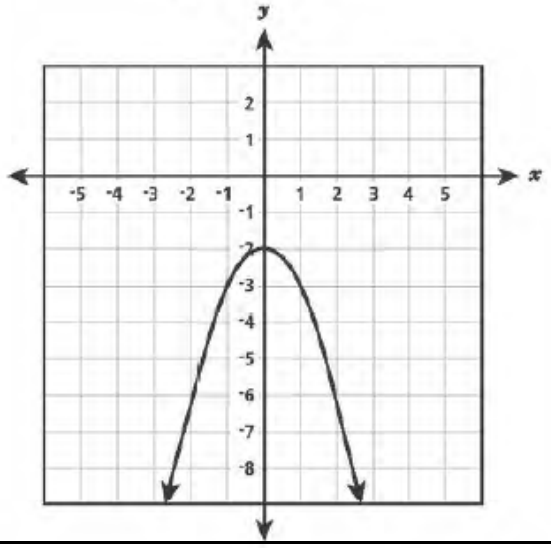
B 10

C 30

D 100

14) Function 1 is represented by the equation $y = -\frac{4}{5}x - 2$, and function 2 is represented by the graph below.

FUNCTION 2



For which of the functions are all the output values less than −1?

A both functions

B only function 1

C only function 2

D neither function

15) A series of transformations on quadrilateral S resulted in quadrilateral T.

- The angle measures of quadrilateral T are congruent to those of quadrilateral S.
- The side lengths of quadrilateral T are twice as long as those of quadrilateral S.

Which transformation on quadrilateral S **must** be included to result in quadrilateral T?

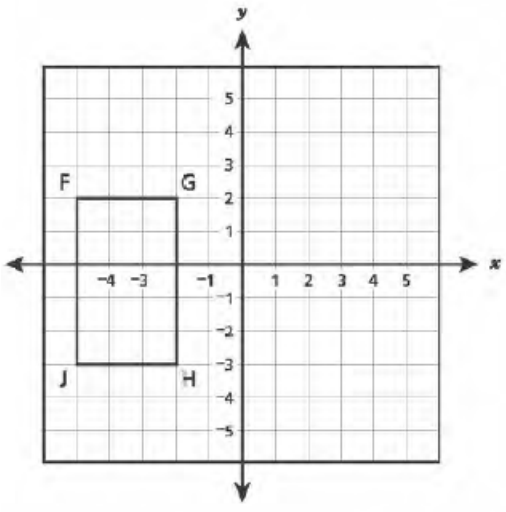
A dilation

B rotation

C reflection

D translation

16) Rectangle FGHJ, shown below, is translated 6 units right and 1 unit up to produce rectangle F'G'H'J'.



Which statement about the side lengths of rectangle F'G'H'J' is true?

A F'G' = 3 and G'H' = 5

B F'G' = 3 and G'H' = 6

C F'G' = 9 and G'H' = 5

D F'G' = 9 and G'H' = 6

For the following questions Calculators are permitted

17) Solve the system of equations below.

$$2x + 4y = 10$$
$$2x + 4y = -10$$

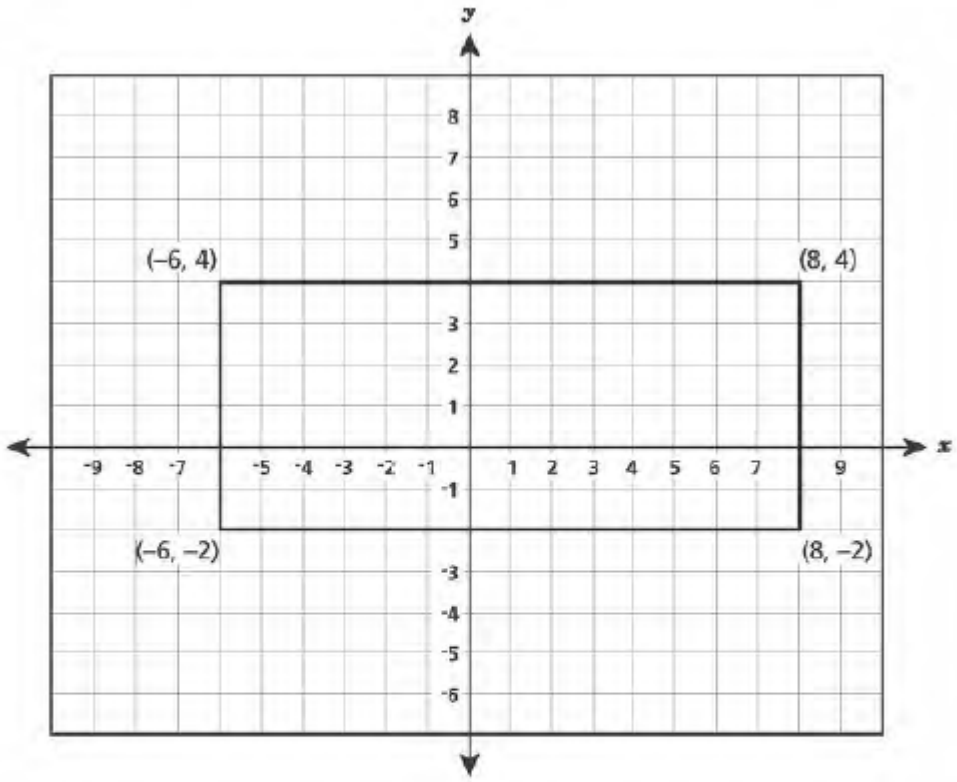
A $x = 3, y = 1$

B $x = 6, y = -4$

C No solution

D Infinitely many solutions

18) Mia enlarged a plan for an outdoor stage. The original plan is shown below.



She dilated the outdoor stage by a scale factor of four with the center of dilation at the origin. Which ordered pair will be the coordinates of one of the new vertices?

A (2, 1)

B (8, 16)

C (32, 4)

D (32, 16)

19) Bianca and Nick are both musicians who sell their songs online. During the same year, Bianca sold 8×10^5 downloads of her songs and Nick sold 4×10^6 downloads of his songs. How many times as much is the number of songs that Nick sold than the number of songs that Bianca sold?

A 2

B 5

C 20

D 40

---

20) Which table represents a relation that is **not** a function?

A

Input	Output
1	1
2	1
3	1
4	1

C

Input	Output
−1	−7
−2	11
−3	13
−4	105

B

Input	Output
2	0
4	1
6	2
8	0

D

Input	Output
3	0
5	2
7	1
3	−4

---

21) The Ecology Club was planning to take a field trip either to the seacoast or the mountains. The club president surveyed all of the members to determine the preferred trip. The results are displayed in the table below.

FIELD TRIP SURVEY

Students	Seacoast	Mountains	Total
Seventh-Grade	42	28	70
Eighth-Grade	30	50	80
Total	72	78	150

Which statement is true about the results of the survey?

A 20% of eighth-grade students preferred the seacoast

B 32% of seventh-grade students preferred the mountains

C 40% of students preferred the mountains

D 48% of students preferred the seacoast

22) A cylinder has a radius of 3 inches and a height of $4\frac{3}{4}$ inches. A sphere has a radius of 3 inches. What is the difference between the volumes, to the nearest tenth of a cubic inch, of the cylinder and the sphere?

A 21.2

B 51.8

C 68.3

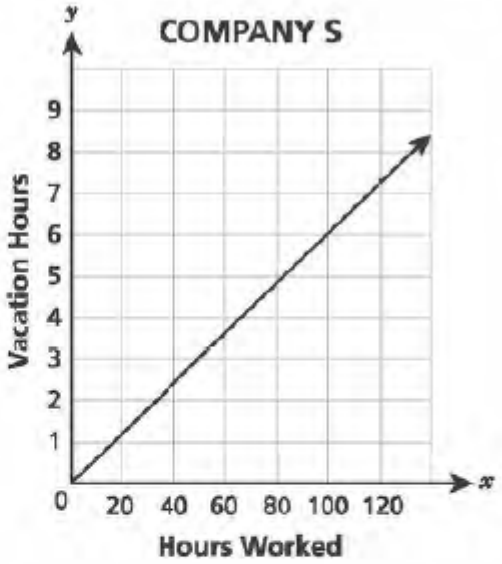
D 96.6

---

23) Two friends work at different companies, P and S. Both companies use the number of hours that an employee works to calculate that employee's vacation hours. The relationship between the number of hours worked and the number of vacation hours for employees at each company is shown in the table and graph, respectively.

COMPANY P

Hours Worked	Vacation Hours
10	0.4
20	0.8
30	1.2
40	1.6
50	2.0



Which statement describes the difference in each friend's vacation hours if both work 2,080 hours?

A The friend at company S will have about 42 more vacation hours than the friend at company P.

B The friend at company S will have about 46 more vacation hours than the friend at company P.

C The friend at company P will have about eight more vacation hours than the friend at company S.

D The friend at company P will have about nine more vacation hours than the friend at company S.

24) Which equation represents a nonlinear function?

A $y = -3x + 1$

B $y = x^2 + 1$

C $y = \frac{x}{2} + 1$

D $y = 2x + \frac{1}{2}$

25) What is the value of the expression below?

$$\frac{(4.8 \times 10^8)}{(1.2 \times 10^4)} \times (2.2 \times 10^{-6})$$

A 0.88

B 0.088

C 0.0088

D 0.00088

26) A crane is lowering a concrete block from a height of 270 feet above the ground at a constant rate of 2.5 feet per second. Which function can be used to determine h, the height, in feet, above the ground of the concrete block after s seconds?

A $h = 270s + 2.5$

B $h = 2.5s + 270$

C $h = 270 - 2.5s$

D $h = 2.5s - 270$

27) Function P is a linear function with a y-intercept of 5. Function Q is defined by the equation $y = -\frac{1}{3}x + 4$. Which statement **must** be true about functions P and Q?

A Both functions have the same slope.

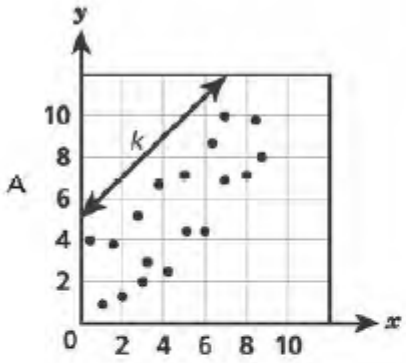
B Both functions have a negative slope.

C The functions will have the same input when $y = 0$.

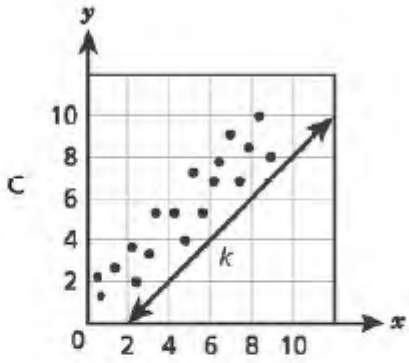
D The functions will have different outputs when $x = 0$.

28) Line k is the line of best fit for a set of data on a scatter plot. The data show a strong linear association. Which scatter plot **best** represents these data and line k?

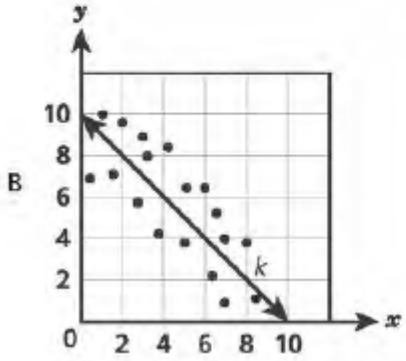
A



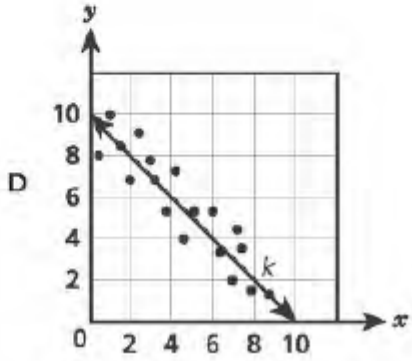
C



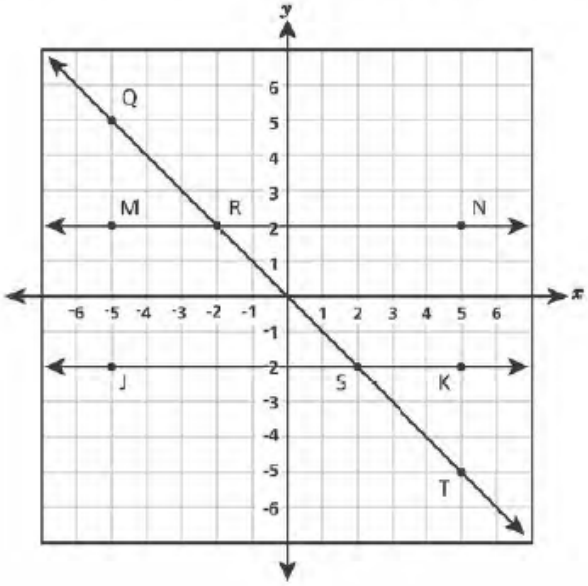
B



D



29) In the diagram below, lines MN and JK are parallel and are intersected by line QT.



Which transformation could be used to show that ∠**MRS** is congruent to ∠**JST**?

A reflect ∠**MRS** over the x-axis

B rotate ∠**MRS** about the origin

C translate ∠**MRS** down and to the right

D dilate ∠**MRS** by a scale factor of two with the center at point R

30) What is the equation of the line that passes through points $(-3, 0.5)$ and $(3, -0.5)$?

A $y = -\frac{1}{6}x$

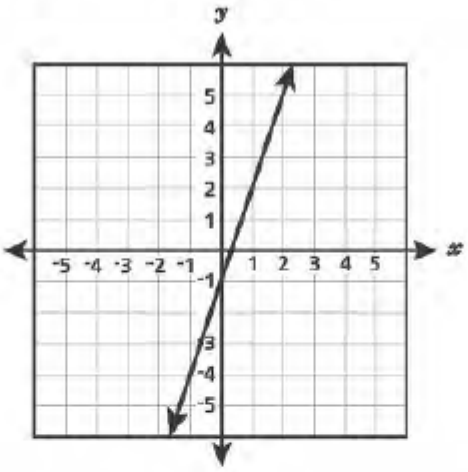
B $y = -6x$

C $y = -\frac{1}{6}x + 1$

D $y = -6x - 17.5$

---

31) Function J is shown on the coordinate grid below.



If the y-intercept of Function R is $\frac{3}{2}$ greater than the y-intercept of Function J, which equation could represent Function R?

A $y = -x + 4.5$

B $y = 0.5x + 3$

C $y = 3x + 0.5$

D $y = 4.5x - 1$

Extended Response: Calculators are permitted - You must Show all work for full credit

32) Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \left(\frac{1}{8}\right)^6 = \frac{1}{262{,}144}$$

Describe the mistake that Jude made.

Answer

_____

_____

_____

Correctly simplify the expression.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$$

Answer _____

33) Write an equation of a function that is not linear.

Answer _____

Use your equation to explain why your function is not linear.

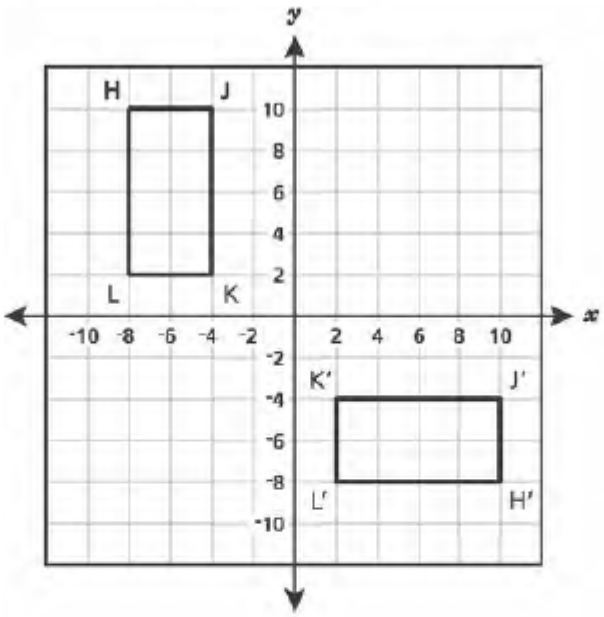
Answer

_____

_____

_____

34) Congruent rectangles HJKL and H'J'K'L' are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle H'J'K'L'.

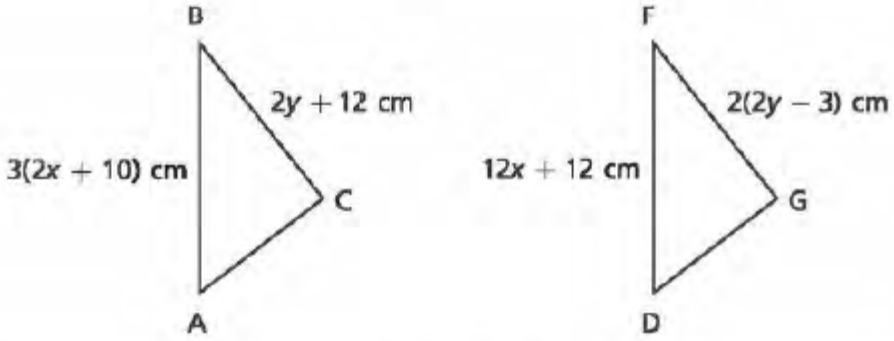
Answer

_____

_____

_____

35) Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y.

Show your work.

Answer $x =$_____ and $y =$_____

36) A reporter collected data on y, the current market value, in dollars, of a certain car for various years, x, after it had been purchased new. The equation below was fit to the data.

$$y = 16{,}500 - 1{,}500x$$

What does the slope of the graph of this equation represent?

Answer

_____

_____

What does the y-intercept of the graph of this equation represent?

Answer

_____

_____

37) A triangle with vertices at A$(-1, 1)$, B$(-2, 1)$, and C$(-1, 4)$ is translated. The image of vertex A has coordinates at $(3, -1)$.

Determine the coordinates of either the image of vertex B or the image of vertex C.

Show your work.

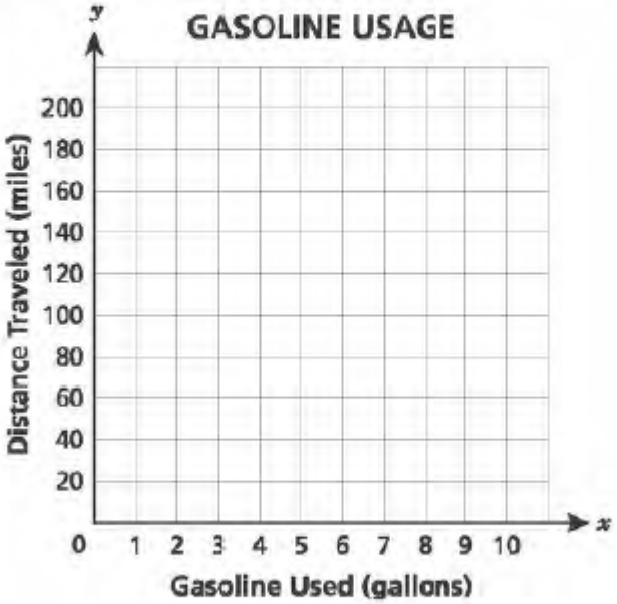
Answer _____

38)

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x, and the distance traveled, y, during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

_____

_____

39) Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

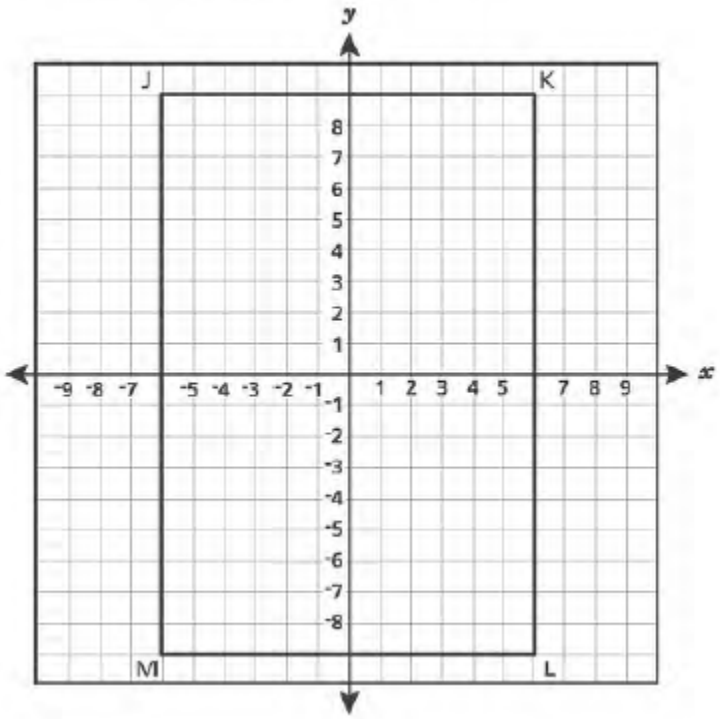
Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

Answer

40) Rectangle JKLM is shown on the coordinate grid below.



Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

Answer

41) Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p, the mass, in pounds, of one paperback, and t, the mass, in pounds, of one textbook.

Answer

Solve the system of equations to find the two masses

Show your work.

Mass of one paperback _____ pound(s)

Mass of one textbook _____ pound(s)

Unit 13

Real Number System

	Date	Lesson	Topic
		1 2	Perfect Squares and Perfect Cubes and Rounding non-perfect square roots, non-perfect cube roots, and equation answers
		3 4	Rational vs Irrational and Estimating, Comparing and Ordering Square Roots
		5	Simplest Radical Form
			Quiz Review
			Quiz
		6	Intro to Pythagorean Theorem and Finding Missing Sides (w/calc)
		7	Finding Missing Sides in simplest radical form
		8	Converse, Word Problems & Applications
			Review
			Test

Lesson 1
Perfect Squares and Perfect Cubes

Vocabulary:

- Perfect square- the answer to a number multiplied by itself two times.
- Square root- the number that when multiplied by itself is equal to the given number.
- Perfect cube- the answer to a number multiplied by itself three times.
- Cube root- a number that when raised to the third power is equal to the given number.
- Radicand- the number under the radical symbol.

Part 1: Perfect Squares

List the first 15 perfect squares:

$\underset{1^2}{____}, \underset{2^2}{____}, \underset{3^2}{____}, \underset{4^2}{____}, \underset{5^2}{____}, \underset{6^2}{____}, \underset{7^2}{____}, \underset{8^2}{____}, \underset{9^2}{____}, \underset{10^2}{____}, \underset{11^2}{____}, \underset{12^2}{____}, \underset{13^2}{____}, \underset{14^2}{____}, \underset{15^2}{____}$

Examples: Simplify

1) $\sqrt{36}$ = _____ because ( )^2 is 36

2) $-\sqrt{64}$ = _____

3) $\pm\sqrt{.09}$ = _____

4) $\sqrt{\frac{81}{9}}$ = _____

5) $-\frac{\sqrt{196}}{\sqrt{25}}$ = _____

Part 2: Perfect Cubes

List the first 10 perfect cubes:

$\underset{1^3}{____}, \underset{2^3}{____}, \underset{3^3}{____}, \underset{4^3}{____}, \underset{5^3}{____}, \underset{6^3}{____}, \underset{7^3}{____}, \underset{8^3}{____}, \underset{9^3}{____}, \underset{10^3}{____}$

Examples: Simplify

6) $\sqrt[3]{27}$ = _____ because ( )^3 is 27

7) $-\sqrt[3]{8}$ = _____

8) $\pm\sqrt[3]{125}$ = _____

9) $\sqrt[3]{\frac{216}{27}}$ = _____

10) $-\frac{\sqrt[3]{343}}{\sqrt{49}}$ = _____

Part 3: Equations: Solve each equation for x

Examples:

11) $x^2 = 81$

2) $x^3 = 1000$

3) $x^2 = 1.44$

4) $x^2 = 121$

5) $x^3 = 512$

Try These:

1) $\sqrt{9}$

2) $-\sqrt{100}$

3) $\pm\sqrt{.0004}$

4) $\sqrt{\frac{225}{25}}$

5) $\frac{\sqrt{16}}{\sqrt{169}}$

6) $\sqrt{4+5}$

7) $x^2 = 36$

8) $x^2 = 1$

9) $x^2 = 144$

10) The area of a square boxing ring is 225ft^2. What is the length of one side? ($a = s^2$)

11) $\sqrt[3]{125}$

12) $-\sqrt[3]{64}$

13) $\sqrt[3]{1}$

14) $-\sqrt[3]{216}$

15) $\sqrt[3]{\frac{1}{27}}$

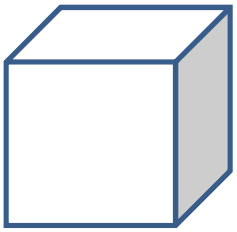
16) $\frac{\sqrt[3]{512}}{\sqrt{16}}$

17) $x^3 = .064$

18) $x^3 = 1000$

19) $x^3 = \frac{1}{8}$

20) The volume of a cube is 125 ft^3. What is the length of one side? ($v = s^3$)



Lesson 1: Classwork

1) What is the value of $\sqrt{100}$?

A. 4
B. 10
C. 25
D. 50

2) What is the value of $\sqrt[3]{27}$?

A. 3
B. 5
C. 9
D. 13.5

3) Solve for x: $x^2 = 256$

A. $x = \pm 16$
B. $x = \pm 15$
C. $x = \pm 16$
D. $x = \pm 128$

4) Solve for y: $y^3 = 216$

A. $y = 4$
B. $y = \pm 4$
C. $y = 6$
D. $y = \pm 6$

5) Which statement below is true?

A. $\sqrt{1} = \sqrt[3]{1}$
B. $\sqrt{2} = \sqrt[3]{3}$
C. $\sqrt{4} = \sqrt[3]{9}$
D. $\sqrt{4} = \sqrt[3]{27}$

6) Which statement below is true?

A. $\sqrt{4} = \sqrt[3]{4}$
B. $\sqrt{4} = \sqrt[3]{27}$
C. $\sqrt{16} = \sqrt[3]{27}$
D. $\sqrt{16} = \sqrt[3]{64}$

7) Robert thinks the cube root of 1,000 is 10. Is he correct? Explain how you know.

_____
_____
_____

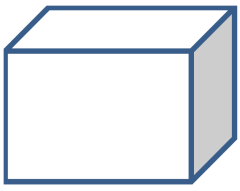
8) The floor of a square bedroom has an area of 169 square feet.

Part A: What is the length of each side of the bedroom? _____

Part B: The floor of a square family room has an area twice as great as the area of his bedroom floor. Is the length of each sid of the family room twice as great as the length of each side of the bedroom floor? Explain how you know.

_____
_____
_____
_____

9) The volume of a cube is 512 cm^3.



Part A: What is the length of one side? _____

Part B: What is the area of one of the faces?

Lesson 1: Homework

1) $\sqrt{225}$ 2) $\sqrt{49}$ 3) $x^2 = 81$ 4) $\sqrt{121}$

5) $\sqrt{144}$ 6) $p^3 = \frac{343}{1000}$ 7) $-\sqrt{4}$ 8) $\frac{\sqrt{225}}{25}$

9) $\sqrt{\frac{27}{3}}$ 10) $-\sqrt{81}$ 11) $\sqrt[3]{\frac{64}{125}}$ 12) $\sqrt[3]{64}$

13) $-\sqrt{64}$ 14) $\frac{\sqrt{16}}{\sqrt{4}}$ 15) $\sqrt[3]{\frac{36}{36}}$ 16) $\sqrt[3]{343}$

17) $\sqrt{.0009}$ 18) $x^3 = \frac{8}{343}$ 19) $-\sqrt{169}$ 20) $-\sqrt{.64}$

21) The volume of a cube is 1,000 ft^3. What is the length of each side of the cube?

22) Alex just built a pool in his backyard. He needs to put up a fence around the pool. The area he needs to enclose is a square with an area of 225 square feet.

a) What is the length of each side of the square area that Alex wants to enclose?

b) What is the total amount of fence that Alex needs to put up? (Hint: Perimeter)

23) Complete the table below:

x	1	2	3	4	5	6	7	8	9	10
x^2										
x^3										

List any of numbers that are both a perfect square and a perfect cube? _____

Lesson 2
Rounding non-perfect square roots, non-perfect cube roots, and equation answers

Part 1: Rounding

1, 2 3 4 . 5 6 7 8

Steps to Rounding:
1) Underline the number that you are rounding to. Box the number.
2) Draw an arrow to the number after it.
3) 4 and lower stay the same OR 5 and higher go up.

Examples:

1) Round the following to the nearest whole number:

$\boxed{754.}8132 =$

2) Round the following to the nearest tenth:

$8.\underline{9}437 =$

3) Round the following to the nearest hundredths:

$3987.42915 =$

4) Round the following to the largest digit:

$9534.0934 =$

Try These:

Round the following to the nearest whole number:

1) 159.513
2) 2,374.928
3) 4.1
4) 0.783
5) 19.51
6) $\sqrt{55}$

Round the following to the nearest tenths:

7) 159.513
8) 2,374.928
9) 4.18
10) 0.783
11) 12.63
12) $\sqrt{87}$

Round the following to the nearest hundredths:

13) 35.689
14) 2,589.399
15) 33.89657
16) 0.95238
17) 4.895
18) $\sqrt[3]{320}$

Part 2: Non-Perfect Square Roots, Non-Perfect Cube Roots, and Equation Answers

Vocabulary:

Non-Perfect square- _____

Non-Perfect cube- _____

Examples:

1) Round $\sqrt{3}$ to the nearest tenth

2) Approximate $-\sqrt{27}$ to the nearest tenth.

3) Round $\pm\sqrt[3]{20}$ to the nearest hundredth.

4) Approximate $\sqrt[3]{638}$ to the nearest tenth.

5) Round the answer $x^2 = 30$ to the nearest tenth.

6) Round the answer $x^3 = 30$ to the nearest tenth.

Try These:

Round to the nearest tenth

1) $\sqrt{8}$

2) $\sqrt{108}$

3) $-\sqrt{6}$

4) $p^2 = 140$

5) $\sqrt{\frac{80}{9}}$

6) $\sqrt[3]{12}$

7) $-\sqrt[3]{60}$

8) $\sqrt[3]{100}$

9) $\sqrt[3]{80}$

10) $-\sqrt[3]{75}$

Approximate to the nearest whole #.

11) $x^2 = 30$

12) $\sqrt{300}$

13) $-\frac{\sqrt{195}}{\sqrt{7}}$

14) $\sqrt{\frac{220}{20}}$

15) $\sqrt{1+7}$

16) $x^3 = \frac{125}{3}$

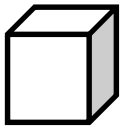
17) $p^3 = 21$

18) $\sqrt[3]{\frac{175}{25}}$

19) $x^3 = 1030$

20) $x^3 = 21$

20) The area of a square boxing ring is $22ft^2$. What is the length of one side to the nearest hundredth? ($a = s^2$)

21) 

The volume of a cube is 240 ft^3. What is the length of one side to the nearest hundredth? ($v = s^3$)

Lesson 2: Classwork

1) What is the value of $\sqrt{16}$?

A. 4
B. 10
C. 25
D. 50

2) What is the value of $\sqrt[3]{37}$ to the nearest whole number?

A. 4
B. 3
C. 2
D. 3.3

3) Find the radicand: $\sqrt[3]{\quad} = 6$

A. 125
B. 216
C. 343
D. 512

4) Approximate the value of x to the nearest tenth: $x^2 = 250$

A. $x = \pm 15.81$
B. $x = \pm 15$
C. $x = \pm 15.9$
D. $x = \pm 15.8$

5) Which of the following has the correct approximation to the nearest tenth?

A. $\sqrt{10} = 3.1$
B. $\sqrt{20} = 4.4$
C. $\sqrt{40} = 6.3$
D. $\sqrt{45} = 6.8$

6) Which of the following has the correct approximation to the nearest whole number?

A. $\sqrt[3]{200} = 6$
B. $\sqrt[3]{7} = 1$
C. $\sqrt[3]{86} = 5$
D. $\sqrt[3]{52} = 3$

7) Mateo thinks the cube root of 120 is approximately 5. Is he correct? Explain how you know.

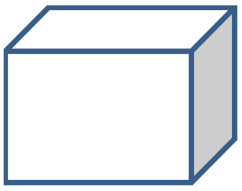
_____
_____
_____

8) The floor of Bobby's **square** bedroom has an area of 147 square feet.

Part A: What is the length of each side of Bobby's to the nearest tenth? _____

Part B: The floor of Tommy's **square** bedroom has an area of 180. How many feet longer is Tommy's bedroom floor. _____

9) The volume of a cube is 550 cm^3.



Part A: What is the length of one side to the nearest whole number? _____

Part B: What is the area of one of the faces?

Lesson 2: Homework

Approximate to the nearest tenth

1) $\sqrt{22}$ 2) $\sqrt{40}$ 3) $x^2 = 80$ 4) $\sqrt{12}$ 5) $\sqrt{145}$

6) $p^3 = \frac{34}{10}$ 7) $-\sqrt{43}$ 8) $\frac{\sqrt{22}}{2}$ 9) $\sqrt{\frac{20}{3}}$ 10) $-\sqrt{85}$

11) $\sqrt[3]{12}$ 12) $-\sqrt[3]{60}$ 13) $\sqrt[3]{100}$ 14) $\sqrt[3]{80}$ 15) $-\sqrt[3]{75}$

Round to the nearest whole number

16) $\sqrt[3]{\frac{604}{12}}$ 17) $\sqrt[3]{65}$ 18) $-\sqrt{6}$ 19) $\frac{\sqrt{160}}{\sqrt{4}}$ 20) $\sqrt[3]{\frac{36}{6}}$

21) $\sqrt[3]{340}$ 22) $\sqrt{807}$ 23) $x^3 = \frac{800}{34}$ 24) $-\sqrt{165}$ 25) $-\sqrt{60}$

26) The volume of a cube is 1,500 ft^3. What is the length of each side of the cube to the nearest hundredth?

27) Alex just built a pool in his backyard. He needs to put up a fence around the pool. The area he needs to enclose is a square with an area of 229 square feet.

a) What is the length of each side of the square that Alex wants to enclose to the nearest hundredth?

b) What is the total amount of fence that Alex needs to put up? (Hint: Perimeter)

Lesson 3
Real Number System

Vocabulary

Counting Numbers (Natural Numbers): Numbers that we use when counting. Ex._____

Whole Numbers: Counting numbers plus zero. Ex._____

Integers: Whole numbers and their opposites Ex._____

Consecutive Integers: one number right after another. Ex. _____

Real Numbers are made up of _____and _____ numbers.

Rational Numbers	**Irrational Numbers**
1) A number that can be written as a **fraction** where the numerator and denominator are both integers. 2) A decimal that terminates. 3) A decimal that repeats with a pattern. 4) The square roots of perfect squares.	1) A decimal that repeats without a pattern. 2) Pi 3) The square roots of non-perfect squares

Examples:

Tell whether each is Rational or Irrational and why.

1) .424242...

2) -.5638

3) $\overline{.68}$

4) -3.312334...

5) -.000009

6) $\frac{4}{5}$

7) $\frac{34}{53454}$

8) 0

9) 456,812

10) 3.14

11) 7π

12) $\frac{7}{22}$

13) $\sqrt{\frac{4}{81}}$

14) $\sqrt{85}$

15) $\sqrt{625}$

Extended Response

16) a) Circle the rational number? π $\sqrt{8}$ $\sqrt{81}$

b) Explain why the number you chose is rational.

_____

_____

17) a) Circle the irrational number? $\sqrt{85}$ $\frac{5}{\sqrt{16}}$ $\frac{\sqrt{4}}{\sqrt{8}}$

b) Explain why the number you chose is irrational.

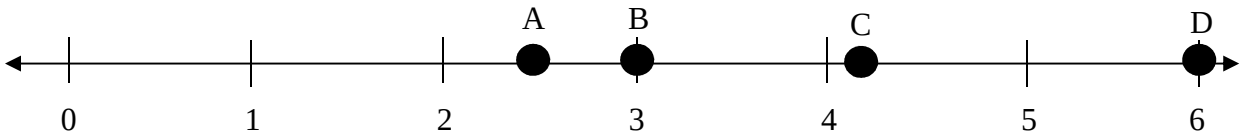
_____

_____

18) Circle only the rational numbers

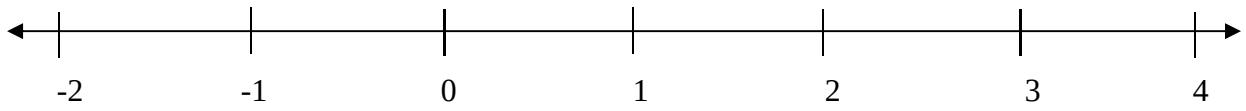
7.8	3.8732...	$5.\overline{7}$	-17
$\sqrt{361}$	$\sqrt{300}$	12π	$\frac{32}{16}$

19) Which letter on the number line below best represents the value of $\sqrt{6}$?



20) Place the following numbers on the number line:

$\sqrt{5}$, $\frac{3}{2}$, -0.5 , $-\sqrt{4}$, π



Try These:

Tell whether each description is rational or irrational:

1) Terminating decimals are _____.
2) Pi is _____.
3) Decimals that repeat without a pattern are _____.
4) Fractions are _____.
5) The square roots of perfect squares are _____.
6) The square roots of all other positive integers are _____.
7) Decimals that repeat with a pattern are _____.

Tell whether each number is rational or irrational.

8) $\sqrt{21}$ _____

9) $\sqrt{5}$ _____

10) -7 _____

11) 22 _____

12) 0_____

13) $\sqrt{46}$ _____

14) 4.5 _____

15) $7.\overline{3}$ _____

16) $\frac{3}{7}$ _____

17) $4\frac{2}{3}$ _____

18) 8 _____

19) 0.7_____

20) $1.\overline{6}$ _____

21) -0.333 _____

22) 0.30729..._____

23) $\frac{7}{22}$ _____

24) $\sqrt{50}$_____

25) 5.101001... _____

26) 9π _____

27) 2.7913... _____

28) 4.8936..._____

29) $2.\overline{28}$ _____

30) $\sqrt{12}$_____

40) $3.\overline{3}$ _____

Lesson 3: Homework

Choose the best answer:

1) Which of the following is an integer, but not a whole number?

A) 0 B) -11 C) 0 D) -5.5

2) Which of the following is not a counting number (natural number)?

A) 0 B) 1 C) 2 D) 3

3) Which is an example of a whole number?

A) 0 B) -11 C) 2.5 D) $\frac{1}{2}$

4) Which number is an integer, a whole number, and a counting (natural) number?

A) 0 B) -1 C) 15 D) 0.5

5) Which of the following is a rational number?

A) π B) -11
C) $\sqrt{2}$ D) $-5.5234\ldots$

6) Which of the following is irrational?

A) 0 B) $\frac{1}{2}$
C) 2π D) 3.14

7) Which of the following is an example of a non-perfect square?

A) $\sqrt{9}$ B) $\sqrt{81}$ C) $\sqrt{225}$ D) $\sqrt{45}$

9) Which of the following is ***not*** a rational number?

A) 6 B) $\frac{1}{3}$ C) 7π D) 3.5

10) Which of the following is a rational number?

A) 7.2348 ... B) π C) $\sqrt{25}$ D) $\frac{8}{9}$

11) Which of the following is ***not*** an irrational number?

A) 4 B) $\frac{\pi}{3}$ C) $\sqrt{7}$ D) $\sqrt{200}$

12) Which of the following is an irrational number?

A) 9.5 B) 3.14 C) 9π D) -0.5

13) $\sqrt{197}$ lies between which two consecutive integers?

A) 196 & 197 B) 14 & 15
C) 15 & 16 D) 197 & 198

14) Jessica is asked if 3π is a rational number. Which of the following is the most logical response?

A) "No, it is irrational because any multiple of π is irrational."
B) "Yes, it is rational because 3π can be written as a fraction."
C) "No, it is irrational because 3 is a prime number."
D) "Yes, it is rational because 3 and π are both rational."

Lesson 4
Estimating, Comparing and Ordering Square Roots

Vocabulary:

<	>	≤	≥
Less Than	Greater Than	Less than or equal to	Greater than or equal to

Examples:
Find the two consecutive whole numbers the square root lies between.

