Algebra 2

Summer Prep 2019

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225 + 193 =

GLASBERGEN
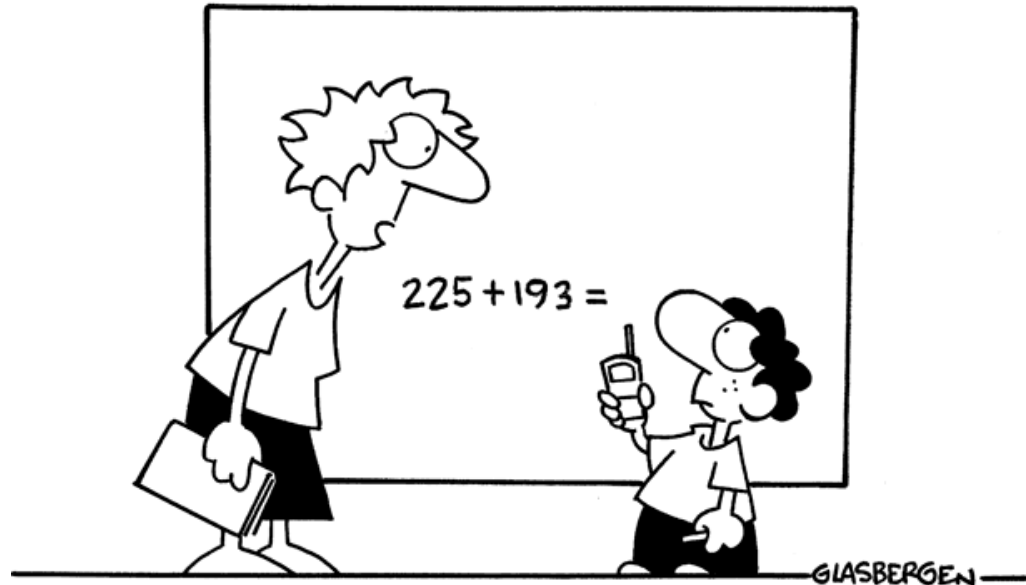
"You have to solve this problem by yourself. You can't call tech support."

Name:_____

Algebra 2 Summer Prep 2018   **Name:**_____

Choose the most appropriate answer from the choices listed. Show your work when appropriate.

Solving Equations with Variables on Both Sides/Proportions

Solve for the variable:

____   1. $2(h-8)-h=h-16$

    a. 8   c. infinitely many solutions
    b. −8   d. no solution

____   2. $2+3z=5+3z$

    a. $-\dfrac{1}{2}$ c. no solution

    b. infinitely many solutions   d. $2\dfrac{1}{3}$

____   3. $\dfrac{14}{12}=\dfrac{d}{48}$

    a. 56   c. 168
    b. 672   d. 576

Inequalities, Set Notation, Compound Inequalities

Solve the inequality

____   4. $m>\dfrac{7}{12}$

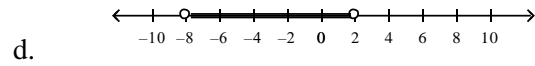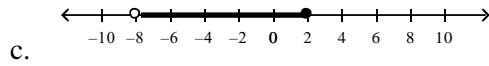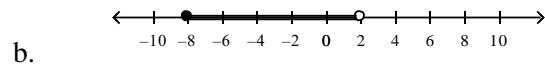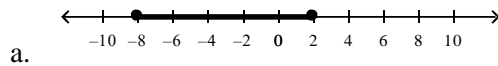   a. 1   b. −1   c. −9   d. −5

____   5. $8<x(7-x)$

    a. 2   b. 8   c. −1   d. 0

____   6. Write $-2-x\ge-1$ in set builder notation

    a. $\left\{x\,|\,x\le1\right\}$ b. $\left\{x\,|\,x\ge1\right\}$ c. $\left\{x\,|\,x\ge-1\right\}$ d. $\left\{x\,|\,x\le-1\right\}$

____ 7. What is the graph of (–8, 2]?

a.
```
←——+——●━━━━━━●——+——+——+——+——→
  –10 –8 –6 –4 –2  0  2  4  6  8  10
```

b.
```
←——+——●━━━━━━━━━○——+——+——+——→
  –10 –8 –6 –4 –2  0  2  4  6  8  10
```

c.
```
←——+——○━━━━━━●——+——+——+——+——→
  –10 –8 –6 –4 –2  0  2  4  6  8  10
```

d.
```
←——+——○━━━━━━━━━○——+——+——+——→
  –10 –8 –6 –4 –2  0  2  4  6  8  10
```

____ 8. How do you write $x \geq -6$ and $x < -3$ in interval notation?

a. [–6, –3]   c. [–6, –3)

