Student: _____ **Date:** _____	**Instructor:** Joe Betters **Course:** Pre-Calculus Pre AP (Master Course)	**Assignment:** 1st Nine Weeks Review (Chapters 1-3, 5.1, 5.2, 6) 2019

1. Graph the equation using a graphing utility. Use a graphing utility to approximate the intercepts rounded to two decimal places. Use the TABLE feature to help establish the viewing window.

    $7x - 5y = 88$

    Enter the y-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

    ○ **A.** $y =$ _____
        (Round to two decimal places as needed. Use a comma to separate answers as needed.)
    ○ **B.** There is no y-intercept.

    Enter the x-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

    ○ **A.** $x =$ _____
        (Round to two decimal places as needed. Use a comma to separate answers as needed.)
    ○ **B.** There is no x-intercept.

    ID: 1.1.93

2. Find the length of each side of the triangle determined by the three points and state whether the triangle is an isosceles triangle, a right triangle, neither of these, or both. (An isosceles triangle is one in which at least two of the sides are of equal length.)

    $P_1 = (-2, -8)$, $P_2 = (0,12)$, $P_3 = (9,1)$

    $d(P_1,P_2) =$ _____ (Type an exact answer, using radicals as needed.)
    $d(P_1,P_3) =$ _____ (Type an exact answer, using radicals as needed.)
    $d(P_2,P_3) =$ _____ (Type an exact answer, using radicals as needed.)

    The triangle is (1) _____ .

    (1) ○ an isosceles triangle
        ○ a right triangle
        ○ neither of these
        ○ isosceles right triangle

    ID: 1.1.103

3. List the intercepts and test for symmetry.

$$y = x^4 - 14x^2 - 32$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The intercept(s) is/are _____ .
  (Type an ordered pair. Use a comma to separate answers as needed. Type each answer only once.)
- **B.** There are no intercepts.

What are the results of the tests for symmetry? Choose the correct answer below. Select all that apply.

- ☐ **A.** The graph is symmetric with respect to the y-axis.
- ☐ **B.** The graph is symmetric with respect to the x-axis.
- ☐ **C.** The graph is symmetric with respect to the origin.
- ☐ **D.** The graph has no symmetry.

ID: 1.2.49

4. For the given equation, list the intercepts and test for symmetry.

$$y = \frac{-5x}{x^2 + 25}$$

What are the intercept(s)? Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The intercept(s) is/are _____ .
  (Type an ordered pair. Use a comma to separate answers as needed.)
- **B.** There are no intercepts.

Is the graph of the equation symmetric with respect to the x-axis?

- ○ Yes
- ○ No

Is the graph of the equation symmetric with respect to the y-axis?

- ○ Yes
- ○ No

Is the graph of the equation symmetric with respect to the origin?

- ○ Yes
- ○ No

ID: 1.2.57

5. Use a graphing utility to approximate the real solutions, if any, of the given equation rounded to two decimal places. All solutions lie between -10 and 10.

$$-\frac{2}{5}x^4 - 2x^3 + \frac{7}{3}x = -\frac{2}{5}x^2 + \frac{1}{3}$$

What are the approximate real solutions? Select the correct choice below and fill in any answer boxes within your choice.

    ○ **A.** The solution set is $\{\underline{\hspace{2cm}}\}$.
        (Round to two decimal places as needed. Use a comma to separate answers as needed.)
    ○ **B.** There are no solutions.

    ID: 1.3.13

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6. Solve the equation.

$$(x + 9)(x - 3) = (x + 1)^2$$

Select the correct choice below and fill in any answer boxes in your choice.

    ○ **A.** The solution set is $\{\underline{\hspace{2cm}}\}$. (Simplify your answer.)
    ○ **B.** There is no solution.

    ID: 1.3.25

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7. Find the equation of a line that is parallel to the line $x = 3$ and contains the point $(-8,2)$.

The equation of the parallel line is $\underline{\hspace{2cm}}$. (Type an equation.)

    ID: 1.4.63

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8. Find the equation of the line with the given properties. Express the equation in general form or slope-intercept form.

    Perpendicular to the line $-4x + y = -40$; contains the point $(8, -9)$

The equation of the line is $\underline{\hspace{2cm}}$.
(Simplify your answer. Type an equation. Type your answer in general form or slope-intercept form.)

    ID: 1.4.67

9. **(a)** Find the intercepts of the graph of the following equation.
    (b) Graph the equation.

 $7x + 4y = 14$

    (a) What is the x-intercept? Select the correct choice below
    and, if necessary, fill in the answer box to complete your
    choice.