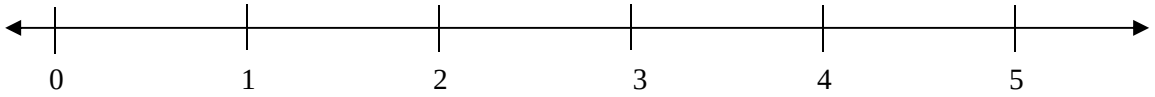
1) $\sqrt{3}$ 2) $\sqrt{7}$ 3) $\sqrt{111}$ 4) $-\sqrt{50}$ 5) $-\sqrt{27}$

Compare: Use >, <, ≤, ≥, or =

6) 12 ◯ $\sqrt{12}$ 7) $\sqrt{169}$ ◯ 13 8) -10 ◯ $-\sqrt{81}$ 9) $\sqrt[3]{27}$ ◯ $\sqrt{12}$

10) **Part A:** Put in order least to greatest **Part B:** Place the original numbers on the number line:

$\sqrt{9}$, $\sqrt{5}$, 2 , 1.2 , $\sqrt{24}$, $\sqrt[3]{125}$



Try These:

Find the two consecutive integers the square root lies between.

1) $\sqrt{29}$ 2) $\sqrt{110}$ 3) $-\sqrt{15}$ 4) $-\sqrt{72}$

Compare: Use >, <, ≤, ≥, or =

5) 16 ◯ $\sqrt{16}$ 6) $\sqrt{121}$ ◯ 11 7) -16 ◯ $-\sqrt{225}$ 8) $\sqrt[3]{8}$ ◯ $\sqrt{45}$

Order from least to greatest

9) $\sqrt{2}$, 5.85, 4^2, $-\sqrt{33}$

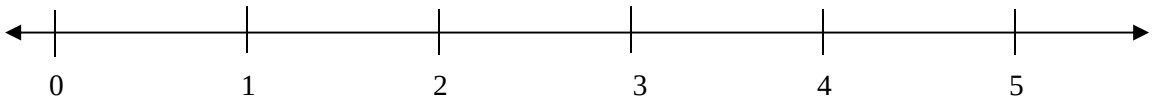
10) $\sqrt{125}$, $\sqrt[3]{8}$, $-\sqrt{100}$, $-\sqrt{201}$

11) Which of the following is the best estimate for $\sqrt{58}$?

A) 2.9 B) 7.7 C) 7.6 D) 5.8

12) Place the following numbers on the number line:

$\sqrt{2}$, $\sqrt{18}$, 0.5 , $\sqrt{4}$, $\sqrt{11}$



13) Between which two whole numbers does $\sqrt{89}$?

A. between 4 and 5
B. between 7 and 8
C. between 8 and 9
D. between 9 and 10

14) Between what two consecutive whole numbers is $\sqrt{75}$?

A. 5 and 6
B. 6 and 7
C. 7 and 8
D. 8 and 9

15) Which radical when rounded to the nearest tenth is closest in value to 8?

A. $\sqrt{45}$
B. $\sqrt{55}$
C. $\sqrt{65}$
D. $\sqrt{75}$

Lesson 4: Homework

Find the two consecutive integers the square root lies between.

1) $\sqrt{19}$ 2) $\sqrt{99}$ 3) $\sqrt{76}$ 4) $\sqrt{215}$ 5) $\sqrt{181}$

6) $\sqrt{226}$ 7) $\sqrt{42}$ 8) $-\sqrt{6}$ 9) $-\sqrt{55}$ 10) $-\sqrt{77}$

Compare: Use >, <, ≤, ≥, or =

11) 7 ◯ $\sqrt{7}$ 12) $\sqrt{121}$ ◯ 11 13) -16 ◯ $-\sqrt{225}$ 14) $\sqrt[3]{8}$ ◯ $\sqrt{45}$ 15) 3 ◯ $\sqrt{9}$

Order from least to greatest

16) $\sqrt{125}$, $\sqrt[3]{8}$, $\sqrt{100}$, $-\sqrt{201}$

17) $\sqrt{224}$, 10^3 $\sqrt{57}$, 5.89

18) Which of the following is the best estimate for $\sqrt{26}$?

A) 25 B) 4.9 C) 6.2 D) 5.1

19) Which of the following is the best estimate for $\sqrt{79}$?

A) 8.9 B) 9.5 C) 8.1 D) 7.9

20) Which of the following is the best estimate for $\sqrt{30}$?

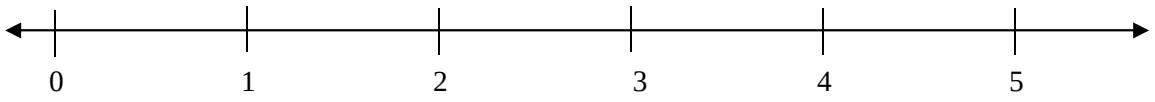
A) 5 B) 6 C) 5.5 D) 6.5

21) Which of the following is the best estimate for $\sqrt{50}$?

A) 7.1 B) 6.9 C) 5 D) 10

22) Place the following numbers on the number line:

$\sqrt{9}$, $\sqrt{5}$, 2 , 1.2 , $\sqrt{24}$, $\sqrt[3]{125}$



Lesson 5
Simplest Radical Form

Review Work: Simplify

1) $\sqrt{25}$ 2) $\sqrt{81}$ 3) $\sqrt{1}$ 4) $\sqrt{49}$ 5) $\sqrt{100}$

6) $\sqrt{36}$ 7) $\sqrt{9}$ 8) $\sqrt{16}$ 9) $\sqrt{64}$ 10) $\sqrt{4}$

Simplifying Radicals

Rule:

* Step 1: $\sqrt{PerfectSquare}\ \sqrt{OtherFactor}$
Step 2: Simplify the Perfect Square
Step 3: Leave other factor in radical sign
Step 4: Write final answer

Example:
Simplify: $\sqrt{18}$

$\sqrt{9}\ \sqrt{2}$

3

$\sqrt{2}$

$3\sqrt{2}$

*** To help with Step 1 - Perfect Square MUST be written first.**

List all perfect squares up to 100 - 1, 4, 9, 16, 25, 36, 49, 64, 81, 100

Remember Begin with: $\sqrt{PerfectSquare}\ \sqrt{OtherFactor}$

Examples: Put each in simplest radical form.

1) $\sqrt{12}$ = _____ 2) $\sqrt{20}$ = _____ 3) $\sqrt{64}$ = _____

4) $5\sqrt{27}$ = _____ 5) $3\sqrt{24}$ = _____ 6) $2\sqrt{36}$ = _____

Try These: Put each in simplest radical form.

Perfect Squares: _____

Remember Begin with: $\sqrt{PerfectSquare}\ \sqrt{OtherFactor}$

1) $\sqrt{8}$ = _____

2) $4\sqrt{18}$ = _____

3) $8\sqrt{54}$ = _____

4) $\sqrt{28}$ = _____

5) $2\sqrt{50}$ = _____

6) $10\sqrt{45}$ = _____

7) $2\sqrt{49}$ = _____

8) $5\sqrt{63}$ = _____

9) $\sqrt{108}$ = _____

Lesson 5: Classwork/Homework

Put each in simplest radical form.

1) $\sqrt{24}$ = _____

2) $\sqrt{40}$ = _____

3) $5\sqrt{8}$ = _____

4) $4\sqrt{99}$ = _____

5) $2\sqrt{28}$ = _____

6) $\sqrt{64}$ = _____

Perfect Squares: _____

Remember Begin with: $\sqrt{PerfectSquare}\ \sqrt{OtherFactor}$

7) $5\sqrt{12}$ = _____

8) $\sqrt{32}$ = _____

9) $\sqrt{18}$ = _____

10) $\sqrt{45}$ = _____

11) $3\sqrt{50}$ = _____

12) $\sqrt{27}$ = _____

13) $3\sqrt{98}$ = _____

14) $5\sqrt{40}$ = _____

15) $4\sqrt{9}$ = _____

16) The expression $\sqrt{48}$ is equivalent to

(1) $2\sqrt{3}$ (2) $4\sqrt{12}$ (3) $4\sqrt{3}$ (4) $16\sqrt{3}$

17) The expression $4\sqrt{2}$ is equivalent to

(1) $\sqrt{8}$ (2) $\sqrt{42}$ (3) $\sqrt{32}$ (4) $\sqrt{64}$

18) The expression $3\sqrt{18}$ is equivalent to

(1) $\sqrt{54}$ (2) $3\sqrt{2}$ (3) $9\sqrt{2}$ (4) $3\sqrt{6}$

19) The expression $3\sqrt{3}$ is equivalent to

(1) $\sqrt{9}$ (2) $\sqrt{6}$ (3) $\sqrt{12}$ (4) $\sqrt{27}$

Name _____ **Math 8** **Unit 13 Quiz Review**

Lesson 5: Simplify: Write in simplest radical form

1) $\sqrt{27}$ 2) $\sqrt{90}$ 3) $\sqrt{28}$ 4) $2\sqrt{64}$

5) $\sqrt{300}$ 6) $2\sqrt{45}$ 7) $\sqrt{32}$ 8) $5\sqrt{20}$

9) $16\sqrt{50}$ 10) $2\sqrt{81}$ 11) $3\sqrt{98}$ 12) $6\sqrt{16}$

Lesson 4

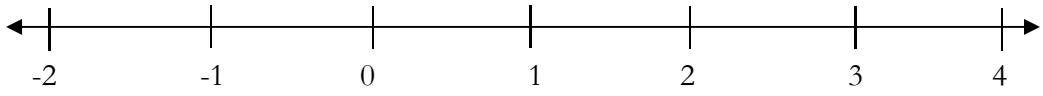
13) Find the two consecutive whole numbers the square root lies between.

a. $\sqrt{2}$ b. $\sqrt{8}$ c. $\sqrt{112}$ d. $-\sqrt{51}$ e. $-\sqrt{28}$

Compare using <, >, or =:

14) 8 ◯ $\sqrt{8}$ 15) $\sqrt{196}$ ◯ 14 15) -7 ◯ $-\sqrt{64}$ 16) $\sqrt[3]{64}$ ◯ $\sqrt{18}$

17) Put in order from least to greatest, and then place on the number line. $\sqrt{16}$, $\sqrt{11}$, 1, 2.8, $-\sqrt{5}$, $\sqrt[3]{27}$



Compare using <, >, or =.

18) $\frac{4}{5} \bigcirc \frac{5}{6}$ 19) $0.35 \bigcirc \frac{1}{3}$ 20) $5.02 \quad 5\frac{1}{5}$ 21) $-8 \quad -\sqrt{9}$

Lesson 3: Tell whether each description is rational or irrational:

22) Terminating decimals are _____.
23) Pi is _____.
24) Decimals that repeat without a pattern are _____.
25) Fractions are _____.
26) The square roots of perfect squares are _____.
27) The square roots of all other positive integers are _____.
28) Decimals that repeat with a pattern are _____.

Examples: Tell whether each is Rational or Irrational.

29) .424242... _____ 30) -.5638 _____ 31) $\overline{.68}$ _____

32) -3.312334... _____ 33) -.000009 _____ 34) $\frac{4}{5}$ _____

Lesson 2

35) Round $\sqrt{34}$ to the nearest tenth

36) Approximate $-\sqrt{97}$ to the nearest tenth.

37) Round $\pm\sqrt[3]{20}$ to the nearest hundredth.

38) Approximate $\sqrt[3]{638}$ to the nearest tenth.

39) Round the answer $x^2 = 50$ to the nearest tenth.

40) Round the answer $x^3 = 70$ to the nearest whole number.

Lesson 1

41) List the first 10 perfect cubes:

_____ , _____ , _____ , _____ , _____ , _____ , _____ , _____ , _____ , _____
1^3 2^3 3^3 4^3 5^3 6^3 7^3 8^3 9^3 10^3

Simplify:

42) $\sqrt{225}$ 43) $-\sqrt{49}$ 44) $x^2 = 81$ 45) $\frac{\sqrt{36}}{64}$ 46) $\sqrt[3]{64}$ 47) $x^3 = 8$

REVIEW Choose the best answer:

1) Which of the following is an integer, but not a whole number?

A) 20 B) -9 C) 0 D) -2.5

2) Which of the following is not a counting number (natural number)?

A) 0 B) 1 C) 2 D) 3

3) Which is an example of a whole number?

A) 0 B) -11 C) 2.5 D) $\frac{1}{2}$

4) Which number is an integer, a whole number, and a counting (natural) number?

A) 0 B) -1 C) 15 D) 0.5

5) Which of the following is a rational number?

A) π B) -11
C) $\sqrt{2}$ D) $-5.5234\ldots$

6) Which of the following is irrational?

A) 0 B) $\frac{1}{2}$
C) 2π D) 3.14

7) Which of the following is an example of a non-perfect square?

A) $\sqrt{9}$ B) $\sqrt{81}$ C) $\sqrt{225}$ D) $\sqrt{45}$

8) What is the first counting (natural) number?

A) 0 B) 1 C) -1 D) 0.1

9) Which of the following is ***not*** a rational number?

A) 6 B) $\frac{1}{3}$ C) 7π D) 3.5

10) Which of the following is a rational number?

A) $7.2348\ldots$ B) π C) $\sqrt{26}$ D) $\frac{8}{9}$

11) Which of the following is ***not*** an irrational number?

A) 4 B) $\frac{\pi}{3}$ C) $\sqrt{7}$ D) $\sqrt{200}$

12) Which of the following is an irrational number?

A) 9.5 B) 3.14 C) 9π D) -0.5

13) $\sqrt{197}$ lies between which two consecutive integers?

A) 196 & 197 B) 14 & 15
C) 15 & 16 D) 197 & 198

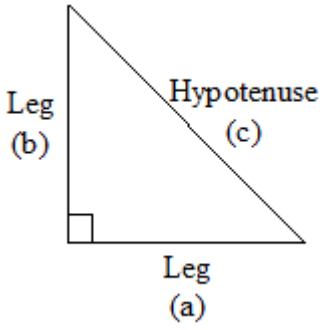
14) Jessica is asked if 3π is a rational number. Which of the following is the most logical response?

A) "No, it is irrational because any multiple of π is irrational."
B) "Yes, it is rational because 3π can be written as a fraction."
C) "No, it is irrational because 3 is a prime number."
D) "Yes, it is rational because 3 and π are both rational."

Lesson 6
Introduction to Pythagorean Theorem

The **Pythagorean Theorem** applies to **right triangles** only. It relates the side lengths of any right triangle. The sum of squares of the lengths of the legs is equal to the square of the length of the hypotenuse.

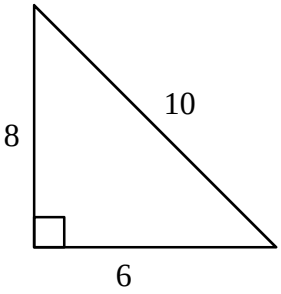
Parts of a right triangle



Part I: Identifying the sides of a right triangle?

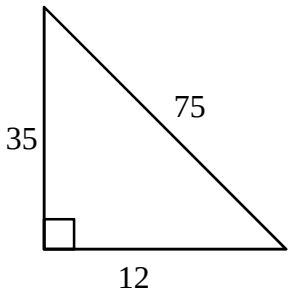
Examples:

1)



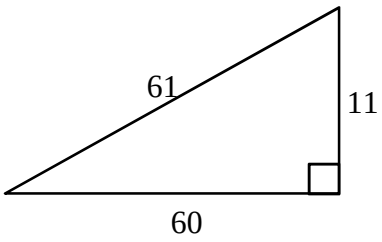
What is the measure of:
Leg _____
Leg _____
Hypotenuse _____

2)



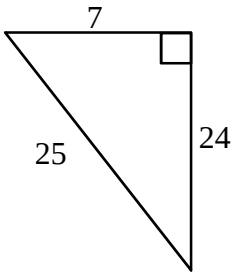
What is the measure of:
Side a _____
Side b _____
Side c _____

3)



What is the measure of:
Leg _____
Leg _____
Hypotenuse _____

4)



What is the measure of:
Side a _____
Side b _____
Side c _____

Part II: Finding the missing side of a right triangle
Examples:

The Pythagorean Theorem is

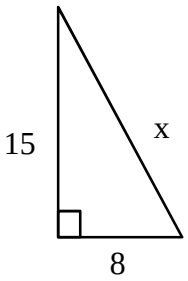
$a^2 + b^2 = c^2$

Steps to Solving a Pythagorean Theorem Problem:

1) **Label the 3 sides of your triangle a, b, c**
2) **Write: $a^2 + b^2 = c^2$**
3) **Plug in the values of a, b and c into your equation.**
4) **Solve for x**

---

1)



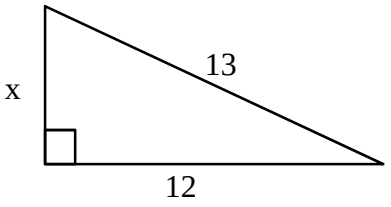
Find the missing side

a = _____

b = _____

c = _____

2)



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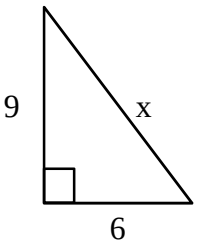
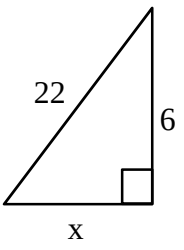
3) Round to the nearest tenth

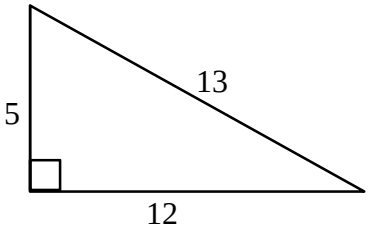


4) Round to the nearest hundredth



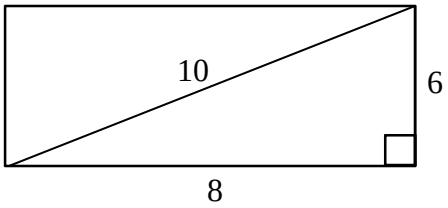
Try These:

1)



What is the measure of:
Leg _____
Leg _____
Hypotenuse _____

2)



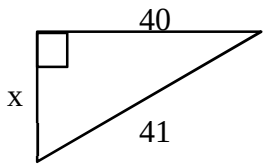
What is the measure of:
Side a _____
Side b _____
Side c _____

Two lengths of a right triangle are given. Find the third length. If necessary, round your answer to the nearest tenth.

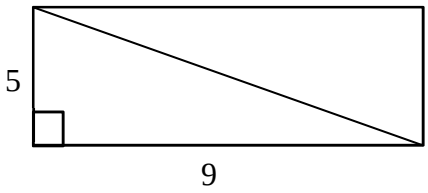
3) a = 4, b = 3

4) b = 15, c = 39

5)

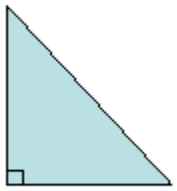


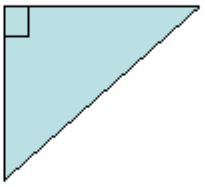
6) Find the measure of the diagonal to the nearest tenth.

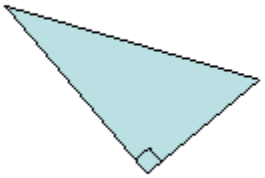


Lesson 6: Classwork/Homework

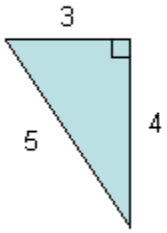
Label the sides: a (leg) b (leg) c (hypotenuse)

1) 

2) 

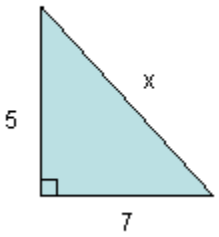
3) 

4) Name the sides:



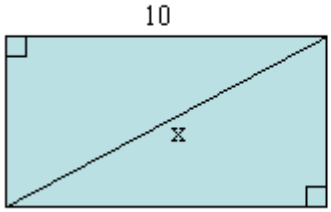
a = _____
b = _____
c = _____

5) Name the sides:



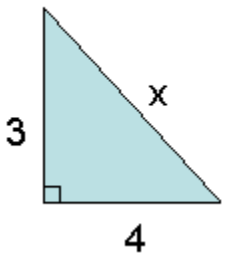
a = _____
b = _____
c = _____

5) Name the sides:



a = _____
b = _____
c = _____

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

7) 

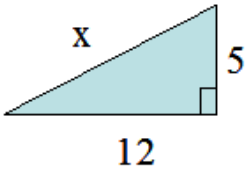
Find the missing side

a = _____

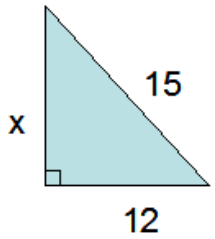
b = _____

c = _____

8)



9)



Two lengths of a right triangle are given. Find the third length. If necessary, round your answer to the nearest tenth.