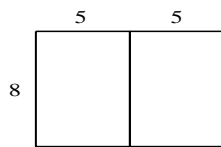b. (–6, –3)   d. (–6, –3]

Patterns and Linear Functions
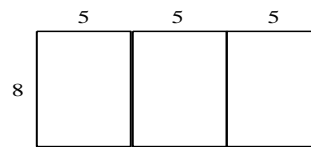
____ 9. Which of the following tables represent the relationship in the diagram below?
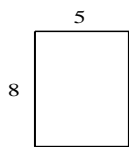
1 rectangle   2 rectangles   3 rectangles

a.

Number of Rectangles	Perimeter
1	52
2	72
3	92

c.

Number of Rectangles	Perimeter
1	26
2	36
3	46

b.

Number of Rectangles	Perimeter
1	13
2	18
3	23

d.

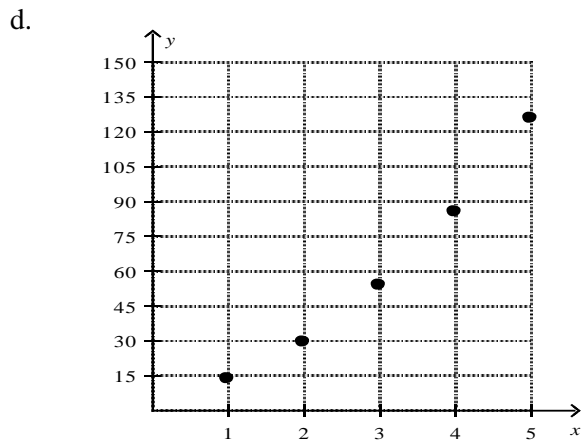| Number of Rectangles	Perimeter
1	26
2	44
3	62

Patterns and Non-Linear Functions
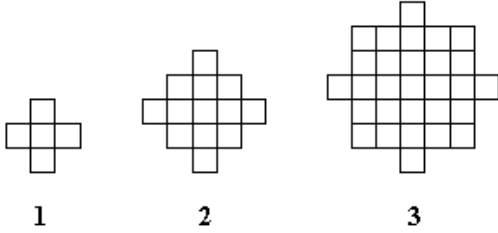
Number of Figure, x	Total Number of Squares, y	Ordered Pair (x, y)
1	5	(1, 5)
2	13	(2, 13)
3	29	(3, 29)
4		
5		

____ 10 Which of the following equations represents the pattern above?

a. $y = (2x + 4)^2$

b. $y = (2x + 1)^2 + 4$

c. $y = (2x)^2 + 4$

d. $y = (2x - 1)^2 + 4$

____ 11. Which of the following graphs matches the pattern described above?

a.

c.

b.

d.
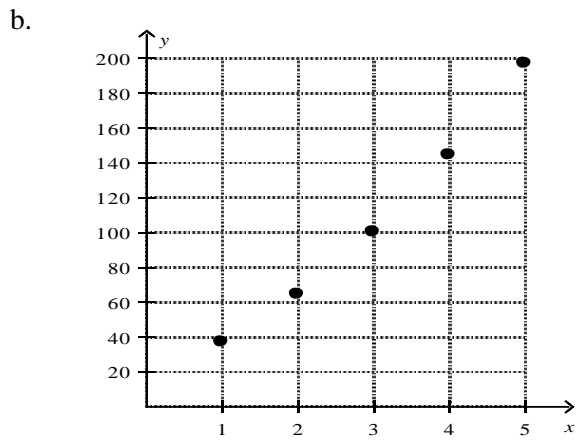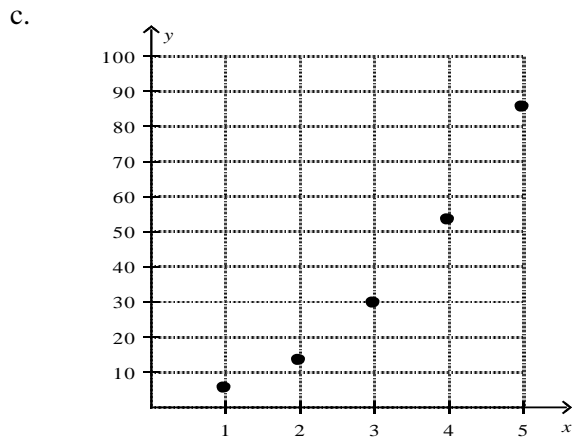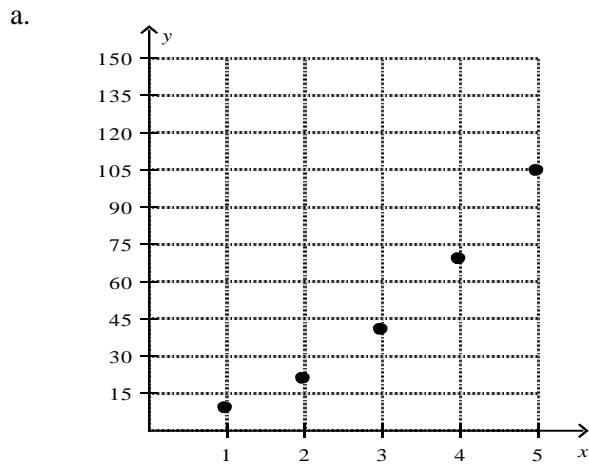
_____ 12. The ordered pairs (1, 1), (2, 4), (3, 9), (4, 16), and (5, 25) represent a function. What is a rule that represents this function?