   ○ **A.** The x-intercept is _____ .
      (Type an integer or a simplified fraction.)
    ○ **B.** There is no x-intercept.

    What is the y-intercept? Select the correct choice below and,
    if necessary, fill in the answer box to complete your choice.

    ○ **A.** The y-intercept is _____ .
      (Type an integer or a simplified fraction.)
    ○ **B.** There is no y-intercept.

    (b) Use the graphing tool to graph the line.
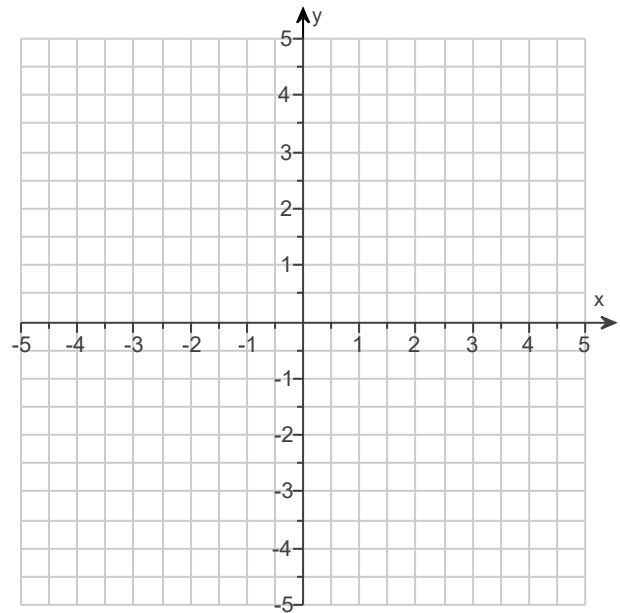
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10. Find the center and radius of the circle. Write the standard form of the equation.
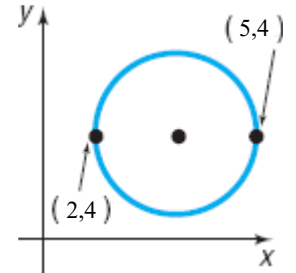
    The center of the circle is _____ .
    (Type an ordered pair.)

    The radius of the circle is _____ .

    The standard form of the equation is _____ .

    ID: 1.5.9

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11. Write the standard form of the equation and the general form of the equation of the circle with radius r and center (h,k). Then graph the circle.
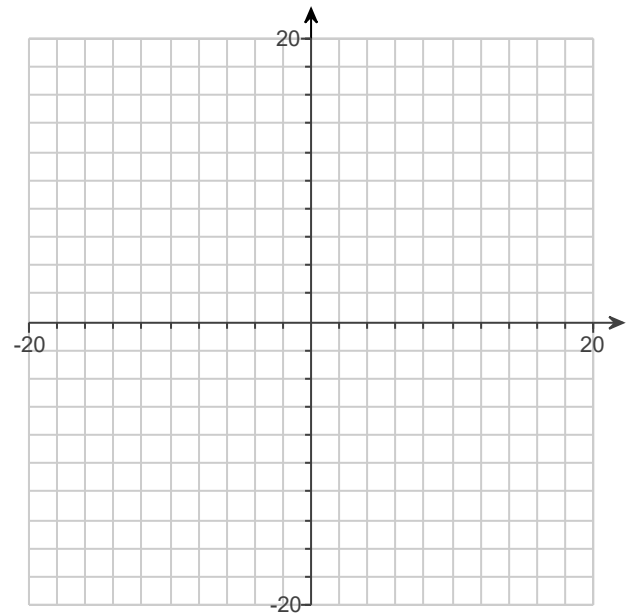
   $r = 10;$ $(h,k) = (6, -8)$

   The standard form of the equation of this circle is

   _____ .

   The general form of the equation of this circle is

   _____ .
   (Simplify your answer.)

   Graph the circle.

   ID: 1.5.17

12. For the equation $x^2 + y^2 - 6x - 8y - 11 = 0$, do the following.

   (a) Find the center (h,k) and radius r of the circle.
   (b) Graph the circle.
   (c) Find the intercepts, if any.

   (a) The center is _____ .
   (Type an ordered pair.)

   The radius is r = _____ .

   (b) Use the graphing tool to graph the circle.

   (c) Find the intercepts, if any. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

   ○ **A.** The intercept(s) is/are

        _____ .
        (Type an ordered pair. Use a comma to separate answers as needed. Type exact answers for each coordinate, using radicals as needed.)