10) a = 9, b = 12

11) a = 10, b = 24

12) a = 6, b = 7

---

13) a = 2, b = 1

14) a = 21,c = 29

15) b = 15, c= 39

---

16) b = 12, c = 20

17) c= 20, a = 19

18) c = 40, b = 39

Lesson 7
Pythagorean Theorem
Finding Missing Side in Simplest Radical Form

Review Work: Put each in simplest radical form.

1) $\sqrt{45}$

2) $3\sqrt{24}$

3) $5\sqrt{36}$

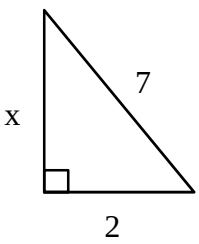
4) $4\sqrt{50}$

5) $\sqrt{27}$

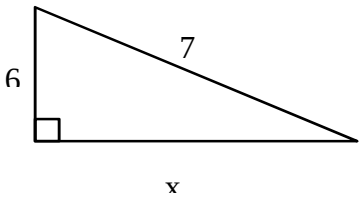
6) $10\sqrt{99}$

Examples: Find the missing side in simplest radical form

1)



2)



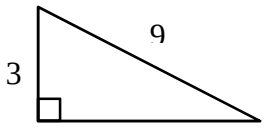
Two lengths of a right triangle are given. Find the third length in simplest radical form.

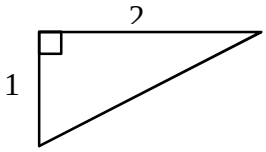
3) a = 9, b = 12

4) a = 7, c = 8

Try These:

Find the missing side in simplest radical form

1) 

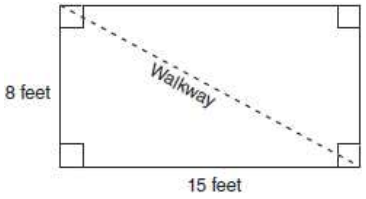
2) 

Two lengths of a right triangle are given. Find the third length in simplest radical form.

3) a = 7, c = 13

4) a = 3, b = 9

5) Nancy's rectangular garden is represented in the diagram below.



If a diagonal walkway crosses her garden, what is its length, in feet?

1) 17

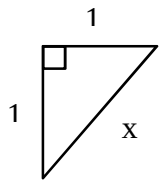
2) 22

3) $\sqrt{161}$

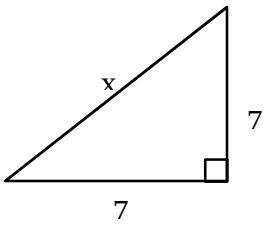
4) $\sqrt{529}$

Lesson 7: Classwork/Homework Find the missing side in simplest radical form

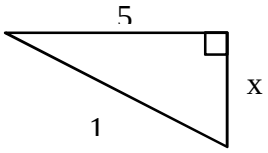
1)



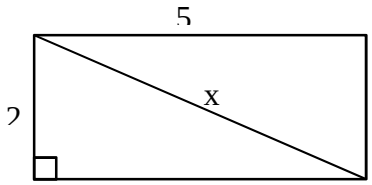
2)



3)



4)



Two lengths of a right triangle are given. Find the third length in simplest radical form

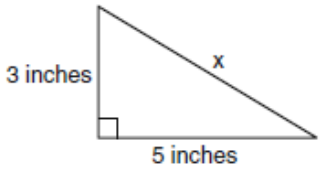
5) a =11, c = 13

6) a = 4, b = 5

7) a = 6, b = 7

8) What is the value of *x*, in inches, in the right triangle?

A) $\sqrt{15}$ B) 8 C) $\sqrt{34}$ D) 4

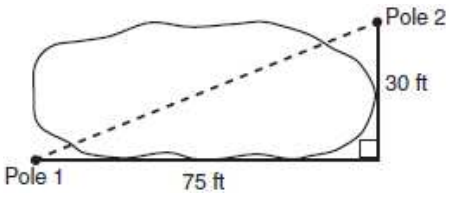


9) If the length of the legs of a right triangle measure 5 and 7, what is the length of the hypotenuse?

A) $\sqrt{2}$ B) $2\sqrt{3}$ C) $2\sqrt{6}$ D) $\sqrt{74}$

---

10) The NuFone Communications Company must run a telephone line between two poles at opposite ends of a lake, as shown in the accompanying diagram. The length and width of the lake are 75 feet and 30 feet, respectively.



What is the distance between the two poles, to the *nearest foot*?

A) 105 B) 81 C) 69 D) 45

Lesson 8
Converse, Word Problems & Applications

Part I: Given 3 sides of a triangle, determine if it is a right triangle

Step 1: Draw a right triangle
Step 2: Label sides (be sure to label legs and hypotenuse correctly)
Step 3: Plug into Pythagorean Theorem
Step 4: Determine if it is a right triangle

Examples:

1) Can a right triangle have the sides of 6, 9, and 12?

2) Can a right triangle have the sides of 7, 24, and 25?

Part 2: Word Problems and Applications

Step 1: Draw a right triangle
Step 2: Label sides (be sure to label legs and hypotenuse correctly)
Step 3: Solve using the Pythagorean Theorem

Examples:

3) A student designed a school pennant that is shaped like a right triangle. One side is 5 inches long, and the hypotenuse is 10 inches long. How long is the third side to the nearest tenth?

4) A rectangle is 12 inches high and 5 inches wide. What is the measure of its diagonal?

Try These:

1) Can a right triangle have side lengths of 5, 8, 13.

2) Mr. Carroll designed a new Jet's pennant that is shaped like a right triangle. One side is 8 inches long And the hypotenuse is 12 inches long. How long is the third side to the nearest inch?

Lesson 8: Classwork (Round to the nearest tenth if necessary.)

Problem	Picture	Work
1) Matt's ramp for his skateboard is 10 inches high and 30 inches long. How far will Matt travel up the ramp? Round to the nearest tenth if necessary.		
2) A 15 foot ladder is leaning up against a brick wall. The bottom of the ladder is 9 feet from the base of the wall. How high up the wall does the ladder reach?		
3) A 20 foot rope is attached to the top of a flagpole. The rope reaches 12 feet from the base of the flagpole. What is the height of the flagpole?		
4) Trey drove 8 miles due east and them 5 miles due north. How far is Trey from his starting point? Round to the nearest tenth of an inch.		
5) Lauren is building a rectangular picture frame. If the sides of the frame are 8 inches by 10 inches, what should the diagonal measure?		

Lesson 8: Homework (Round to the nearest tenth if necessary.)

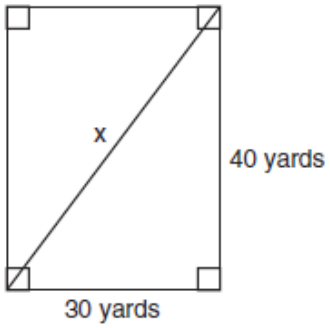
Problem	Picture	Work
1) A 17 foot ladder is leaning up against a brick wall. The bottom of the ladder is 8' from the base of the wall. How high up the wall does the ladder reach?		
2) A 27 foot rope is attached to the top of a 17 foot pole. If the rope is stretched to the ground and is fastened. How far from the base of the pole is the rope fastened?		
3) A square empty parking lot that is often used as a shortcut is 50'on a side. How many feet is it to walk from one corner of the lot to the corner diagonal from it?		
4) A cable wire is attached to the 100 foot television tower and to a stake that is 25' from the tower. How long is the cable wire?		
5) Tom and Jerry biked 11 miles east and then 6 miles north. How far are they from the starting point? (Use the shortest distance)		
6) An 11 foot rope is attached to the top of a flagpole. The rope reaches a point on the ground 6' from the base of the flagpole. What is the height of the flagpole?		
7) The diagonal of a rectangle is 17 meters and one side is 5 meters. How long is the other side of the rectangle?		
8) A 17 foot tree casts a 23 foot shadow on the ground. How far is the top of the tree from the end of the shadow?		

Can a right triangle have these side lengths?

9) 2, 3, 4 10) 20, 21, 29 11) 15, 36, 39 12) 10, 10, 15

Application Homework - Mixed Review

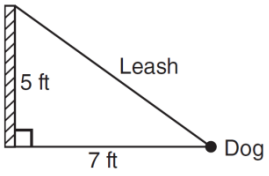
13) Tanya runs diagonally across a rectangular field that has a length of 40 yards and a width of 30 yards, as shown in the diagram below.



What is the length of the diagonal, in yards, that Tanya runs?

A) 50 B) 60 C) 70 D) 80

14) The end of a dog's leash is attached to the top of a 5-foot-tall fence post, as shown in the diagram below. The dog is 7 feet away from the base of the fence post.



How long is the leash, to the *nearest tenth of a foot*?

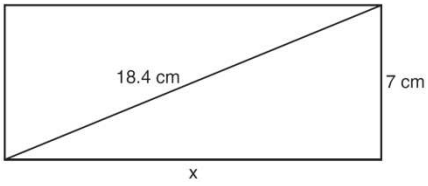
A) 4.9 B) 8.6 C) 9.0 D) 12.0

15) The legs of an isosceles right triangle each measure 10 inches. What is the length of the hypotenuse of this triangle, to the *nearest tenth of an inch*?

A) 6.3 B) 7.1 C) 14.1 D) 17.1

---

16) The rectangle shown below has a diagonal of 18.4 cm and a width of 7 cm.

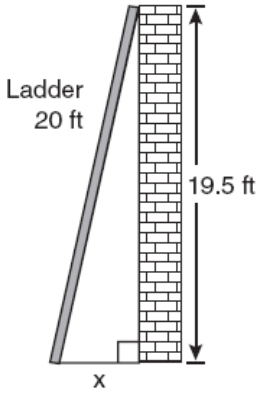


To the *nearest centimeter*, what is the length, *x*, of the rectangle?

A) 11 B) 17 C) 20 D) 25

---

17) Don placed a ladder against the side of his house as shown in the diagram below.



Which equation could be used to find the distance, *x*, from the foot of the ladder to the base of the house?

1) $x = 20 - 19.5$
2) $x = 20^2 - 19.5^2$
3) $x = \sqrt{20^2 - 19.5^2}$
4) $x = \sqrt{20^2 + 19.5^2}$

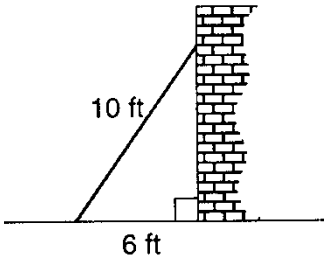
---

18) The length of the hypotenuse of a right triangle is 34 inches and the length of one of its legs is 16 inches. What is the length, in inches, of the other leg of this right triangle?

A) 16 B) 18 C) 25 D) 30

---

19) A wall is supported by a brace 10 feet long, as shown in the diagram below. If one end of the brace is placed 6 feet from the base of the wall, how many feet up the wall does the brace reach?



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20) If the length of a rectangular television screen is 20 inches and its height is 15 inches, what is the length of its diagonal, in inches?

A) 15 B) 13.2 C) 25 D) 35

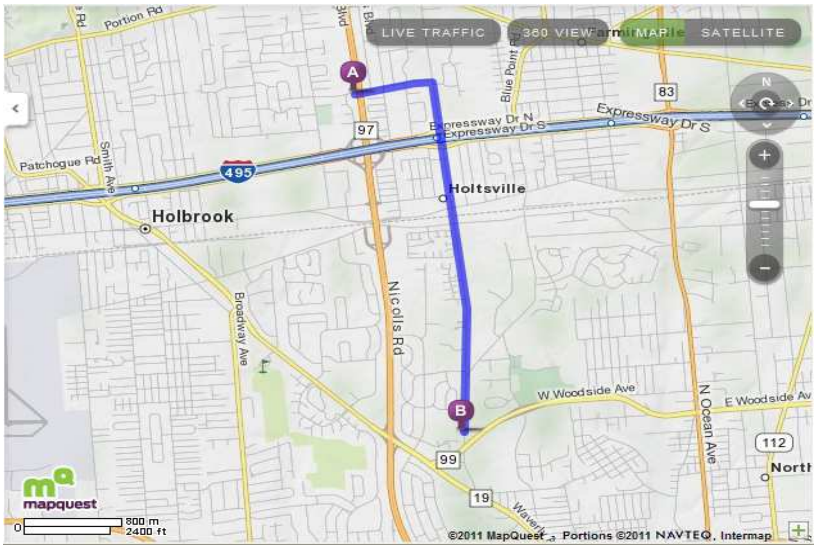
---

21) A woman has a ladder that is 13 feet long. If she sets the base of the ladder on level ground 5 feet from the side of a house, how many feet above the ground will the top of the ladder be when it rests against the house?

A) 8 B) 9 C) 11 D) 12

---

22) Below is the MapQuest directions from Sagamore Middle School to Sequoya Middle School:



The directions read; drive .5 miles East on Division St. turn right and then drive 2.5 miles South on Waverly Ave. If we assume that the right turn onto Waverly is a perfect right angle, approximately how far away is Sequoya Middle School on a straight path?

Name _____ 8R Unit 13 Review Sheet

Lesson 1

Determine the value of each

1) $\sqrt{\frac{121}{9}}$ 2) $\frac{\sqrt{16}}{\sqrt{144}}$ 3) $\sqrt{11+14}$ 4) $x^2 = 81$ 5) $x^3 = 0.027$ 6) $-\sqrt[3]{125}$

Lesson 2

Round the following to the nearest tenth:

7) 19.4093 8) 0.8801 9) $\sqrt{22}$ 10) $x^2 = 70$ 11) $-\sqrt{43}$

Lesson 3

12) Circle the counting numbers: -3 $\frac{2}{5}$ 0.54 12 $\sqrt{14}$ 0 1 -1

13) Circle the whole numbers: -3 $\frac{2}{5}$ 0.54 $0.\overline{3}$ $\sqrt{14}$ 0 1 -1

14) Circle the integers: -3 $\frac{2}{5}$ 0.54 $0.\overline{3}$ $\sqrt{14}$ 0 1 -1 2π

15) Which is a rational number? A) $\sqrt{7}$ B) $\sqrt{18}$ C) $\sqrt{49}$ D) $\sqrt{20}$

16) Which is an irrational number? A) -1.03 B) $\frac{22}{7}$ C) $\sqrt{9}$ D) $\sqrt{2}$

Tell whether each number is rational (R) or irrational (I).

17) $\sqrt{31}$ 18) -7 19) 2.2 20) 0 21) $-\sqrt{64}$ 22) $7.\overline{3}$

Lesson 4 and 5

Determine which two integers the following square roots are between:

23) $\sqrt{2}$ 24) $\sqrt{99}$ 25) $-\sqrt{72}$ 26) $\sqrt{0.16}$

_____ _____ _____ _____ _____ _____ _____ _____

27) **Which is the most accurate approximation of $\sqrt{72} + \sqrt{5}$**

a) 8.5 b) 8.49 c) 10.72 d) 2.236 e) 10.7

Compare: Use >, < or =

28) 2.1 ◯ $\sqrt{8}$ 29) $\sqrt{121}$ ◯ $\frac{-55}{5}$ 30) -10 ◯ $-\sqrt{81}$

31) $\sqrt[3]{27}$ ◯ $\sqrt{9}$ 32) $0.\overline{7}$ ◯ 0.7

Write in order from greatest to least:

33) -3, 4, $\sqrt{36}$, $-\sqrt[3]{8}$, 3.5, $\sqrt{5}$ 34) 5.25, $\sqrt{144}$, $-\sqrt{49}$, $\sqrt[3]{1}$, $-\sqrt[3]{27}$, -1, 3

Lesson 6

Put each in simplest radical form.

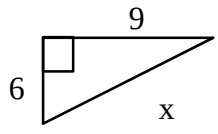
35) $\sqrt{8}$ 36) $4\sqrt{18}$ 37) $\sqrt{45}$ 38) $3\sqrt{50}$ 39) $3\sqrt{98}$ 40) $4\sqrt{9}$

Lesson 7

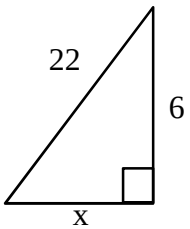
Two lengths of a right triangle are given. Find the third length. If necessary, round your answer to the nearest tenth.

41) a = 18, b = 24 42) a = 5, c = 24 43) a = 6, b = 7

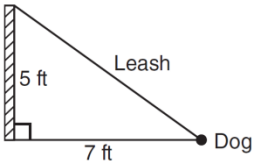
44) Round to the nearest tenth



45) Round to the nearest hundredth



46) The end of a dog's leash is attached to the top of a 5-foot-tall fence post, as shown in the diagram below. The dog is 7 feet away from the base of the fence post.



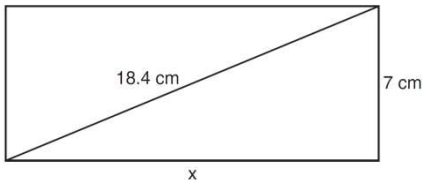
How long is the leash, to the *nearest tenth of a foot*?
1) 4.9
2) 8.6
3) 9.0
4) 12.0

---

47) The length of one side of a square is 13 feet. What is the length, to the *nearest foot*, of a diagonal of the square?
1) 13
2) 18
3) 19
4) 26

---

48) The rectangle shown below has a diagonal of 18.4 cm and a width of 7 cm.