a. $y = x^2$

c. $y = x + 2$

b. $y = 2^x$

d. $y = 2x$

_____ 13. Write a function rule for the area, A, of a triangle whose base, b, is 2 cm less than seven times the height, h. What is the area of the triangle when the height is 14 cm?

a. $A = \dfrac{7h^2 - 2h}{2}$; 672 cm^2

c. $A = 7h - 2$; 96 cm^2

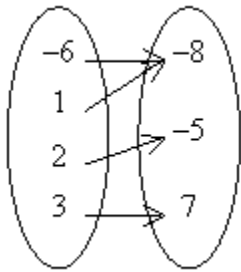b. $A = \dfrac{7h - 2}{2}$; 48 cm^2

d. $A = 7h^2 - 2h$; 1344 cm^2

Relations and Functions

_____ 14. Identify the mapping diagram that represents the relation and determine whether the relation is a function.
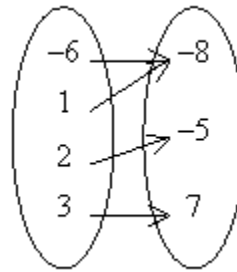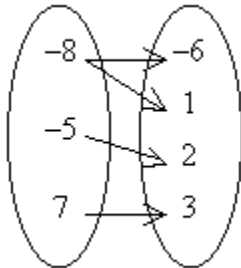$\{(-8, -6), (-5, 2), (-8, 1), (7, 3)\}$
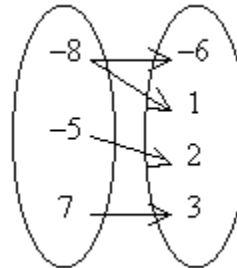
a.

The relation is a function.

c.

The relation is not a function

b.

The relation is a function.

d.

The relation is not a function.

_____ 15. The function $j(x) = 39x$ represents the number of jumping jacks $j(x)$ you can do in x minutes. How many jumping jacks can you do in 5 minutes?

  a. 195 jumping jacks
  b. 7 jumping jacks
  c. 144 jumping jacks
  d. 234 jumping jacks

_____ 16. The function $b(n) = 6n$ represents the number of light bulbs $b(n)$ that are needed for n chandeliers. How many light bulbs are needed for 15 chandeliers?