   ○ **B.** There is no intercept.
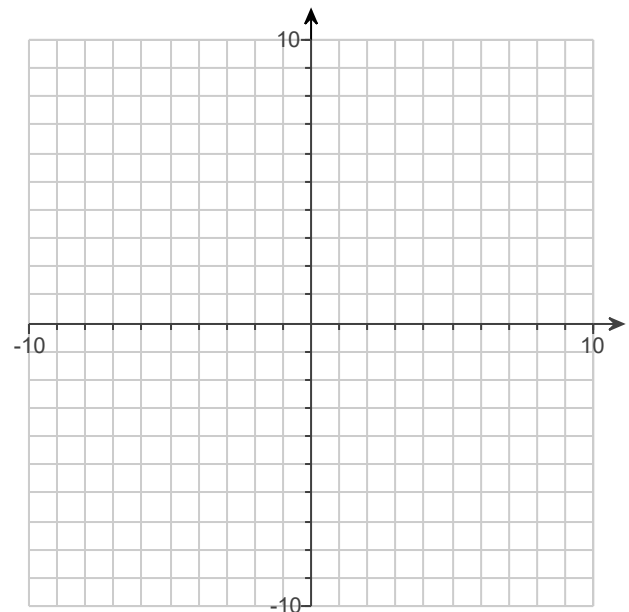
   ID: 1.5.25

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13. Find the standard form of the equation of the circle with center $(-6,4)$ and tangent to the line $y = 1$.

   The standard form of the equation of this circle is _____ .

   ID: 1.5.41

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14. For the given functions f and g, complete parts (a)-(h). For parts (a)-(d), also find the domain.

$$f(x) = x - 9; \; g(x) = 3x^2$$

(a) Find $(f + g)(x)$.

$(f + g)(x) = $ _____ (Simplify your answer.)

What is the domain of $f + g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The domain is $\{x \mid$ _____ $\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

○ **B.** The domain is $\{x \mid x$ is any real number$\}$.

(b) Find $(f - g)(x)$.

$(f - g)(x) = $ _____ (Simplify your answer.)

What is the domain of $f - g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The domain is $\{x \mid$ _____ $\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

○ **B.** The domain is $\{x \mid x$ is any real number$\}$.

(c) Find $(f \cdot g)(x)$.

$(f \cdot g)(x) = $ _____ (Simplify your answer.)

What is the domain of $f \cdot g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The domain is $\{x \mid$ _____ $\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

○ **B.** The domain is $\{x \mid x$ is any real number$\}$.

(d) Find $\left(\dfrac{f}{g}\right)(x)$.

$\left(\dfrac{f}{g}\right)(x) = $ _____ (Simplify your answer.)

What is the domain of $\dfrac{f}{g}$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The domain is $\{x \mid$ _____ $\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

○ **B.** The domain is $\{x \mid x$ is any real number$\}$.

(e) Find $(f + g)(2)$.

$(f + g)(2) =$ _____   (Type an integer or a simplified fraction.)

(f) Find $(f - g)(4)$.

$(f - g)(4) =$ _____   (Type an integer or a simplified fraction.)

(g) Find $(f \cdot g)(3)$.

$(f \cdot g)(3) =$ _____   (Type an integer or a simplified fraction.)

(h) Find $\left(\dfrac{f}{g}\right)(3)$.

$\left(\dfrac{f}{g}\right)(3) =$ _____   (Type an integer or a simplified fraction.)

ID: 2.1.65

15.
Find the difference quotient of f; that is, find $\dfrac{f(x + h) - f(x)}{h}$, $h \neq 0$, for the following function. Be sure to simplify.

$f(x) = x^2 - 2x + 1$

$\dfrac{f(x + h) - f(x)}{h} =$ _____

ID: 2.1.77

16. Use the given graph of the function f to answer parts (a)-(n).

(a) Find f(− 14) and f(4).

f(− 14) = _____

f(4) = _____

(b) Find f(12) and f(0).

f(12) = _____

f(0) = _____

(c) Is f(4) positive or negative?

○ Positive
○ Negative

(d) Is f(− 6) positive or negative?

○ Positive
○ Negative

(e) For what value(s) of x is f(x) = 0?

x = _____
(Use a comma to separate answers as needed.)

(f) For what values of x is f(x) > 0?

_____
(Type a compound inequality. Use a comma to separate answers as needed.)

(g) What is the domain of f?

The domain of f is {x| _____ }.
(Type a compound inequality.)

(h) What is the range of f?

The range of f is {y| _____ }.
(Type a compound inequality.)