To the *nearest centimeter*, what is the length, *x*, of the rectangle?
1) 11
2) 17
3) 20
4) 25

Determine if these sides can create a right triangle

49) 12, 13, 5 50) 32, 6, 28 51) 1, 2, 3 52) 0.3, 0.4, 0.5

---

53) Which number is an integer, a whole number, and a counting (natural) number?
A) 0 B) -1 C) 15 D) 0.5

54) What is the first counting (natural) number? A) 0 B) 1 C) -1 D) 0.1

Unit 14

Polynomials and Factoring

	Date	Lesson	Topic
		1	Review Polynomial Rules (Adding, Subtracting, and Multiplying)
		2	Multiplying a Binomial by a Binomial
		3	Multiplying a Binomial by a Binomial
		4	Multiplying a Binomial by a Polynomial
			Quiz
		5	Find Greatest Common Factor
		6	Factor Out Like Terms
		7	Factor Trinomials Two Sums and Two Differences
		8	Factor Trinomials One Sum - One Difference
		9	Factoring Trinomials Mixed Practice
			Review
			Test

Lesson 1

Review Polynomial Rules (Adding, Subtracting, and Multiplying)

Part 1: Adding and Subtracting Monomials: **Examples:** Simplify by combining like terms:

1) $6x + 3x$ 2) $5x + x$ 3) $x^2 + 7$ 4) $-9x + (-4x)$

5) $-2x - 11x$ 6) $-2x + 3x$ 7) $-3x - 2x$ 8) $10y - (-3y)$

9) $9y - 3 + 6y - 8$ 10) $9x + 4$ 11) $-7x + 7x$ 12) $-4x - -3x$

Part 2: Multiplying Monomials **Examples:**

Rules:
Step 1: Multiply Coefficients
Step 2: Add Exponents

1) $(x)(x)$ 2) $(x)(3)$ 3) $(2)(x)$ 4) $(5)(-6)$

5) $(2x)(3x)$ 6) $(2x)(-4)$ 7) $(7)(3x)$ 8) $(-5)(-3)$

9) $(-5x)(6x)$ 10) $x(x - 4)$ 11) $(x - 4)3$ 12) $(x + 3)(x - 4)$

Part 3: Double Distribute

13) $(x + 8)(x + 2)$ 14) $(x + 4)(x - 3)$ 14) $(x - 6)(x - 1)$ 15) $(x - 5)(x + 3)$

Try These: Simplify

1) $x + x$
2) $(x)(x)$
3) $(4x)(-6x)$
4) $-3x + (-x)$
5) $5(4x - 8)$
6) $-2x + 2x$
7) $x(x + 4)$
8) $(-10y)(- 3y)$
9) $-6(x + 9)$
10) $3x + 1$
11) $(x + 4)(x + 4)$
12) $(x + 4)(x - 7)$

Lesson 1: Classwork - Simplify

1) $2x + 2x$
2) $(-x)(x)$
3) $6x + -6x$
4) $(-9x)(-x)$
5) $-2(6x - 4)$
6) $(x + 2)x$
7) $-8x + 4$
8) $(-5x) - (- 3x)$
9) $5(x + 3)$
10) $3x + x$
11) $(x + 6)(x + 8)$
12) $(x + 9)(x - 2)$

Lesson 1: Homework - Simplify

1) $6x + 3$
2) $5x - x$
3) $3x^2 + 7x^2$
4) $-7x + (-2x)$
5) $(2x)(-11x)$
6) $2x - 3x$
7) $(x)(x)$
8) $10y – (- 3y)$
9) $x – (-x)$
10) $9(x – 3)$
11) $(x - 6)(x - 8)$
12) $(x + 2)(x - 9)$

Lesson 2
Multiplying a Binomial by a Binomial

There are 2 Methods to Multiply a Binomial times a Binomial

1) FOIL
2) Double Distribute using a box (Diagram)

Method 1: FOIL **(x + 2)(x + 3)**

F Firsts $(x + 2)(x + 3)$ $(x)(x) = x^2$

O Outsides $(x + 2)(x + 3)$ $(x)(3) = 3x$

I Insides $(x + 2)(x + 3)$ $(2)(x) = 2x$

$= 5x$

L Lasts $(x + 2)(x + 3)$ $(2)(3) = 6$

Final Answer: $x^2 + 5x + 6$

Method 2: Double Distribute using a box (Diagram) **(x + 2)(x + 3)**

	x	**3**
x	**x^2**	**3x**
2	**2x**	**6**

Final Answer: $x^2 + 5x + 6$

Examples:

1) $(x + 1)(x + 4)$

F ( )( )
O ( )( )
I ( )( )
L ( )( )

	x	**1**
x		
4		

2) $(x + 2)(x + 5)$

3) $(x + 4)(x + 5)$

4) $(x – 3)(x – 4)$

5) $(x – 6)(x – 9)$

6) $(x – 5)(x – 5)$

7) $(x + 8)^2$

8) $(x + 7)(x – 7)$

9) $(x - 6)(x + 1)$

10) $(x + 2)(x – 8)$

Try These:

1) $(x + 1)(x + 3)$

2) $(x + 3)(x + 5)$

3) $(x - 6)(x - 5)$

4) $(x – 7)(x – 1)$

5) $(x + 5)(x – 7)$

6) $(x + 8)(x – 2)$

7) $(x + 3)(x – 3)$

8) $(x + 5)^2$

9) $(3 + x)(6 + x)$

Lesson 2: Homework

1) $(x + 3)(x + 8)$

2) $(x - 4)(x - 8)$

3) $(x + 2)(x - 8)$

4) $(x + 5)(x – 4)$

5) $(x + 2)(x + 7)$

6) $(x – 3)(x – 5)$

7) $(x – 4)^2$

8) $(x + 5)(x – 5)$

9) $(x + 6)(x - 9)$

10) $(x + 4)(x - 1)$

11) $(3 - x)(3 - x)$

12) $(2x + 1)(x + 4)$

Find the missing number:

13) $(x + 1)(x + 4) =$ ____ $+ 5x + 4$

14) $(x + 4)(x + 5) = x^2 +$ ____ $+ 20$

15) $(x + 5)(x - 2) = x^2 + 3x -$ ____

16) $(x + 2)(x - 8) = x^2 -$ ____ $- 16$

17) $(x - 3)(x - 4) = x^2 -$ ____ $+ 12$

18) $(x - 5)(x - 9) = x^2 - 14x +$ ____

Lesson 3
Multiplying a Binomial by a Binomial

Examples:

1) $(3x + 1)(3x+ 4)$

2) $(2x + 7)(3x - 3)$

3) $(2x + 7)(2x - 7)$

4) $(4x – 3)(2x – 4)$

5) $(4x – 1)(2x + 3)$

6) $(2x – 6)(3x – 9)$

Try These:

1) $(3x + 8)(2x – 2)$

2) $(5x + 2)(2x – 4)$

3) $(3x – 4)(x + 5)$

4) $(5x + 7)(x – 3)$

5) $(2x + 1)^2$

6) $(6x – 5)(6x + 5)$

Lesson 3: Homework

1) $(7x + 8)(2x – 3)$

2) $(4x + 9)(x + 4)$

3) $(8x – 4)(3x + 5)$

4) $(x - 2)(6x – 4)$

5) $(3x + 6)(3x – 6)$

6) $(5x – 3)(7x + 3)$

7) $(x + 2)(x + 8)$

8) $(x - 6)(x - 2)$

9) $(x + 4)^2$

10) $(x + 3)(x - 3)$

11) $(x + 5)(x - 2)$

12) $(x + 1)(x - 7)$

13) $(5x - 3)(2x + 6)$

14) $(x + 5)(x - 2)$

*15) $3(x + 2)(x - 7)$

Find the missing number:

16) $(4x + 1)(2x - 6) =$ ____ $- 22x - 6$

17) $(2x + 3)(5x + 3) = 10x^2 +$ ____ $+ 9$

18) $(3x + 2)(3x - 2) = 9x^2 -$ ____

19) $(7x - 5)(3x - 4) = 21x^2 - 43x +$ ____

20) $(x + 6)(x – 6) = x^2 -$ ____

21) $(x + 8)(x – 7) = x^2 +$ ____ $- 56$

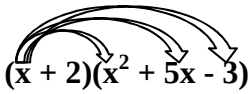
Lesson 4
Multiplying a Binomial by a Polynomial

There are 2 Methods to Multiply a Binomial times a Polynomial

1) **Double Distribute lining up like terms**
2) **Double Distribute using a box (Diagram)**

Method 1: Double Distribute lining up like terms

Step 1: Multiply first term by each term in the parentheses



$(x + 2)(x^2 + 5x - 3)$

Step 2: Multiply the second term by each term in the parentheses

$(x + 2)(x^2 + 5x - 3)$

$$\begin{array}{r} x^3 + 5x^2 - 3x \\ + 2x^2 + 10x - 6 \\ \hline x^3 + 7x^2 + 7x - 6 \end{array}$$

Step 3: Combine Like Terms

Method 2: Double Distribute using a box (Diagram)

Using the double distributive property:

$(x + 2)(x^2 + 5x - 3)$

	x^2	$5x$	-3
x	x^3	$5x^2$	$-3x$
2	$2x^2$	$10x$	-6

$x^3 + 7x^2 + 7x - 6$

Rules:
Step 1: Distribute (multiply) the first term to each term in the second parentheses.
Step 2: Distribute (multiply) the second term to each term in the second parentheses.
Step 3: Be sure to line up LIKE terms under each other - Combine like terms.

Examples:

1) $(x + 4)(x^2 - 3x + 5)$

2) $(2x + 3)(x^2 - 4x - 6)$

3) $(x^2 - 2x + 5)(x - 7)$

4) $(w + 1)(w^2 - w + 1)$

---

5) $(x + 2)(x - 5)$

6) $(2y + 1)(3y^2 - 4y + 2)$

Try These:

1) $2x^4(5x^3 - 3x^2 + x + 15)$

2) $(3x - 8)(4x^2 + 2x + 3)$

Draw a picture to represent the expression

3) $(x + 8)(3x^2 + 5x - 6)$

4) $(3x^2 + x - 1)(x - 2x + 1)$

Lesson 4: Classwork/ Homework:

Simplify: Solve by double distributing:

1) $(2x - 3)(3x^2 - 5x + 4)$

2) $(x + 2)(x - 6)$

Solve by drawing a diagram:

3) $(x - 1)(x^2 - x + 1)$

Solve any method:

4) $(3x^2 + 4x + 2)(2x + 3)$

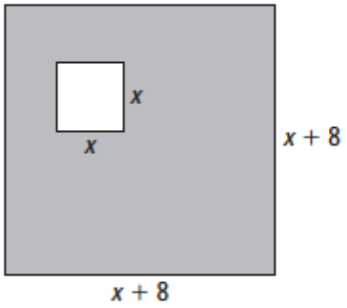
5) $(x - 5)(x^2 + x + 1)$

---

6) $(2x^2 + 10x + 1)(x + 1)$

7) $(4x + 3)(2x + 5)$

8) Application Problem: The figure below is a square. Find an expression for the area of the shaded region. Write your answer in standard form.



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9) What is the final answer using this diagram?

	$2x^2$	+ x	-3
x	$2x^3$	x^2	$-3x$
+			
2	$4x^2$	$2x$	-6

Mixed Review Extra Help:

1) $(8x + 2)(3x + 1)$

2) $(3x + 1)(x^2 + 2x + 1)$

---

3) $(x + 3)^2$

4) $(a - b)(a^2 + 2ab + b^2)$

Draw a picture to represent the expression

5) $(x + 3)(x^3 – 2x^2 – x + 3)$

6) $(x^2 + x – 5)(2x^2 – x + 5)$

Lesson 5
Greatest Common Factor

Rule:

1) Find the GCF of the coefficient
2) Find the GCF of the variables.

Examples: Find the Greatest Common Factor

1) 10; 15
2) 12; 18
3) 14; 35
4) 18; 24; 36
5) 4x; 4y
6) 7y; 7
7) 2x; 7x
8) 10x; 12x
9) $3x^2$; 6x
10) 10x; $15x^3$
11) 5ab,$12a^2b$
12) $60x^2$; $36x^3$

Try These: Find the Greatest Common Factor

1) 12; 30
2) 18; 27
3) 15; 21
4) 10; 13
5) 5a; 5b
6) 6; 12a
7) 5x; 12x
8) 8xy; 6xz
9) 4; 12x
10) 3; 9
11) 7xy; 10
12) 90x; 1
13) 9xyz; 12xyz
14) $12x^2y$; 9xy
15) $22x^2$; $10x^5$
16) 90x; $10x^3$

Lesson 5: Homework Find the Greatest Common Factor:

1) 25; 75
2) 10; 28
3) 6; 21
4) 18; 45
5) 8; 7x
6) 7x; 7y
7) 15x; 12x
8) $4x^3y^3$; $6x^2y$
9) 4x; 4y
10) 4r; $6r^2$
11) 8xy; 6xz
12) $10x^2$; $15xy^2$
13) $36xy^2z$; $-27xy^2z^2$
14) $24ab^2c^3$; $18ac^2$
15) $14a^2b$; 13ab
16) 36xyz; 25xyz

***17) $2ab^2c$; $3x^2yz$

Lesson 6
Factor Out Like Terms

Rules for factoring out like terms:
Step 1: Find the Greatest Common Factor (GCF)

Step 2: Write GCF ( )

Step 3: Divide all terms by GCF and put the answers in the parentheses

Examples: Factor out Like Terms

1) $15 + 10x$

2) $6x - xy$

3) $4x^2 + 20x$

4) $12x^2 - 8x^3$

5) $8x^2 + 32x + 12$

6) $6x^3 - 18x^2 - 12x$

7) $32x^2y - 16xy + 24xy^2$

8) $-10xyz + 14x^2z$

9) $x^2y - 3xy^4$

10) $5x^5y^8 + 20x^3y^7$

11) $40x^4yz^5 - 60x^3y^{11}z^3 + 10x^2y^2z^4$

Try These: Factor out Like Terms

1) $y^2 - 5y$

2) $5 - 10n$

3) $x^2y + 2xy$

4) $5x^7 - 2x^5$

5) $7x^4 + x^2 + 33x^3$

6) $3x^3 + 24x^2 - 12x$

7) $5x^2 - 25x + 10$

8) $8x^2 + 10x - 2$

9) $20x^9y^3 - 10x^6y^2$

10) $11xy^8 + 3x^6y^6$

11) $30xyz^3 - 60a^2bc^3 - 6x^7y^2$

12) $11xy^8 + 3x^6y^6$

Lesson 6: Homework **Factor out Like Terms**

1) $36x + 28$

2) $3x - 3$

3) $-3x - 33$

4) $-15x^2 + 18y$

5) $4x^3 - 28$

6) $16x^3 + 10$

7) $19x^3 - 19$

8) $6x^3 + 8$

9) $3x^2 + 6x$

10) $14x^2 + 16x$

11) $2x^3 + 16x$

12) $14x^5 - 24x^4$

13) $x^3 + 3x$

14) $4x^2 + 3y$

15) $6x^5 + 3x^3$

16) $6x^3 - 8x^2 + 10x$

17) $36x^3 - 24x^2 + 8x$

18) $7x^4 - 21x^3 - 28x^2$

19) $9x^3 - 18x^2 + 45x$

20) $2x^6 - 4x^5 + 20x^4$

21) $-10x^6 + 12x^5 - 4x^4$

22) $16x^4 - 32x^3 - 80x^2$

Lesson 7
Factoring Trinomials - Two Sums and Two Differences

Many trinomials are the product of two binomials. That is how you factor a trinomial.

$x^2 + 5x + 6$

Step 1: Look for any **Like** terms to factor out! If there are not any continue to Step 2.
Step 2: Write: (x)(x)
Step 3: List all factors of the last number. 1,6 2,3
Step 4: Choose the factors that thier sum equals the 2nd number. 2 + 3 = 5
Step 5: Put factors into the parentheses. (x + 2)(x + 3)
Step 6: Check your answer by multiplying your binomial pair (FOIL)

Examples: Two Sums

1) $x^2 + 7x + 10$ 2) $x^2 + 10x + 16$ 3) $x^2 + 8x + 7$ 4) $x^2 + 4x + 4$

(x)(x)

Examples: Two Differences

5) $x^2 - 8x + 15$ 6) $x^2 - 10x + 16$ 7) $x^2 - 5x + 4$ 8) $x^2 - 7x + 10$

(x)(x)

Examples: Mixed

9) $x^2 + 6x + 9$ 10) $x^2 - 8x + 16$ 11) $x^2 + 4x + 4$ 12) $x^2 - 10x + 25$

(x)(x)

Try These: Factor each trinomial into a binomial pair:

1) $x^2 + 8x + 12$ 2) $x^2 - 12x + 35$ 3) $x^2 + 6x + 8$ 4) $x^2 - 9x + 20$

(x)(x)

5) $x^2 + 8x + 16$ 6) $x^2 + 4x + 3$ 7) $x^2 - 12x + 36$ 8) $x^2 - 11x + 30$

9) $x^2 + 14x + 49$ 10) $x^2 - 9x + 14$ 11) $x^2 + 9x + 18$ 12) $x^2 - 5x + 6$

Lesson 7: Homework

Factor each trinomial into a binomial pair:

1) $x^2 + 5x + 6$

2) $x^2 - 16x + 15$

3) $x^2 + 8x + 12$

4) $x^2 - 6x + 9$

---

5) $x^2 + 11x + 24$

6) $x^2 - 4x + 3$

7) $x^2 + 6x + 8$

8) $x^2 - 12x + 11$

---

9) $x^2 + 2x + 1$

10) $x^2 - 7x + 12$

11) $x^2 + 8x + 7$

12) $x^2 - 9x + 18$

---

13) $x^2 + 7x + 10$

14) $- 7x + 10$

15) $x^2 + 12x + 20$

16) $x^2 - 11x + 18$

Factor Out Like Terms

17) $2x + 6$

18) $12x^2 - 8$

19) $7x^2 + 21x$

20) $3x^5 - 15x^4 + 6x^2$

---

21) $6c^3 – 12c^2 + 3c$

22) $3a + 6a^2 + 15a^3$

23) $12a^2 + 20ab$

24) $3x – 3y$

Lesson 8
Factor Trinomials One Sum - One Difference

Many trinomials are the product of two binomials. This is how you factor a trinomial.

$x^2 - 2x - 8$

Step 1: Look for any Like terms to factor out! If there are not any continue to Step 2.
Step 2: Write: (x)(x)
Step 3: List all factors of the last number. -1, 8 -2, 4 -8, 1 -4, 2
Step 4: Choose the factors thats sum equals the 2nd number.
~~-1 + 8 = 7~~ ~~-2 + 4= 2~~ ~~-8 + 1 = -7~~ -4 + 2 = -2
Step 5: Put factors into the parentheses. (x - 4)(x + 2)
Step 6: Check your answer by multiplying your binomial pair (FOIL)

Examples: Factor each trinomial into a binomial pair:

1) $x^2 + 4x - 12$ 2) $x^2 - 2x - 15$ 3) $x^2 + 4x - 21$ 4) $x^2 + 5x - 6$

(x)(x)

5) $x^2 - 2x - 24$ 6) $x^2 + 5x - 14$ 7) $x^2 - x - 6$ 8) $x^2 - 6x + 8$

(x)(x)

Try These: Factor each trinomial into a binomial pair:

1) $x^2 + 7x - 18$ 2) $x^2 - x - 56$ 3) $x^2 + 11x + 30$ 4) $x^2 + x - 30$

(x)(x)

5) $x^2 - 25x + 24$ 6) $x^2 + 3x - 10$ 7) $x^2 - 2x - 35$ 8) $x^2 - 16x - 17$

(x)(x)

Lesson 8: Homework Factor each trinomial into a binomial pair:

Factor each trinomial into a binomial pair:

1) $x^2 + 4x - 12$ 2) $x^2 - 3x - 10$ 3) $x^2 + 5x - 24$ 4) $x^2 - 8x - 20$

5) $x^2 + 2x - 15$ 6) $x^2 - 2x - 8$ 7) $x^2 + 8x - 33$ 8) $x^2 - 10x - 11$

9) $x^2 + 6x - 16$ 10) $x^2 + 9x + 18$ 11) $x^2 + 10x - 24$ 12) $x^2 - 8x + 7$

13) $x^2 + 10x - 39$ 14) $x^2 - 6x - 16$ 15) $x^2 + 9x - 22$ 16) $x^2 - 14x - 15$

Review Work:

Multiply:

17) $8x(3x^2 - x + 2)$ 18) $(3x + 2)(2x - 3)$ 19) $6(7x - 3)$ 20) $(x - 4)(x + 4)$

Factor Out Like Terms:

21) $64x^2 + 16x$ 22) $20x^2y^2 + 12xy$ 23) $4x^2 + 42$ 24) $6x^4 + 4x^3 + 10x^2$

Lesson 9
Factoring Trinomials Mixed Practice

Factor each trinomial into a binomial pair:

1) $x^2 + 3x - 18$

2) $x^2 + 10x + 9$

3) $x^2 - 9x + 20$

4) $x^2 - 4x - 21$

5) $x^2 + 10x + 25$

6) $x^2 - 8x + 12$

7) $x^2 + 8x - 33$

8) $x^2 + 4x - 5$

9) $x^2 - 4x + 4$

10) $x^2 + 10x - 11$

11) $x^2 - 10x - 24$

12) $x^2 + 5x + 6$

13) $x^2 + 2x - 3$

14) $x^2 - 2x + 1$

15) $x^2 - 3x - 4$

16) $x^2 + 9x + 14$

17) $x^2 + 3x - 10$

18) $x^2 + 14x + 24$

19) $x^2 - 7x - 18$

20) $x^2 - 5x + 6$

21) $x^2 + 6x - 7$

22) $x^2 - 8x + 15$

23) $x^2 - 3x - 28$

24) $x^2 + 4x + 4$

25) $x^2 + 2x - 35$

26) $x^2 - 14x + 13$

27) $x^2 - x - 6$

28) $x^2 + 20x + 19$

Factor out like terms:

29) $4x^2 + 20x$

30) $10x^2y^2 + 6xy$

31) $36x^{12} + 42x^{10}$

32) $9x^2 + 12x - 6$

Name_____ 8R Unit 14 Review

Lesson 1: Review Polynomials

Tell whether each is a monomial, binomial, or trinomial.

1) $6x + 8$

2) $4x^2y$

3) $x^2 + 5x - 6$

Simplify:

4) $4x + 11 – 3x + 4 – 6x$

5) $(2x – 14) + (13x – 5)$

6) $(9x^2 - 3x + 11) - (-6x^2 + x + 2)$

7) $(x^7)(x)$

8) $(9x^2)(-2x^5)$

9) $(4a^2b^5)(3a^4b^2)$

Lessons 2 and 3: Find the product using either method.