  a. 90 light bulbs
  b. 2 light bulbs
  c. 96 light bulbs
  d. 80 light bulbs

_____ 17. You have 8 cups of flour. It takes 1 cup of flour to make 24 cookies. The function $c(f) = 24f$ represents the number of cookies, c, that can be made with f cups of flour. What domain and range are reasonable for the function? What is the graph of the function?
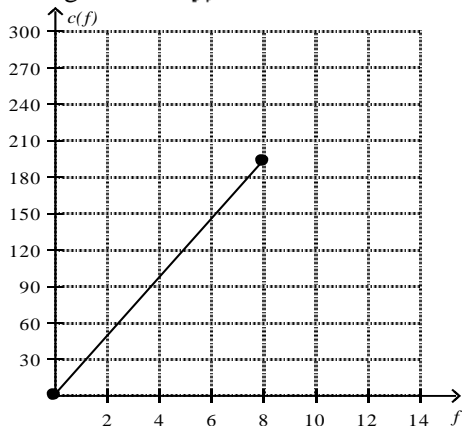
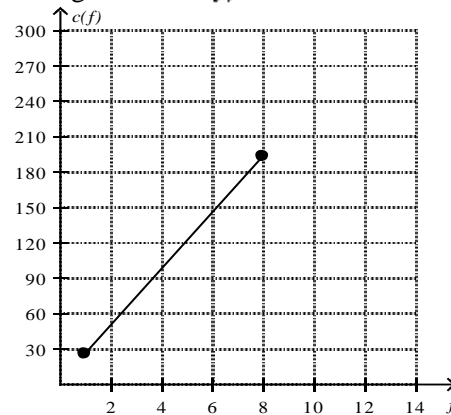 a. The domain is $0 \le c(f) \le 192$.
      The range is $0 \le f \le 8$.
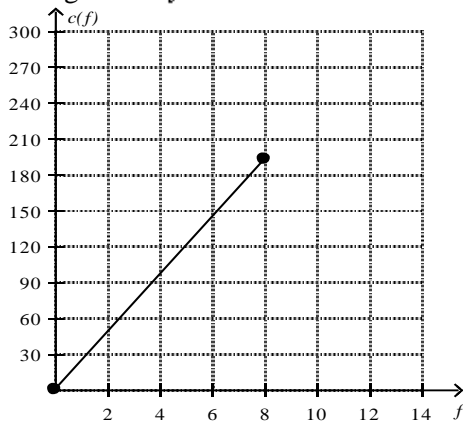
  c. The domain is $24 \le c(f) \le 192$.
      The range is $1 \le f \le 8$.
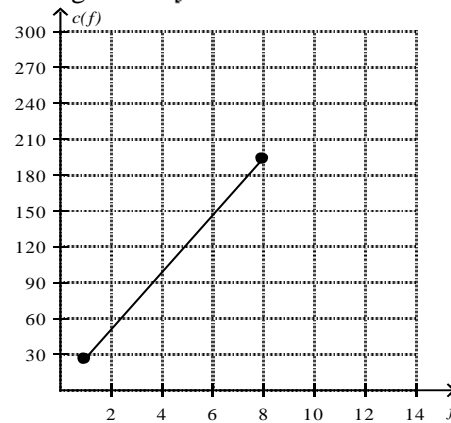
  b. The domain is $0 \le f \le 8$.
      The range is $0 \le c(f) \le 192$.

  d. The domain is $1 \le f \le 8$.
      The range is $24 \le c(f) \le 192$.

_____ 18. Bamboo plants grow rapidly. A bamboo plant is 130 inches tall. Tomorrow it will be 143 inches tall, the next day it will be 156 inches tall, and on the next day it will be 169 inches tall. Write an explicit formula to represent the height of the bamboo plant as an arithmetic sequence. How tall will the plant be in 13 days?

    a. $A(n) = 130 + (n-1)13$; 286 inches
    b. $A(n) = 130 + (n-1)13$; 299 inches
    c. $A(n) = 130 + 13n$; 286 inches
    d. $A(n) = 130 + 13n$; 299 inches

Direct Variation, Graphing Linear Functions and Intercepts

_____ 19. For the data in the table, does *y* vary directly with *x*? If it does, write an equation for the direct variation
.

x	y
8	11
16	22
24	33

    a. yes; $y = 2.75x$ c. yes; $y = 1.375x$
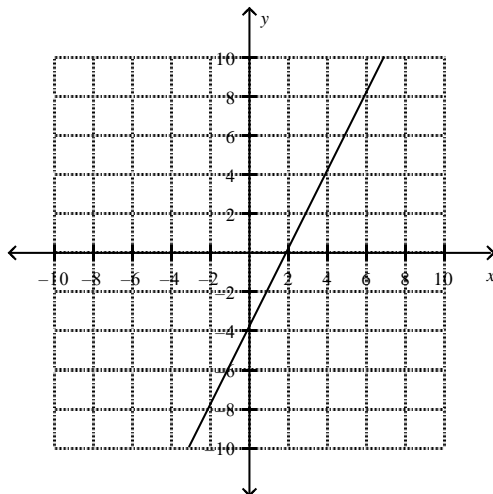   b. yes; $y = 0.6875x$ d. no; *y* does not vary directly with *x*