(i) What are the x-intercept(s)?

x = _____
(Use a comma to separate answers as needed.)

(j) What are the y-intercept(s)?

y = _____
(Use a comma to separate answers as needed.)

(k) How often does the line y = 1 intersect the graph?

_____ time(s)

(l) How often does the line x = 2 intersect the graph?

The graph shows points: (−6,9), (−4,6), (−12,0), (−2,0), (12,6), (8,0), (0,−3), (−14,−6), (4,−6)

_____ time(s)

(m) For what value(s) of x does $f(x) = -6$?

x = _____

(Use a comma to separate answers as needed.)

(n) For what value(s) of x does $f(x) = 9$?

x = _____

(Use a comma to separate answers as needed.)

ID: 2.2.9

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17. Determine whether the graph is that of a function by using the vertical-line test. If it is, use the graph to find:

    (a) The domain and range
    (b) The intercepts, if any
    (c) Any symmetry with respect to the x-axis, the y-axis, or the origin

(5, −4)
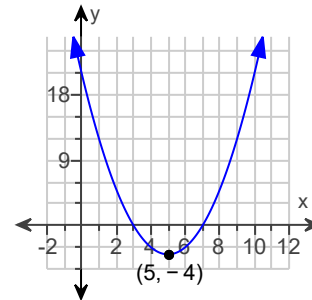
Is the graph that of a function?

○ Yes
○ No

(a) If the graph is that of a function, what are its domain and range? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The domain is _____ . The range is _____ .
     (Type your answers in interval notation.)
○ **B.** The graph is not a function.

(b) If the graph is that of a function, what are its intercepts? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The intercepts are _____
     (Type an ordered pair. Use a comma to separate answers as needed.)
○ **B.** There are no intercepts.
○ **C.** The graph is not a function.

(c) If the graph is that of a function, determine what kinds of symmetry it has. Select all that apply.

☐ **A.** It is symmetric with respect to the x-axis.
☐ **B.** It is symmetric with respect to the y-axis.
☐ **C.** It is symmetric with respect to the origin.
☐ **D.** The graph is not symmetric with respect to the x-axis, y-axis, or the origin.
☐ **E.** The graph is not a function.

ID: 2.2.21

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18. Determine algebraically whether the given function is even, odd, or neither.

$f(x) = -4x + |8x|$

○   Even
○   Odd
○   Neither

ID: 2.3.39

19. Find the average rate of change of $f(x) = 3x^2 + 1$:

(a) From -1 to 1
(b) From 2 to 4
(c) From 0 to 3

(a) From -1 to 1

_____

(b) From 2 to 4

_____

(c) From 0 to 3

_____

ID: 2.3.61

20.

The graph of a piecewise-defined function is given. Write a definition for the function that best describes this graph.
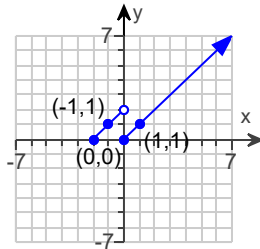
$f(x) = \begin{cases} \underline{\hspace{3cm}} & \text{if } -2 \le x < \underline{\hspace{3cm}} \\ \underline{\hspace{3cm}} & \text{if } x \ge \underline{\hspace{3cm}} \end{cases}$

ID: 2.4.43

21. Write the function whose graph is the graph of $y = x^3$, but is horizontally stretched by a factor of 6.

$y = \underline{\hspace{3cm}}$ (Use integers or fractions for any numbers in the expression.)

ID: 2.5.25

22. A linear function is given. Complete parts (a)-(d).

$g(x) = -3x + 6$

(a) Determine the slope and y-intercept of the function.

The slope is _____ .
(Type an integer or a simplified fraction.)

The y-intercept is _____ .
(Type an integer or a simplified fraction.)

(b) Use the slope and y-intercept to graph the linear function.

Use the graphing tool to graph the function. Use the slope and y-intercept when drawing the line.

(c) Determine the average rate of change of the function.

The average rate of change is _____ .

(d) Determine whether the linear function is increasing, decreasing, or constant. Choose the correct answer below.