10) $(x – 4)(x + 3)$

11) $(x + 6)^2$

12) $(5x + 2)(x – 3)$

13) $(2x – 1)^2$

14) $(x + 2)(x – 2)$

15) $(8x – 6)(2x + 2)$

Lesson 4: Multiplying a Binomial by a Polynomial

Double Distribute using the Diagram Method:

16) $(x - 3)(x^2 - 3x + 4)$

Double Distribute using either method:

17) $(3x + 1)(4x^2 - 2y + 5)$

Lesson 5: Find Greatest Common Factor

Find the GCF of the following:

18) $27x^2 - 9x$

19) $12x + 15$

20) $10xy + 8xz$

Lesson 6: Factor Out Like Terms

Factor:

21) $12x + 28$

22) $5x - 15$

23) $3x^2 + 33x$

24) $9y^2 + 3y$

---

25) If one factor of $16y^2 + 12y$ is $4y$, what is the other factor?

Lesson 7 and 8: Factor Trinomials

26) $x^2 + 5x + 6$

27) $x^2 + 4x - 12$

28) If one factor of $x^2 - 9x + 20$ is $(x - 5)$ what is the other factor?

Review Work:

29) 8^0

30) $8x^0$

31) $(8x)^0$

32) $16(xyz)^0$

33) What is 2.7×10^5 written in standard form?

34) What is 5.63×10^{-4} written in standard form?

35) Is this a function? {(5, 6), (4, 9), (5, 0), (7, 1)}

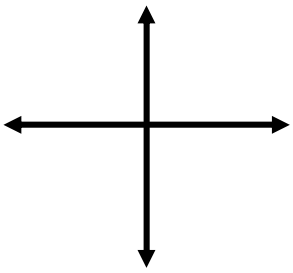
36) Evaluate $6 + xy^2$ if x = 5 and y = 2:

37) What is the equation of a line with a slope of 3 and a y-intercept of -10?

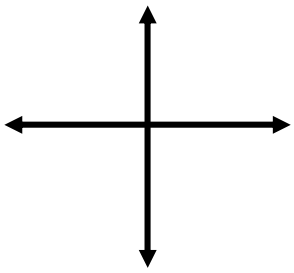
38) What is the rate of change for a line passing through the following points? (2, 5) and (5, 11)

Draw any line with the following slopes:

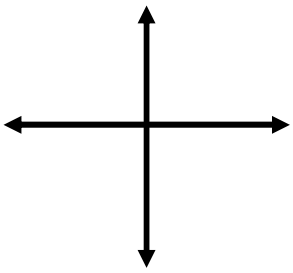
39) Positive Slope



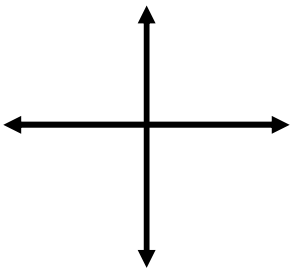
40) Negative Slope



41) Zero Slope



42) Undefined Slope



43) Will these angle measurements form a triangle? 10°, 50°, and 120°

44) What is the complement of 40°?

45) What is the supplement of 70°?

46) **State two angles that are:**

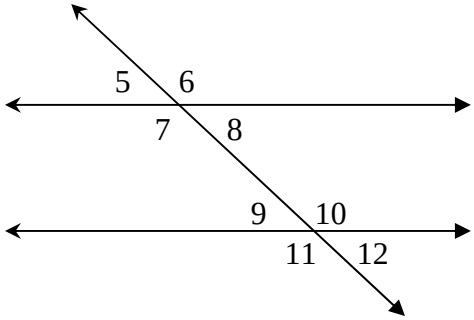
a) Corresponding angles:_____

b) Alternate Interior angles:_____

c) Alternate Exterior angles:_____

d) Vertical angles:_____

e) Supplementary angles:_____



Solve the following systems:

47) $4x + 3y = 5$
$-4x - 3y = -5$

48) $2x + 3y = 4$
$5x - 3y = 10$

49) $7x + 5y = 10$
$-7x - 5y = 20$

Unit 15

Final Review

	Date	Lesson	Topic
			Final Review Day 1 Units 1 - 2
			Final Review Day 2 Units 3 - 4
			Final Review Day 3 Unit 5
			Quiz # 1
			Final Review Day 4 Unit 6
			Final Review Day 5 Units 7 - 8
			Final Review Day 6 Units 9 -10
			Final Review Day 7 Unit 11
			Quiz # 2
			Final Review Day 9 All Units
			Quiz # 3 Last Day of Classes
			Math Final

Final Review Day 1
Units 1 and 2

Unit 1: Integers

Simplify (round to the nearest tenth if necessary)

1) -15 + 8

2) 5 – (-6)

3) 10 – (-6)

4) - 22 – 13 + - 6

5) $-9\frac{2}{3}$ – (-3)

6) (-4)($-5\frac{1}{2}$)

7) (-1)(5)(-3)

8) $\frac{8}{0}$

9) $\frac{0}{8}$

10) Evaluate $3x + 8y^3$ for x = 3 and y = 4

11) Evaluate $7x - 6y^4$ for x = -5 and y = 4

12) Convert Celsius to Fahrenheit. (Round to the nearest tenth) $F = \frac{9}{5}C + 32$

a) C = 9 degrees

b) C = 10 degrees

13) Convert Fahrenheit to Celsius. $C = \frac{5}{9}(F - 32)$

a) F = 59 degrees

b) F = 68

Simplify:

14) -5x – 7x

15) 6x – 9y + 4x – y

16) 3(2x + 5) – 5

17) – (5x – 8)

Translate each expression:

18) 7 less than twice the length of a rectangle

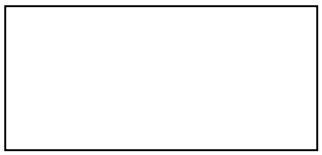
19) a number divided by 2, increased by 4

20) x subtracted from 12

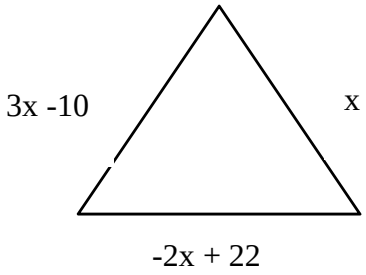
21) 5 less than 3 times x.

---

22) Express the perimeter in terms of x:



23) Express the perimeter in terms of x:



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24) The pentagon building in Washington D.C. is a regular pentagon. If the length of one side is represented by 3n + 8, express the perimeter as a binomial.

Unit 2 Equations

Solve the following equation for the missing variable, otherwise determine solution type

25) 5x - 3 = -8

26) 4x + 2x – 4 = 32

27) $\frac{4}{5}x - 3 = 9$

28) 3x + 6 = 3x - 9

29) 5x + 14 = 2x + 3x + 14

30) $5x - 4 + 3x = 4x + 24$

31) $\frac{3}{10}x - 3 = 7 - \frac{1}{5}x$

32) -15 + 4x = 3x + 5

33) 2(9x – 3) = 6(3x – 1)

Final Review Day 2
Units 3 and 4

Unit 3 Exponents

Simplify:

1) 5^0 2) 5^{-3} 3) 5^3 4) 7^0 5) 7^{-3} 6) 7^3

7) $x^{-3} \cdot x^7$ 8) $x^4 \cdot x^7$ 9) $(3x^6)(6x^8)$ 10) $x^{-5} \cdot x^{-9}$

11) $(2x^3)(7x^2)$ 12) $(5x^2)^3$ 13) $(3x^{-2}y)^4$ 14) $(-2x^9)^2$

15) $\frac{6^{14}}{6^5}$ 16) $\frac{x^4}{x^7}$ 17) $\frac{12y^{11}}{8y^9}$ 18) $3^5 \div 3^3$ 19) $8^7 \div 8^{13}$

20) $12x^{11} \div 4x^3$ 21) $\frac{3^5}{3^5}$ 22) $\frac{5x^2 - 35}{5}$ 23) $\frac{9x^4 - 3x^2}{3x^2}$

24) $\frac{16x^3 + 2x^2 - 10x}{2x}$ 25) $2(3x - 4)$ 26) $4x(7x - 5)$

27) $3x(4x^2 + 6x - 12)$ 28) $3x^2(4x - 8y)$ 29) $5x^2(-7x + 4)$

Unit 4 – Graphing Lines

Rewrite the equation in function form (y = mx + b)

30) 5x + y = 4

31) 3x - 3y = 9

32) -x = y + 17

---

y = 5x – 10

33) What is the slope?_____

34) What is the y-intercept?_____

y = -2x + 5

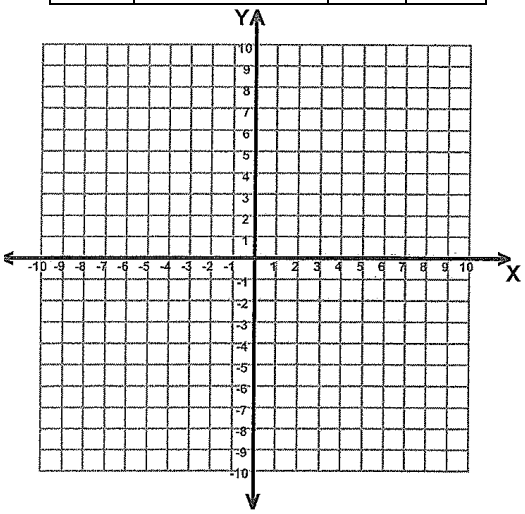
35) m = _____

36) b = _____

37) Graph the following line using table method:

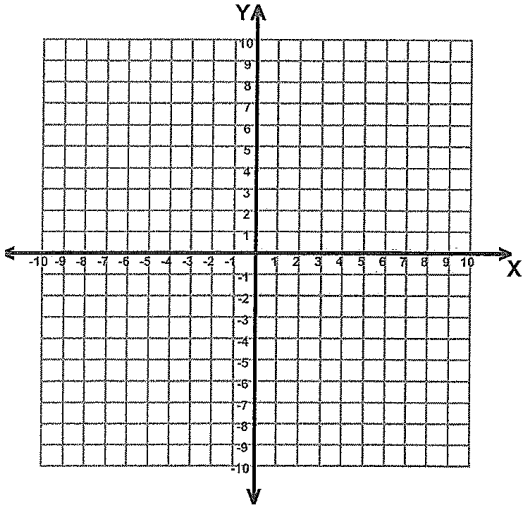
y = -3x + 5

x		y	(x,y)



38) Graph the following line using slope-intercept method:

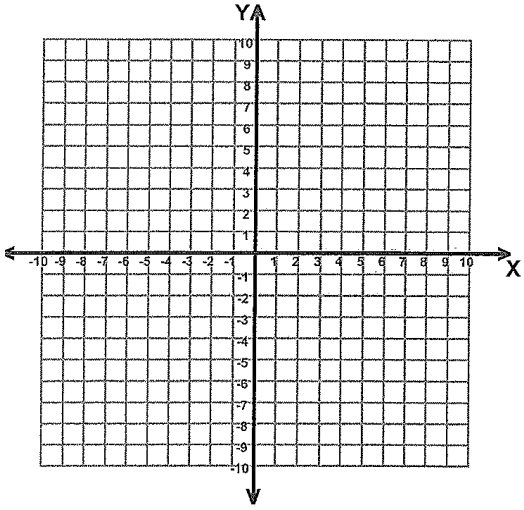
$y = \frac{1}{2}x - 3$



Graph any method:

39) y = - 8

40) x = 3



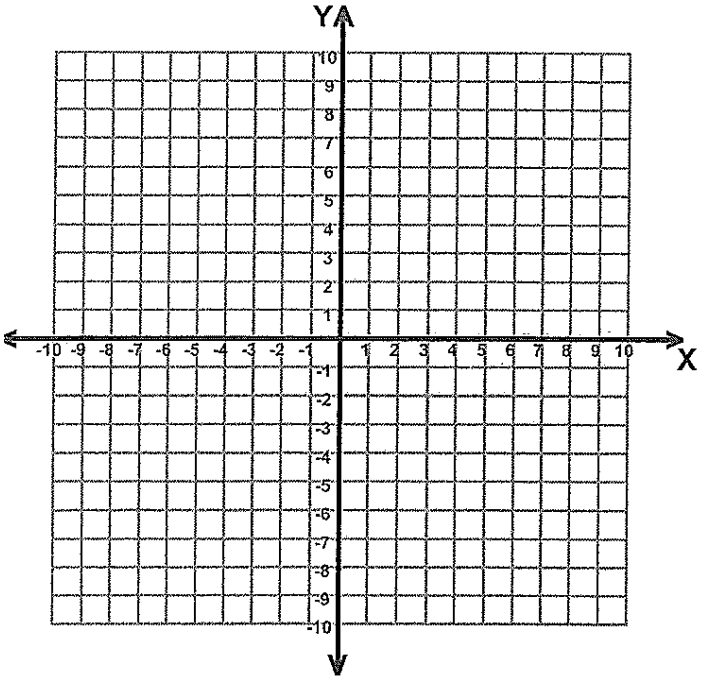
41) What is the function rule?

x	y
4	11
8	19
12	27
16	35
20	43
40	

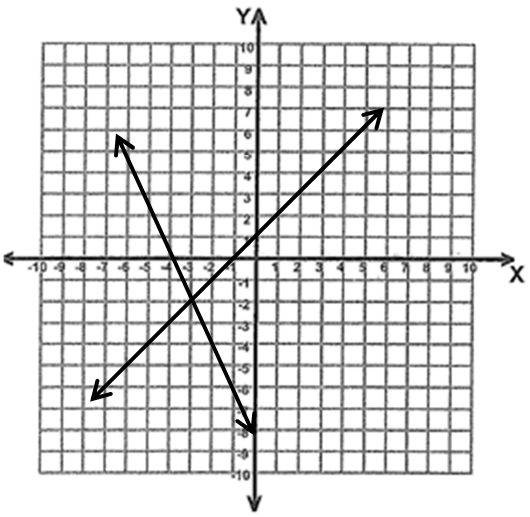
42) Graph the system of equations:

$y = x + 4$

$y = -2x + 7$



43) What is the solution to the system of equations shown on this graph?



44) What is the solution to the system above?

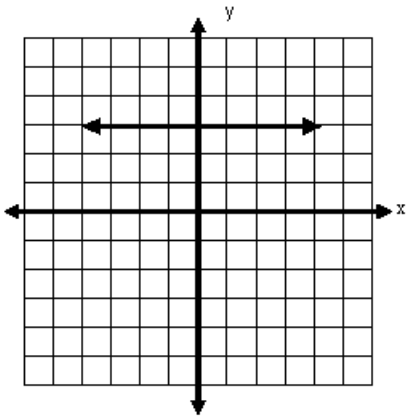
Unit 5: Writing Linear Equations

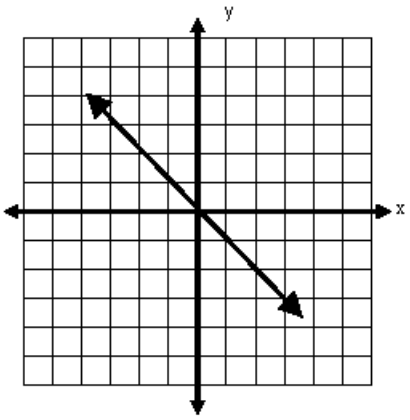
Write the equation of a line when:

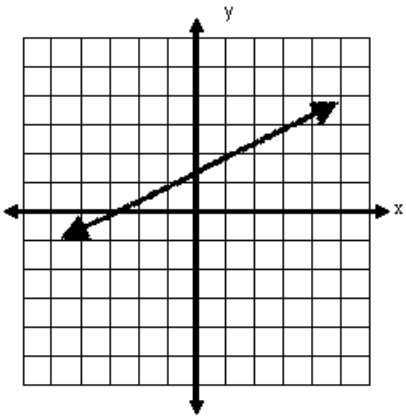
1) m = -9, b = 4

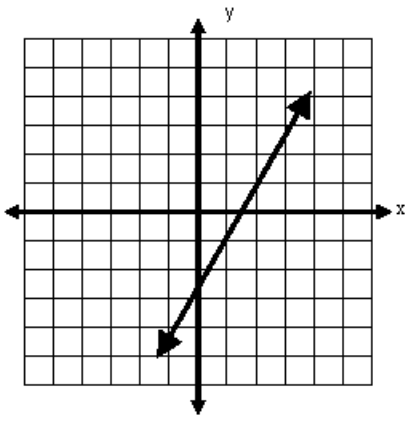
2) slope = 1/2, y-intercept = -3

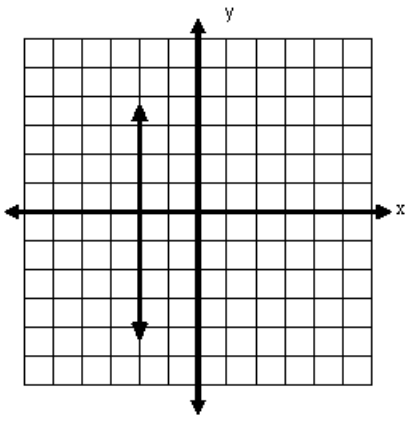
Tell what type of slope each graph represents: (Negative, Positive, Zero or Undefined)

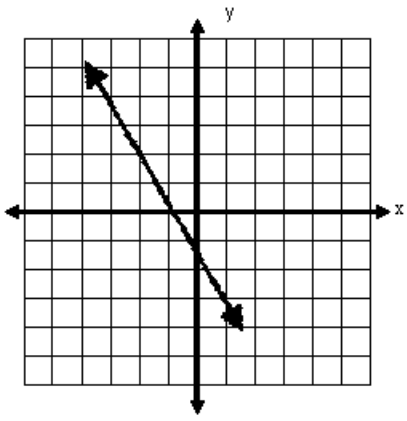
3) 

4) 

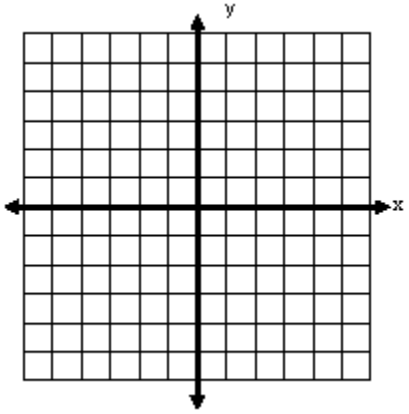
5) 

6) 

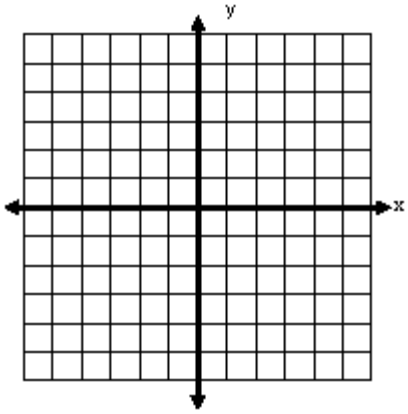
7) 

8) 

9) Graph the line y = -3x + 5

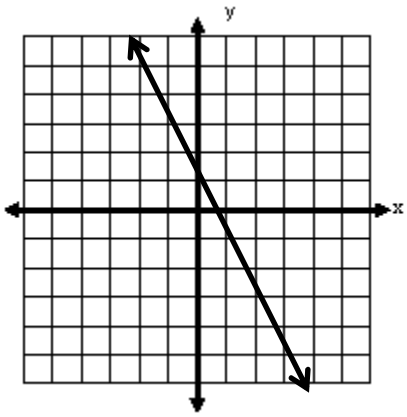


10) Graph the line $y = \frac{1}{2}x - 4$

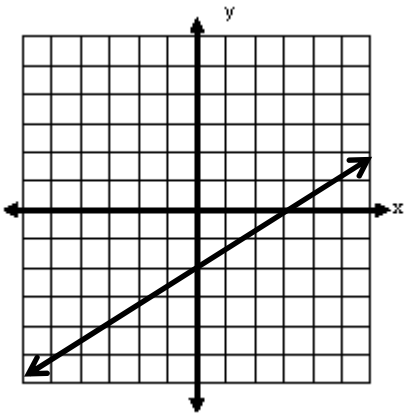


Write the equation of each of the lines below

11)



12)



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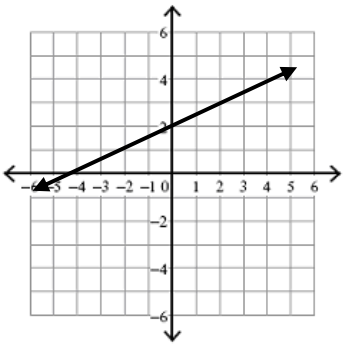
13)



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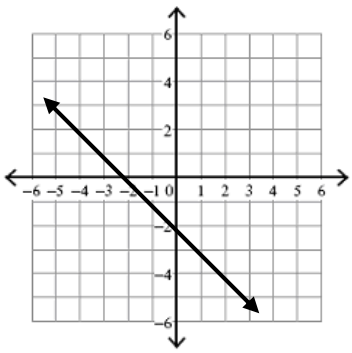

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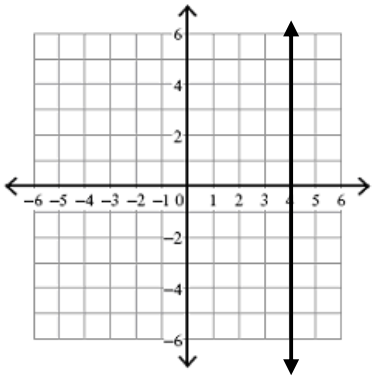

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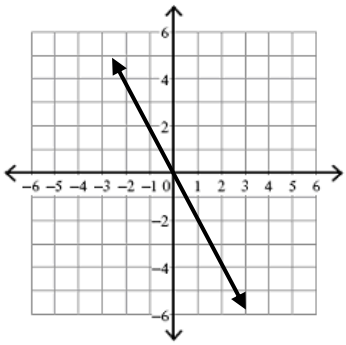
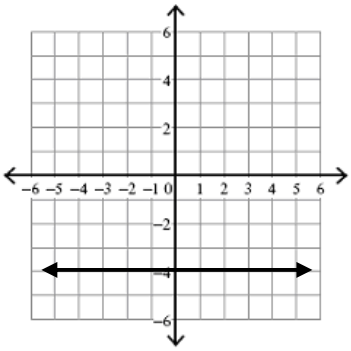
16)



17)



Find the slope (rate of change) of the line containing the following points.