_____ 20. For the data in the table, does *y* vary directly with *x*? If it does, write an equation for the direct variation.
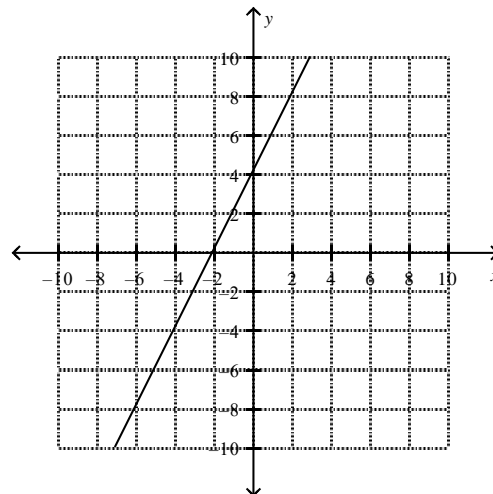
x	y
16	4
32	16
48	36

    a. yes; $y = 2x$ c. yes; $y = 8x$
    b. yes; $y = 4x$ d. no; *y* does not vary directly with *x*
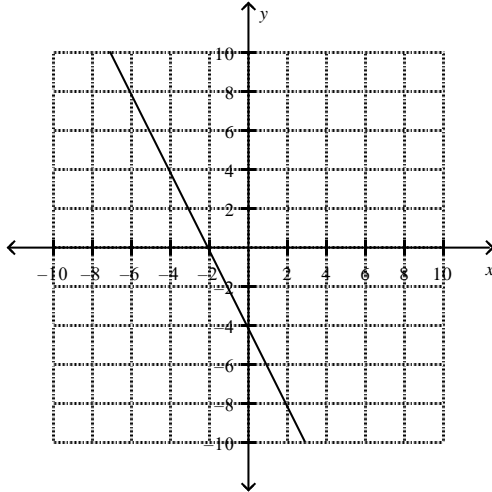
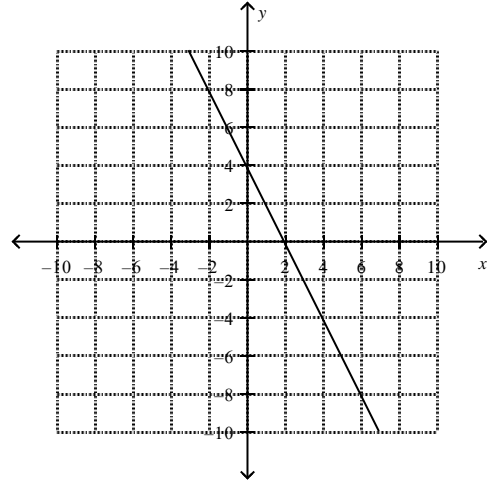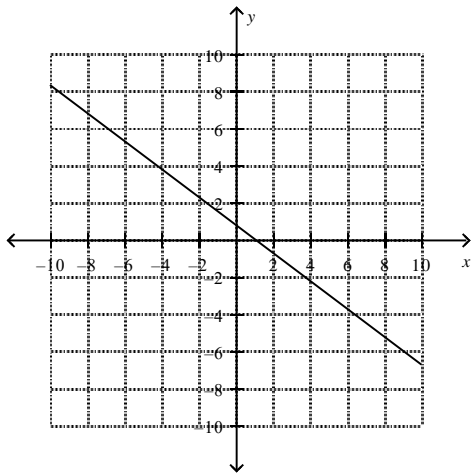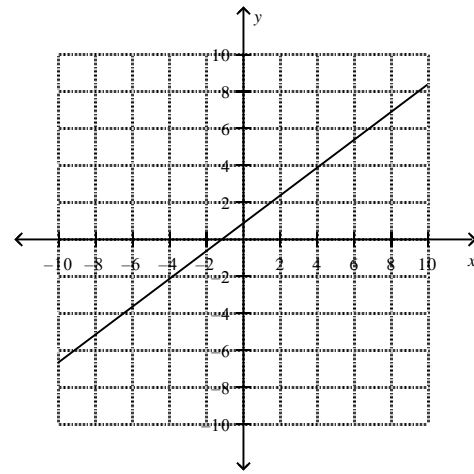_____ 21. Match the equation with its graph. $-4x - 2y = 8$

a.

c.

b.

d.

____ 22. Match the equation with its graph. $\dfrac{3}{4}x - y = -\dfrac{3}{4}$
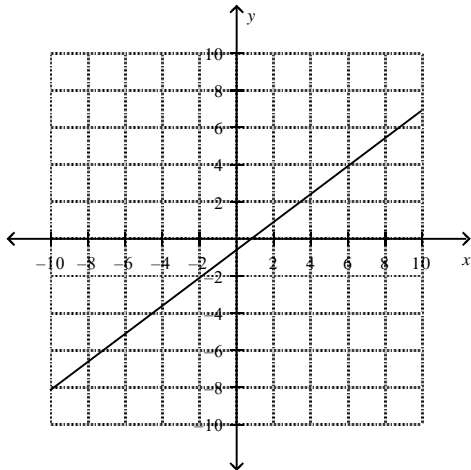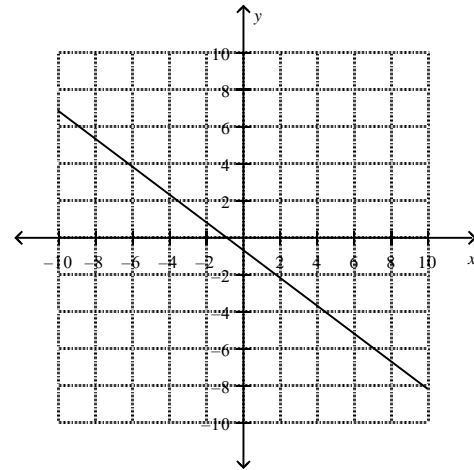
a.

c.

b.

d.

Rational, Radical and Exponential Expressions

23. Simplify $\sqrt[3]{27}$

---

24. Simplify $\left(\dfrac{81}{64}\right)^{-\frac{1}{2}}$

---

25 Simplify $\sqrt{196x^4y^6}$

---

26. Simplify $\dfrac{16x^4 - 8x^2 + 16}{(x+4)(x+2)}$

Operations with Polynomials

____ 27. A biologist studied the populations of white-sided jackrabbits and black-tailed jackrabbits over a 5-year period. The biologist modeled the populations, in thousands, with the following polynomials where x is time, in years.

       in years.   White-sided jackrabbits: $9.7x^2 - 0.8x + 2.3$

                                Black-tailed jackrabbits: $-1.1x^2 + 7.7x + 5.4$

What polynomial models the total number of white-sided and black-tailed jackrabbits?

a. $-8.6x^2 + 6.9x - 7.7$ c. $8.6x^2 + 6.9x + 7.7$

b. $8.6x^2 - 6.9x + 7.7$ d. $8.6x^2 - 6.9x - 7.7$

____ 28. A sports team is building a new stadium on a rectangular lot of land. If the lot measures $7x$ by $7x$ and the sports field will be $5x$ by $5x$, how much of the lot will be left over to build bleachers on?

a. $4x^2$ c. $74x^2$

b. $24x^2$ d. $49x^2 - 25x^2$

_____ 29. $(-5h + 4)(5h - 5)$ Simplify the product using a table.

	$5h$	-5
$-5h$		
4		

a. $-25h^2 + 45h - 20$

c. $-25h^2 - 5h + 20$

b. $-25h^2 - 45h - 20$

d. $-25h^2 + 5h + 20$

_____ 30. The area of a rectangular garden is given by the trinomial $x^2 + x - 42$. What are the possible dimensions of the rectangle? Use factoring.

a. $x - 6$ and $x + 7$

c. $x - 6$ and $x - 7$

b. $x + 6$ and $x - 7$

d. $x + 6$ and $x + 7$

Linear and Quadratic Equations

31   Given the distance between $(x,1)$ and $(-2,5)$ is $2\sqrt{7}$, find the value(s) of x. Leave your answer in simplified exact form.

32. Write an equation of the line in slope-intercept form with x-intercept of -3 and a y-intercept of -5.

Systems of Equations and Linear Inequalities

33. How many solutions does the system have?

$$x = -4y + 4$$
$$2x + 8y = 8$$

34. A local citizen wants to fence a rectangular community garden. The length of the garden should be at least 110 ft, and the distance around should be no more than 380 ft. Write a system of inequalities that models the possible dimensions of the garden.

35. Solve the system of equations below by **graphing**.

$$\begin{cases} y = 3x - 4 \\ 2x + y = 6 \end{cases}$$
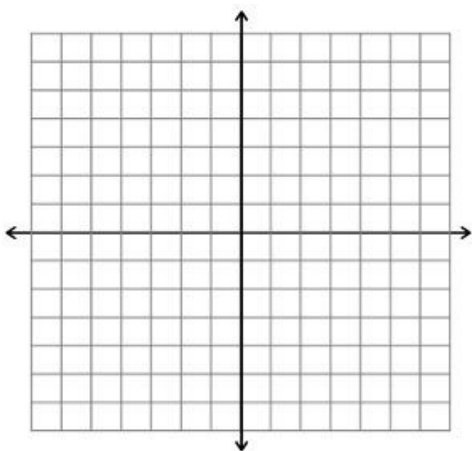
36. Solve the following system of equations using **substitution**

$$\begin{cases} 2x + 5y = -5 \\ x + 3y = 3 \end{cases}$$

37. Solve the following system of equations using **elimination**

$$\begin{cases} 6x + 2y = 8 \\ 4x + 2y = 10 \end{cases}$$

38. In one week, a music store sold 9 guitars for a total of $3611. Electric guitars sold for $479 each and acoustic guitars sold for $339 each. How many of each type of guitar were sold? Set up a system of equations and use any method to solve.