18) A(6,2) B(8,6)

19) A(6,3) B(-2,-5)

20) A(7,1) B(-3,5)

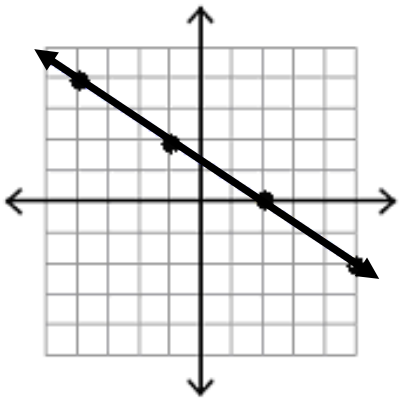
Using the table below, determine the slope (rate of change) using the slope formula.

21)

x	y
8	**4**
6	**8**
4	**12**
2	**16**

Using the graph below, determine the slope using the slope formula.

22)



Which table represents a function?

23)

x	y
0	-4
1	-1
2	2
3	5
4	8

24)

x	y
0	1
2	1
4	1
6	1
8	1

25)

x	y
0	5
1	6
2	7
1	8
0	9

26)

x	y
12	-2
10	-1
8	0
10	1
6	2

---

27) Which set of ordered pairs is *not* a function?

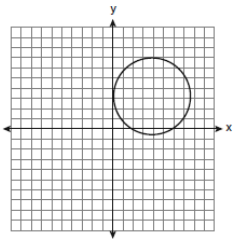
1) $\{(3,1),(2,1),(1,2),(3,2)\}$
2) $\{(4,1),(5,1),(6,1),(7,1)\}$
3) $\{(1,2),(3,4),(4,5),(5,6)\}$
4) $\{(0,0),(1,1),(2,2),(3,3)\}$

28) Which set of ordered pairs represents a function?

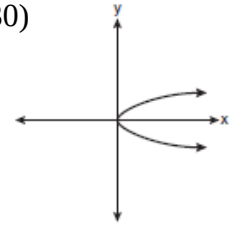
1) $\{(0,4),(2,4),(2,5)\}$
2) $\{(6,0),(5,0),(4,0)\}$
3) $\{(4,1),(6,2),(6,3),(5,0)\}$
4) $\{(0,4),(1,4),(0,5),(1,5)\}$

Using the vertical line test state whether or not each graph is a function:

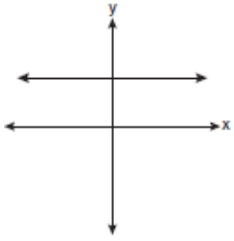
29)



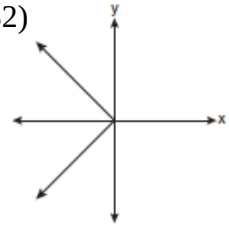
30)



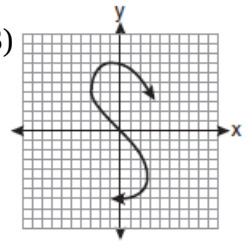
31)



32)



33)



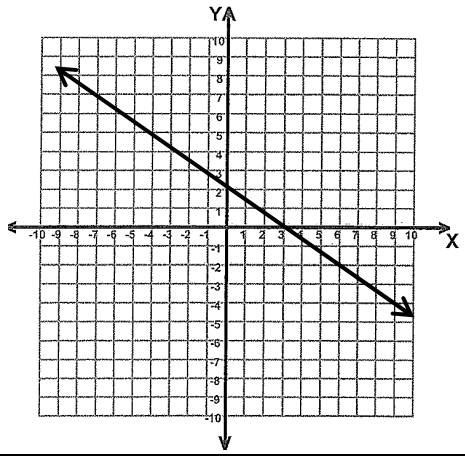
34) Which has the greater rate of change?

A) $y = -x + 8$

B)

x	y
0	5
2	4
6	2
12	-1
14	-2

C)



Use your knowledge of slopes and y-intercepts to determine the type of solution.
(one solution, no solution, or infinite solutions).
Hint: What does the slope tell you?

35) $y = 2x + 8$
$y = 2x - 7$

36) $y = 3x + 8$
$y = -2x - 4$

37) $y = 2x + 3$
$3y = 6x + 9$

Are the following equations Linear or Non-linear

38) $y = x^3 - 3x + 9$

39) $y = x^2 + 5x - 6$

40) $y = 2x - 10$

41) $y = x^2 + x + 2$

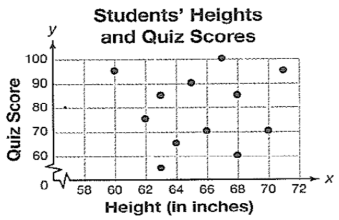
42) $y = 5x$

43) $y = x^2 + 2x$

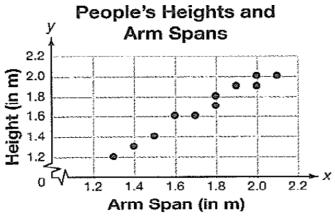
Unit 6: Working with Graphs

For each scatter plot, describe the association shown as linear or nonlinear. If no association is shown, state that. If the association is linear, identify it as positive or negative.

1.

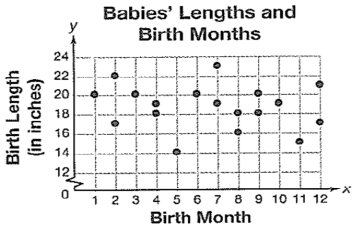


2.



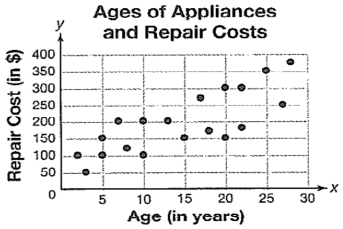
Choose the best answer.

3. The scatter plot shows the lengths of several babies and the numbers representing the months in which they were born. Which best describes the association, if any, that is shown?



A. positive association
B. negative association
C. no association
D. nonlinear association

4. The scatter plot shows the ages of appliances and the costs of repairing them. Which best describes the association, if any, that is shown?



A. positive association
B. negative association
C. no association
D. nonlinear association

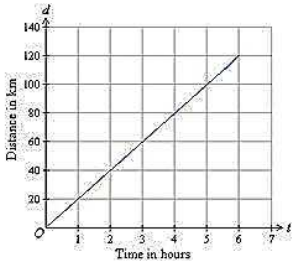
5. The late fees for a school library are resented by the function c = 0.25d, where c is the total cost and d is the number of days a book is late. The fees charged by a city library are shown in the table.

Days Late	1	2	3
Cost ($)	0.35	0.70	1.05

a) Compare the functions' y-intercepts and rates of change.

b) Shamar checks out one book at each library and returns both books 3 days late. What are the fees for each library?

6. Given the following graph, find the rate of change. Does the graph represent a direct relationship? Explain.



7. The number of baskets a company produces each day is shown in the table.

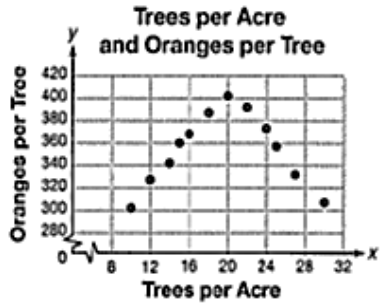
Number of Days, d	Total Baskets, b
1	45
2	90
3	135
4	180

a) Write an equation to find the total number of baskets crafted in any number of days. Describe the relationship in words.

_____
_____
_____
_____

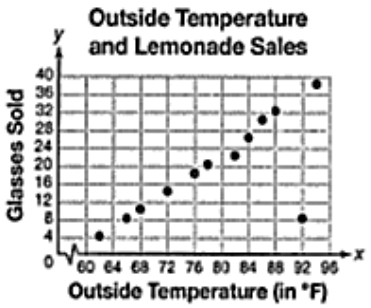
Describe the association shown, if any, by the scatter plot in as many ways as possible, using terms such as linear or nonlinear and positive or negative. Identify any outlier(s).

8.



a) Describe the association. _____
b) Draw the trend (if possible).
c) Identify any outlier(s) _____

9.



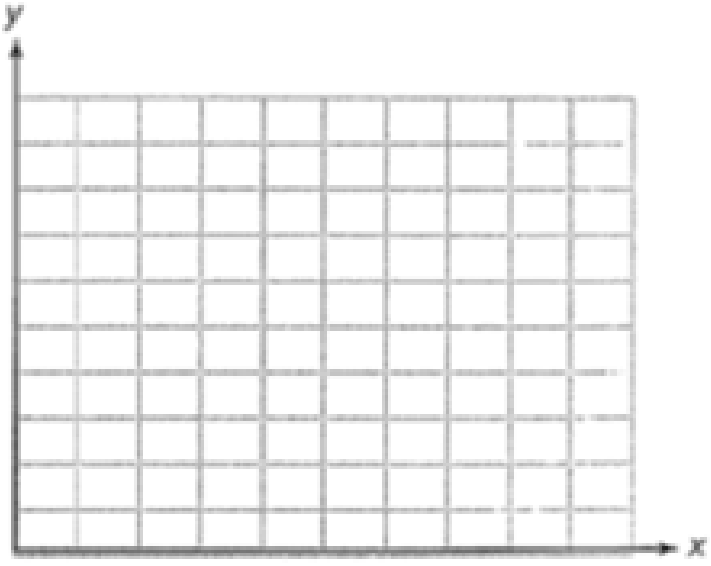
a) Describe the association. _____
b) Draw the trend.
c) Identify any outlier(s) _____

Solve.

10. CREATE The table shows the numbers of minutes 10 shoppers spent in a supermarket and the total amount each spent during that shopping trip. On the grid below, create a scatter plot using the data in the table. Then describe the association shown, if any, in as many ways as possible. Identify any outlier(s).

Time and Total Spent

Time (in min)	Total (in USD)
10	$20
30	$80
50	$120
20	$40
60	$150
30	$60
40	$90
70	$180
60	$20
50	$140



11. Complete the given the two-way frequency table.

	MP3 Player	No MP3 Player	Total
Cell Phone	57		78
No Cell Phone	13	9	
Total			

---

12. Cathy wanted to see if there was a relationship between students' grade levels and school club participation.

She made this two way table below**:**

	1 or more	Not in a club	Total
Grade 6	6	44	50
Grade 7	23	27	50
Grade 8	40	10	50
Total	60	81	150

a. Find the relative frequencies for the table.

	1 or more	Not in a club	Total
Grade 6			
Grade 7			
Grade 8			
Total			

b. State a conclusion about the relationships between a student's grade level and the likelihood that he or she will participate in school clubs.

c. How many students were surveyed?

d. How many 7th graders are not in a club?

e. What percent of the students are in 1 or more clubs?

f. If a student is not in a club, what is the relative frequency that the student is an 8th grader?

---

13. The two-way table shows the places that males and females volunteered in the past month.

	Males	Females	Total
Animal Shelter	26	21	
Hospital	13	17	
Library	9	14	
Total			

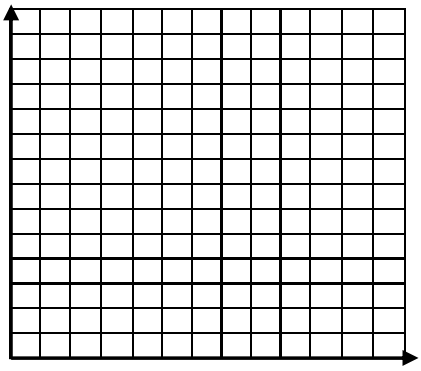
a) What percent of the volunteers are males?

b) If a student volunteers at a hospital, what is the probability the student is a male?

14. An oil tanker contains 24 gallons of oil. It has a hole in the tank and loses 3 gallons an hour.

a. Write an equation to represent this situation.

b. Graph this situation.
(be sure to label)



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15. Circle which equations represent proportional relationships?

A) $y = \frac{2}{3}x$ B) $y = \frac{1}{2}x - 3$ C) $y = 7x$ D) $y = -2x$ E) $y = 3x^2$ F) $y = x$

---

16. What is the slope and y- intercept of the following lines:

A) $y = 2x - 8$ B) $y = \frac{1}{2}x - 5$ C) $y = 2x$ D) $3x + y = 14$ E) $2y = 4x - 12$

m =

b =

---

17. Write the equation of the line: (complete the chart)

x	y
2	7
4	11
6	15
20	

---

18. The table below represents the number of hours a student worked and the amount of money the student earned. Write an equation that represents the number of dollars, *d*, earned in terms of the number of hours, *h*, worked. Using this equation, determine the number of dollars the student would earn for working 40 hrs.

Number of Hours (*h*)	Dollars Earned (*d*)
8	$50.00
15	$93.75
19	$118.75
30	$187.50

Final Review Day 5
Units 7 and 8

Unit 7: Systems of Equations Algebraically

State the number of solutions for each system (No solutions, One Solution or infinite solutions):

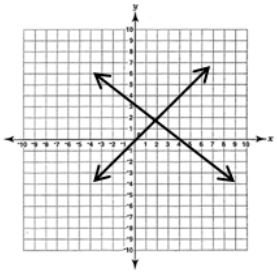
1) $y = 3x + 9$
$y = -5x + 10$

2) $2x + 3y = 24$
$2x + 3y = 10$

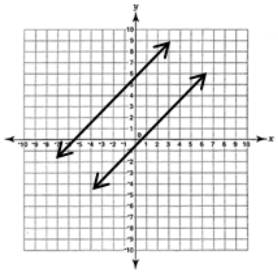
3) $5x + y = 6$
$10x + 2y = 12$

State the number of solutions for each system.

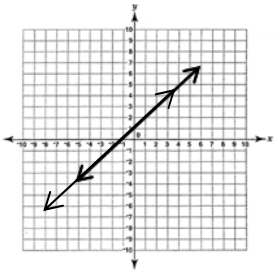
4)



5)



6)



7) How many solutions does the following system have? **$4x - 3y = 7$** **$4x + 2y = 7$**

A) One Solution
B) No Solution
C) Two Solutions
D) Infinite Solutions

8) If a system consists of two equations, one being $y = -x + 2$, what other equation would create no solution?

A) $x = -y - 2$
B) $y = -x + 2$
C) $y = -x$
D) $y = 2x - 1$

9) What is the solution to the system?

$2x - y = -5$
$3x + y = 15$

A) (-2, -9)
B) (2, 9)
C) (9, 2)
D) (2, -9)

10) Mr. Torquato wants to solve the system of equations.

$-4x + 3y = 6$
$3x - 4y = 2$

Which of the following shows the correct factors needed to eliminate the x variable?

A) $3(-4x + 3y = 6)$
$4(3x - 4y = 2)$

B) $4(-4x + 3y = 6)$
$3(3x - 4y = 2)$

C) $-3(-4x + 3y = 6)$
$4(3x - 4y = 2)$

D) $4(-4x + 3y = 6)$
$-3(3x - 4y = 2)$

Solve the following systems:

11) $6x + 9y = 57$
$x = 5$

12) $2x + 3y = 24$
$y = 2x$

13) Sean bought 3 candy bars and 4 packs of gum for $12.50. Harry bought 3 candy bars and 2 packs of gum for $8.50. What is the cost of one pack of gum?

Unit 8: Transformations

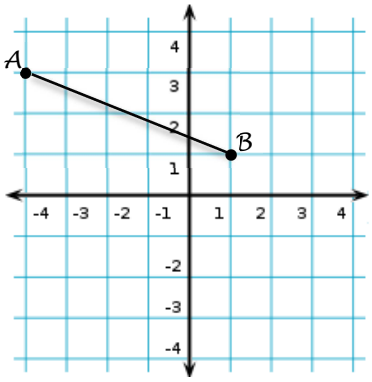
14) Name the transformation(s) (*Translation, Reflection, Rotation, Dilation*) where:

A. size is preserved.

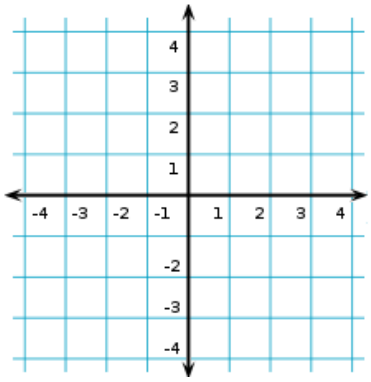
B. size is **not** preserved.

15) Graph the transformation, label each transformation with the appropriate letter and prime letter and list the new coordinate.

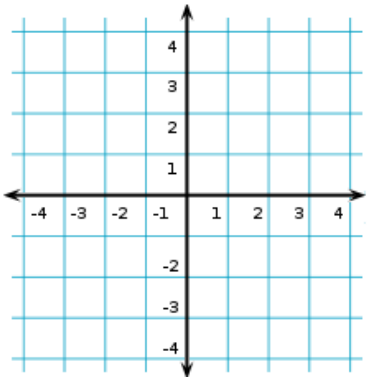
A. Reflect Line A - B in the *x*-axis



B. Graph ΔA(1,4), B(2,1), C(0,0) Rotate 90 degrees clockwise

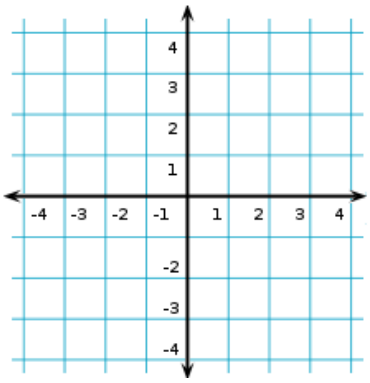


C. Reflect line C(-1,-2), D(1,3) over the line y = x

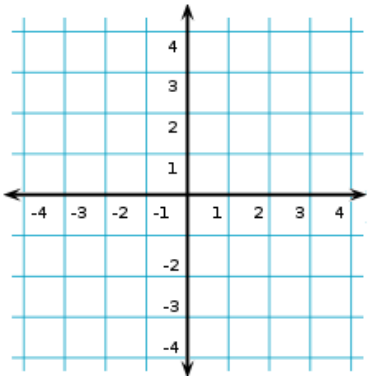


Graph the transformation, label each transformation with the appropriate letter and prime letter and list the new coordinate.