39.   Sketch the solution to the system of inequalities.
$$\begin{cases} y \le \frac{1}{2}x + 2 \\ y < -2x - 3 \end{cases}$$
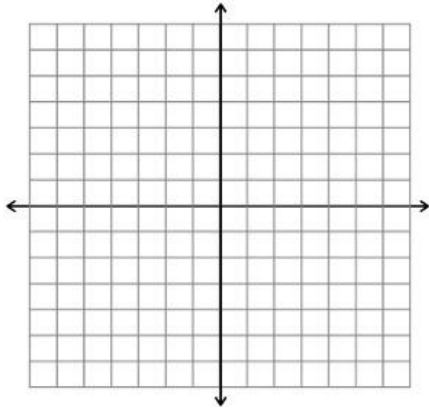
Polynomials and Factoring

40.   Multiply and simplify: $7(-5v - 8) =$

41.   Multiply and simplify: $(n^2 + 6n - 4)(2n - 4) =$

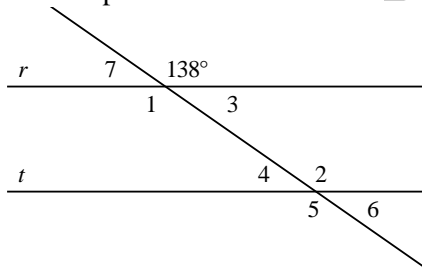42.   Simplify: $\dfrac{-32x^3y^2z^4}{8x^6y^2z} =$

43.   Factor completely: $3x^3 + 6x^2 + 27x =$

44. Factor completely: $36x^2 - 64 =$
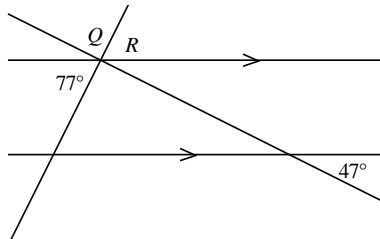
45. Factor completely: $t^2 + 4t - 32$

Geometry Review

_____ 46 Line *r* is parallel to line *t*. Find $m\angle 6$. The diagram is not to scale.

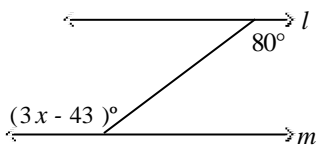A. 32   B. 138   C. 142   D. 42

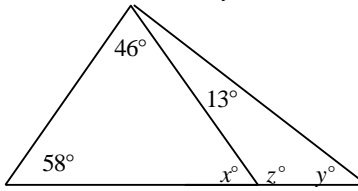_____ 47. Find $m\angle Q$. The diagram is not to scale.

A. 66   B. 56   C. 124   D. 103

_____ 48. Find the value of *x* for which *l* is parallel to *m*. The diagram is not to scale.
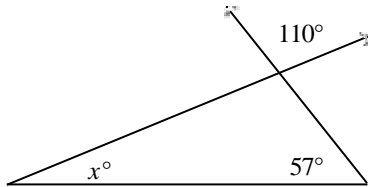

A. 100   B. 80   C. 123   D. 41

_____ 49. Find the values of x, y, and z. The diagram is not to scale.

A. $x = 63$, $y = 104$, $z = 76$ C. $x = 63$, $y = 76$, $z = 104$
B. $x = 76$, $y = 63$, $z = 104$ D. $x = 76$, $y = 104$, $z = 63$

_____ 50. Find the value of x. The diagram is not to scale.

A. 33   B. 70   C. 23   D. 13

_____ 51. Michele wanted to measure the height of her school's flagpole. She placed a mirror on the ground 48 feet from the flagpole, then walked backwards until she was able to see the top of the pole in the mirror. Her eyes were 5 feet above the ground and she was 12 feet from the mirror. Using similar triangles, find the height of the flagpole to the nearest tenth of a foot.
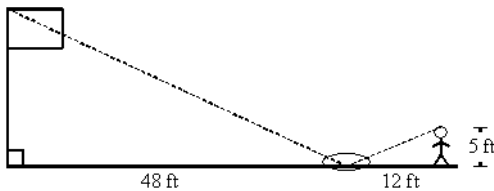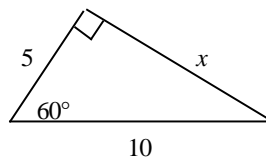

A. 20 ft   B. 38.4 ft   C. 55 ft   D. 25 ft

_____ 52. A triangle has side lengths of 12 cm, 35 cm, and 37 cm. Classify it as acute, obtuse, or right.
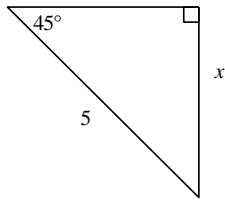
A. obtuse   B. right   C. acute

_____ 53. Find the value of the variable(s). If your answer is not an integer, leave it in simplest radical form.

A. $5\sqrt{3}$ B. $\dfrac{1}{2}$

C. $10\sqrt{3}$ D. 2

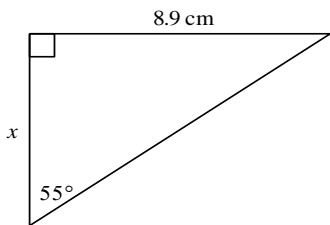_____ 54. Find the value of the variable. If your answer is not an integer, leave it in simplest radical form.

A. $\dfrac{5\sqrt{2}}{2}$ B. $5\sqrt{3}$

C. $5\sqrt{2}$ D. $\dfrac{5\sqrt{3}}{2}$

_____ 55. Use a trigonometric ratio to find the value of x. Round your answer to the nearest tenth.
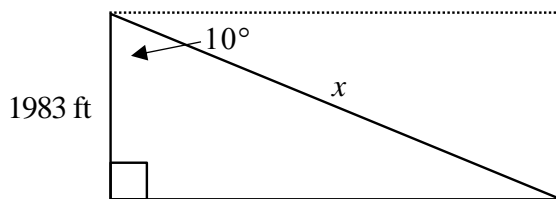

A. 6.2 cm   B. 12.7 cm

C. 15.5 cm   D. 10.9 cm

_____ 56. To approach the runway, a pilot of a small plane must begin a 10° descent starting from a height of 1983 feet above the ground. To the nearest tenth of a mile, how many miles from the runway is the airplane at the start of this approach?
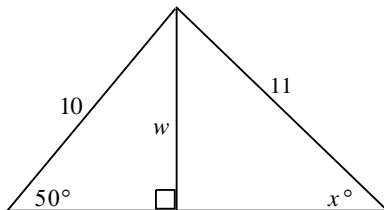

A. 2.2 mi   B. 0.4 mi

C. 11,419.6 mi   D. 2.1 mi

_____ 57. Find the value of w and then x. Round lengths to the nearest tenth and angle measures to the nearest degree.
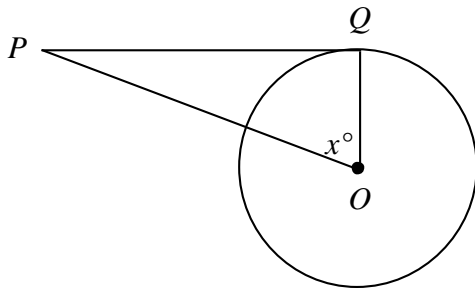

A. $w = 7.7, x = 44$
B. $w = 6.4, x = 4$
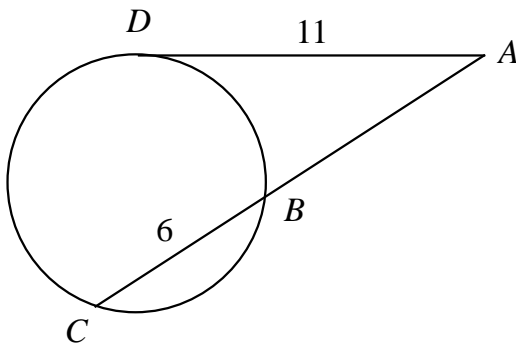C. $w = 7.7, x = 54$
D. $w = 6.4, x = 44$

$m\angle P = 14$

A. 28   B. 76   C. 38   D. 104

_____ 59 $\overline{AD}$ is tangent to circle O at D. Find AB. Round to the nearest tenth if necessary.

A. 3.7   B. 20.2   C. 8.5   D. 8.4

_____ 60. The volume of a sphere is 5000π m^3. What is the surface area of the sphere to the nearest square meter?

A. 62,832 m^2 B. 1517 m^2 C. 3033 m^2 D. 195 m^2

Show work where appropriate. This summer prep packet will be your first grade of the quarter. DO NOT GUESS at the answers. You will be tested on this material during the first week of class.
Sites to use for help:
www.Mathbitsnotebook.com
www.coolmath.com
www.ck12.org