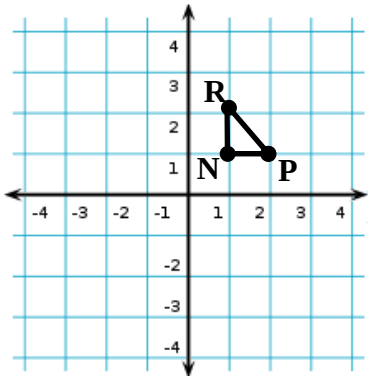
D. Translate Line CD
C (0,1) → (x + 2, y + 4)
D (-2,-1) → (x + 2, y + 4)



E. Reflect A (-4, 3) in the y-axis

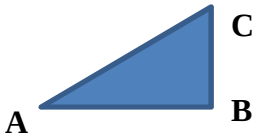


F. Dilate Δ NPR if k = 2



Use the following figures for Question 14

Triangle ABC is similar to Triangle EDF:



16) Which angles are congruent to the angles given.

a) < A ≅ _____ b) < B≅ _____ c) < C ≅ _____

Fill in the missing parts of the proportion.

d) $\frac{AB}{BC} = \frac{}{DF}$ e) $\frac{AC}{EF} = \frac{}{BA}$ f) $\frac{BC}{AC} = \frac{}{DF}$ g) $\frac{DE}{BA} = -$

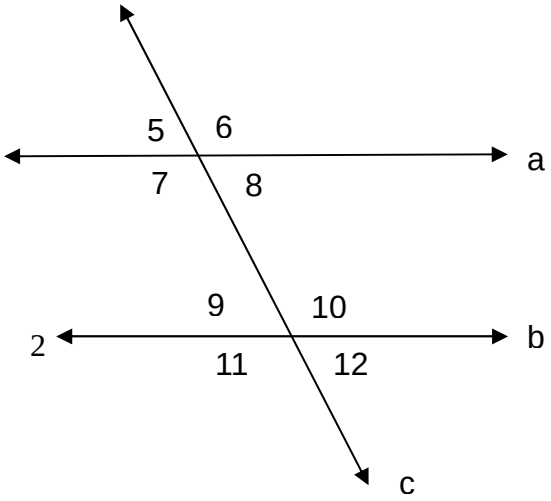
Final Review Day 6
Units 9 and 10

Unit 9: Angles

1) What is the complement of a 42° angle? _____

2) What is the supplement of a 42° angle? _____

Tell the name of each angle pair using Alternate Interior Angles, Alternate Exterior Angles, Vertical Angles, Corresponding Angles, or Supplementary Angles as choices.



3) < 5 and < 12 _____

4) < 6 and < 10 _____

5) < 5 and < 8 _____

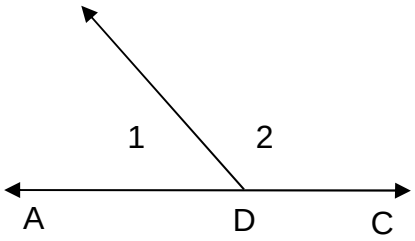
6) < 8 and < 9 _____

7) < 5 and < 6 _____

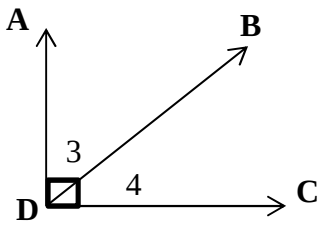
8) If *m* < 7 = 113°, find:

m <5 = _____ *m* <6 = _____ *m* <8 = _____

m <9 = _____ *m* <10 = _____ *m* <11 = _____ *m* <12 = _____



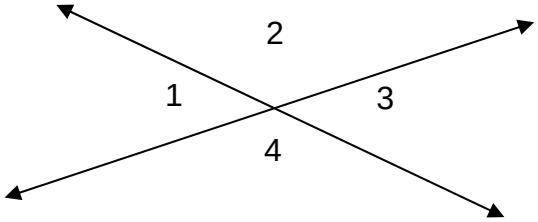
9) What type of angles are 1 and 2?



11) What type of angles are 3 and 4?

10) Given: < 1 = x + 10
< 2 = 2x + 20
Find x

12) Given: < 3 = 2x
< 4 = 3x + 30
Find x



13) What type of angles are <1 and <3?

14) What type of angles are <1 and <2?

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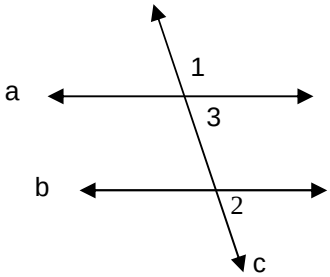
15) Given: line a and b are parallel.

m<1 = 3x + 10

m<2 = 2x + 40

a) Solve for x

b) Find m < 3



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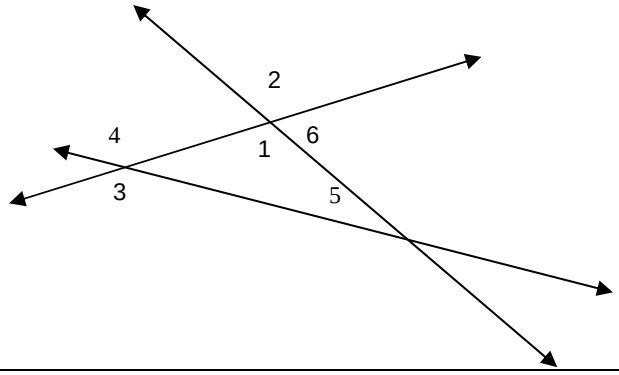
16) If the $m < 1 = 100°$, $m < 3 = 130°$

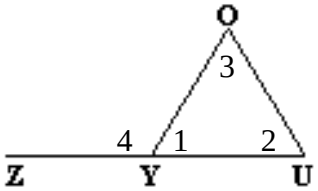
What is the $m < 2 =$ _____

$m < 4 =$ _____

$m < 5 =$ _____

$m < 6 =$ _____

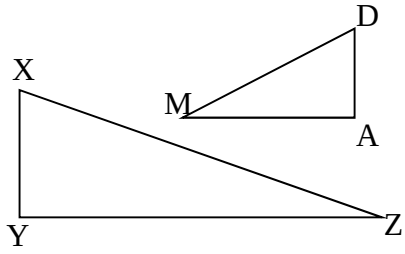




17) Given:
$m < 2 = 50°$
$m < 4 = 110°$
Find the $m < 3 =$ _____

---

18) If **ΔDAM ~ ΔXYZ,** which of the following angles correspond with each other?



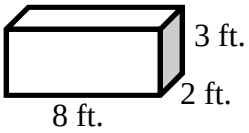
a) ∠A ≅ ∠____ b) ∠X ≅ ∠____ c) ∠Z ≅ ∠____

19) Using the triangles above: If m∠D = 48° and m∠Z = 40°, what is

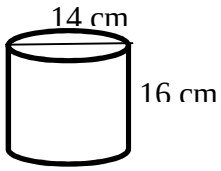
a) m∠A = _____ b) m∠X =_____ c) m∠Y = _____

Find the Surface Area: to the nearest tenth

20)

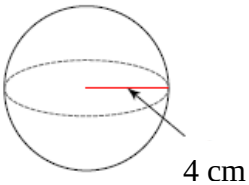


21)

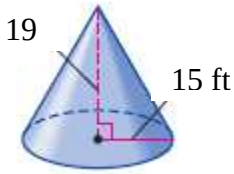


Find the Volume: in terms of π

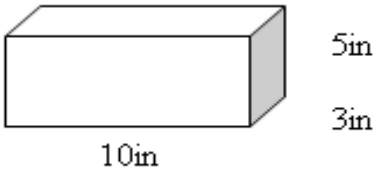
22)



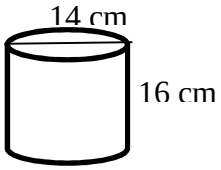
23)



24)



25) to the nearest tenth



26) Which of the following will form a triangle?

a) 100°, 40°, 50° b) 83°, 50°, 47° c) 25°, 90°, 90° d) 38°, 45°, 77°

27) Which measures will form a triangle? (Triangle Inequality Theorem)

a) 9cm, 10 cm, 2 cm b) 2m, 2m, 6m c) 15 in, 20in, 25in d) 5m, 6m, 7m

Final Review Day 7
Unit 11

Unit 11 – Scientific Notation

Write the following in Standard Form:

1) 6.3×10^{7} 2) 5.23×10^{-4}

Write the following using Scientific Notation:

3) 65,002,000 4) 0.0000233

Find the value of the following. Write your answer in Scientific Notation.

5) $(4.3 \times 10^{7})(2.2 \times 10^{3})$ 6) $(3.6 \times 10^{-5})^{3}$ 7) $(3.45 \times 10^{6}) \div (8.01 \times 10^{-5})$ 8) $\frac{6.2 \times 10^{9}}{2 \times 10^{2}}$

Compare using <, >, =

9) 2.7×10^{8} ◯ 8.7×10^{5} 10) 5.3×10^{3} ◯ 4.5×10^{3} 11) 2300 ◯ 2.3×10^{3}

12) How many times larger is 9.8×10^{6} than 6.32×10^{5}?

13) If the length of the school yard is 4×10^{3} meters and the width is 5×10^{4} meters, what is the area of the yard in square meters?

Final Review Day 8
Units 13 and 14

Unit 13: Real Numbers and Pythagorean Theorem

1) Between which two consecutive integers is $\sqrt{59}$?

Round to the nearest tenth:

2) $\sqrt{108}$ 3) $\sqrt[3]{512}$

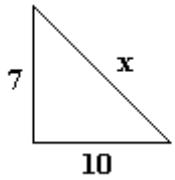
4) What is the length of the side of a square that has an area of 121 cm^2? What is the perimeter of the square?

5) Determine if the numbers are rational or irrational

a) 0.16 b) .272727… c) .375 d) .48732…

e) $\sqrt{25}$ f) $\sqrt{37}$ g) 2π h) $\frac{3}{4}$

6) Find *x* in the following triangle. Round to the nearest *tenth*.



7) If the height of the triangle is 6 cm and the base is 12 cm, find the hypotenuse to the nearest tenth.

8) The base of a 34 foot ladder is placed 12 feet from a building. How high above the ground is the top of the ladder? Round your answer to the nearest whole number.

Tell whether the following can be the sides of a right triangle:

9) 8, 15, and 17 10) 12, 14, and 16

Unit 14: Polynomials and Factoring

Write in standard form.

11) $3 - 6x^2 + 9x$

Add or Subtract:

12) $(4x^2 + 5x - 9) + (5x^2 - 6x - 3)$ 13) $(2x^2 - 4x + 1) - (3x^2 + 8x - 9)$ 14) Subtract $(x^2 + 3x)$ from $(3x^2 - 4x)$

Multiply: (Using any method)

15) $(x + 1)(x + 3)$ 16) $(x + 3)(x - 5)$ 17) $(x - 6)(x - 5)$ 18) $(x + 8)(x - 8)$

---

19) $(3x + 4)(x + 5)$ 20) $(5x - 7)(x - 3)$ 21) $(5x + 2)(2x - 4)$ 22) $(x + 5)^2$

Double Distribute:

26) $(x + 4)(x^2 - 3x + 5)$ 27) $(2x + 3)(x^2 - 4x - 6)$

Factoring:

Find the Greatest Common Factor

28) $5x,\ 7xy$ 29) $4,\ 8x$ 30) $7xy^5,\ 21y^3$ 31) $2x^2y,\ 100xy$

Factor Out Like Terms:

32) $5x + 5y$ 33) $8x^2 - 2x$ 34) $15x^2 - 10x^3$ 35) $6c^3 - 12c^2 + 3c$

Factor into a binomial pair:

36) $x^2 + 8x + 12$ 37) $x^2 - 8x + 7$ 38) $x^2 + 9x - 22$ 39) $x^2 - 2x - 15$

40) The greatest common factor of $12x^2 + 16x$ is

A) 4 B) 12 C) 4x D) 12x

41) If one factor of $x^2 - 6x - 27$ is $(x + 3)$, what is the other factor?

A) $(x + 9)$ B) $(x - 9)$ C) $(x + 24)$ D) $(x - 24)$

42) Factor: $27x^2y^4 + 90xy^5$

A) $9xy^4(3x + 10y)$ B) $9x^2y^4(3 + 10y)$ C) $9x^2y^5(3x + 10y)$ D) $9(3x^2y^4 + 10xy^5y)$

43) Find the **area**. Express as a trinomial

x - 8

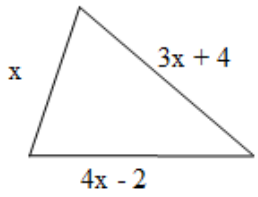
x + 5

Final Review Day 9
Mixed Review

1) Which expression is equivalent to 6x – 4y – 8x?

A) 2x – 4y
B) 14x – 4y
C) -6xy
D) -2x – 4y

2) Find the perimeter of the triangle.



A) 17x + 2
B) 8x + 2
C) 8x + 6
D) 6x + 2

3) Which of the following statements is true?

A) $3^2 = 6$
B) 3a + 5b = 8ab
C) 3 + 4 □ 2 = 24
D) 7x - x = 6x

4) What is the solution to the following equation?

x + 2 = x + 1

A) No solution
B) x = -1
C) Infinite solutions
D) $x = \frac{1}{2}$

5) The formula $C = \frac{5}{9}(F - 32)$ is used to find the Celsius temperature (C) for a given Fahrenheit temperature (F). What Celsius temperature is equal to 104° Fahrenheit?

A) 40° C
B) 25° C
C) 72° C
D) 130° C

6) In the expression $5x^3$, the 5 is called the:

A) Exponent
B) Base
C) Coefficient
D) Variable

7) Which of the given fractions is undefined?

A) $\frac{5}{5}$
B) $\frac{0}{5}$
C) $\frac{-5}{5}$
D) $\frac{5}{0}$

8) If $6^n \cdot 6^3 = 6^6$ then n =

A) 1
B) 3
C) 2
D) 4

9) $-10x^8$ is a solution to which for the following problems?

A) $(-2x^7)(-8x)$
B) $(-2x^4)(5x^2)$
C) $(10x^4)(-x^4)$
D) $(5x^8)(-5)$

10) If $2^n = 64$, then n =

A) n = 3
B) n = 5
C) n = 4
D) n = 6

11) Which expression is equivalent to 8^{-3} ?

A) $\frac{1}{8^{-3}}$
B) $\frac{1}{8^3}$
C) -8^3
D) -24

12) Which of the following is a binomial?

A) $5x^3$
B) 15
C) $2x + 5$
D) $5x^2 + 8x - 3$

13) What is the value of the expression $2xy^2$ when ***x* = -2** and ***y* = 3**?

A) -36
B) 36
C) -72
D) 72

14) Compare: 8.3×10^6 ◯ 8×10^6

A) < C) =
B) > D) ≤

15) What is the value of *n* in the problem:
$0.00032 = 3.2 \times 10^n$

A) $n = 4$ C) $n = -4$
B) $n = 3$ D) $n = -3$

16) What is $(2.45 \times 10^{-4})(3 \times 10^{-1})$ in scientific notation?

A) (7.35×10^{-5}) C) (5.30×10^{1})
B) (1.25×10^{1}) D) (5.30×10^{6})

17) Solve for *x*: $6(x - 2) - 4x = 16$

A) 2 B) 7 C) 12 D) 14

18) Simplify: $4(4x - 3y + 6)$

A) $12x - 12y + 24$ C) $-16x - 12y + 24$
B) $16x - 12y + 24$ D) $16x - 12y - 24$

19) Two numbers grouped together like (2, 5) are called _____.

A) an ordered pair C) the y-coordinate
B) the x – coordinate D) coordinate system

20) The origin is represented by which ordered pair?

A) (1, 0) B) (0,0) C) (0, 1) D) (1, 1)

21) Write the function rule.

x	y
2	2
3	8
4	14
5	20

A) $y = x + 10$
B) $y = x - 10$
C) $y = 6x + 10$
D) $y = 6x - 10$

22) Write $y + 2x = 8$ in standard linear form.

A) $y = 2x + 8$ C) $y = -2x + 8$
B) $y = 2x - 8$ D) $y = -2x - 8$

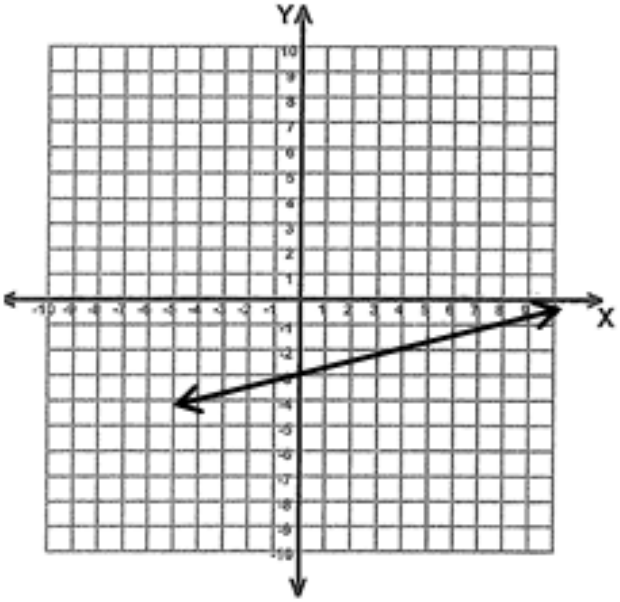
23) About how many times larger is 5.6×10^3 than 1.8×10^3?

A) 2 B) 3 C) 4 D) 5

24) Solve for x: $6 - 3x = 21$

A) -5 B) 5 C) 9 D) -9

25) What is the slope of the line?



A) -4 C) 4
B) $-\frac{1}{4}$ D) $\frac{1}{4}$

26) What is the equation of a line when m = 3 and b = -2

A) $y = -2x + 3$ C) $y = 3x + 2$
B) $y = 2x - 3$ D) $y = 3x - 2$

Renaldo opened a savings account with the $300 he earned mowing yards over the summer. Each week he withdraws $20 for spending.

27) What is the **rate of change** in Renaldo's Savings account?

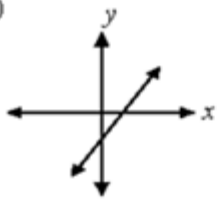
A) -20 B) 300 C) -100 D) 20

28) What is the **initial value** of Renaldo's Savings account?

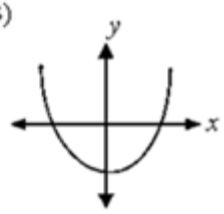
A) -20 B) 300 C) -100 D) 20

29) Which of the following graphs in *not* a function?

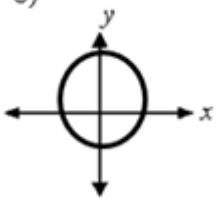
A)



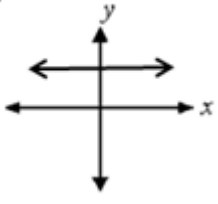
B)



C)



D)



30) Write the equation of a line whose **initial value** is $-\frac{1}{3}$ and the **rate of change** is $\frac{2}{5}$.

A) $y = \frac{2}{5}x - \frac{1}{3}$ C) $y = -\frac{1}{3}x + \frac{2}{5}$

B) $y = -\frac{2}{5}x + \frac{1}{3}$ D) $y = \frac{2}{5}x + \frac{1}{3}$

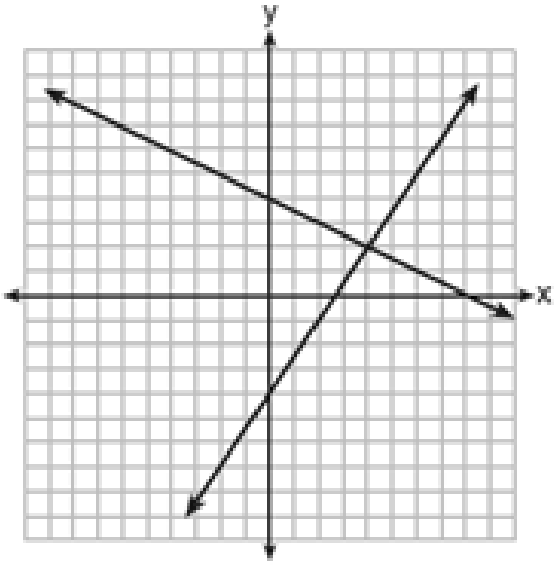
31) Find the measure of the third angle of a triangle if the other two measure 30° and 86°.

A) 180° C) 160°
B) 94° D) 64°

32) What is the supplement of a 52° angle?

A) 52° C) 38°
B) 128° D) 180°

33) A system of equations is graphed on the set of axes below. The solution of this system is



A) (0, 4) C) (2, 4)

B) (4, 2) D) (8, 0)