○ **A.** increasing
○ **B.** decreasing
○ **C.** constant
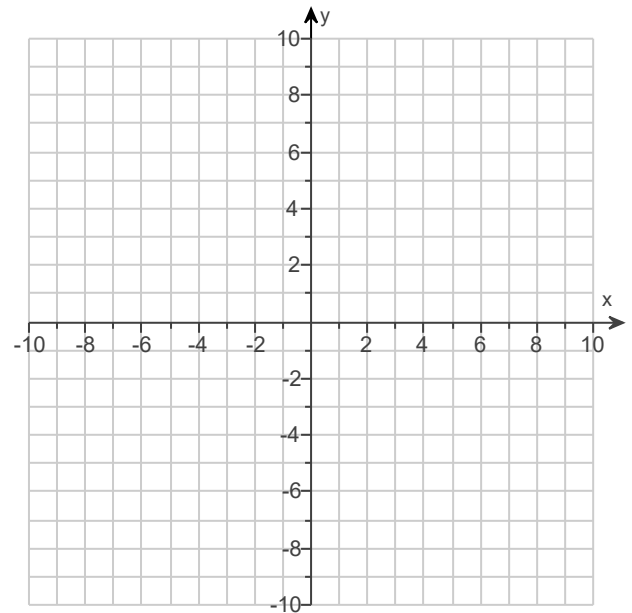
ID: 3.1.15

23. Determine whether the given function is linear or nonlinear. If it is linear, determine the equation of the line.

x	y
−2	7
−1	5
0	3
1	1
2	−1

Select the correct choice below and fill in any answer boxes within your choice.

○ **A.** The function is linear. The equation of the line is _____ .
      (Type your answer in slope-intercept form.)
○ **B.** The function is nonlinear.

ID: 3.1.21

24. For the data given below, answer parts **(a)** through **(d)**.

x	2	3	4	5	6	7	8
y	2	4	5	8	10	12	14

(a) Find the equation of the line containing the first and the last data points.

y = _____

(Type your answer in slope-intercept form. Use integers or fractions for any numbers in the expression.)

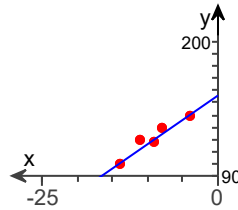**(b)** Draw a scatter diagram and the line found in part **(a)** on the same axes.

Choose the correct graph below.

   ○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**
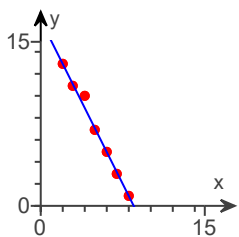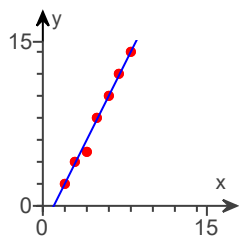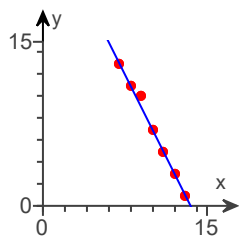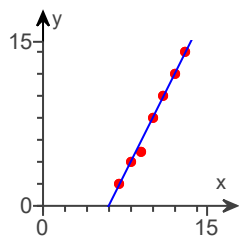
(c) Use a graphing utility to find the line of best fit.

Which of the following is the equation of the line of best fit?

○ **A.** $y = -2.1357x - 2.321$

○ **B.** $y = -2.0357x - 2.321$

○ **C.** $y = 2.1357x - 2.321$

○ **D.** $y = 2.0357x - 2.321$

(d) Use a graphing utility to draw the scatter diagram and graph the line of best fit on it.

Choose the correct graph below.
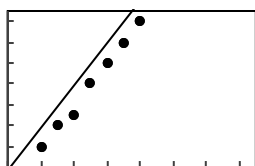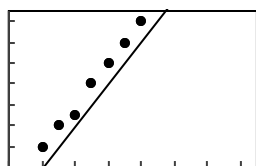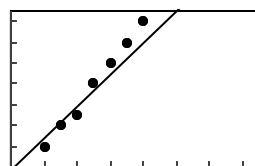
   ○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**
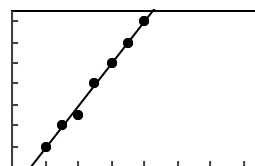
`[0,15,2] by [0,15,2]`

ID: 3.2.11

25. For the data given below, answer parts **(a)** through **(d)**.

x	− 19	− 16	− 14	− 13	− 9
y	100	120	118	130	140

(a) Find the equation of the line containing the first and the last data points.

y = _____

(Type your answer in slope-intercept form. Use integers or fractions for any numbers in the expression.)

(b) Draw a scatter diagram and the line found in part **(a)** on the same axes.

Choose the correct graph below.

   ○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**
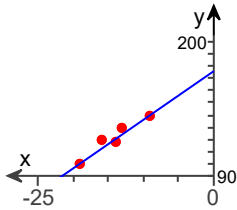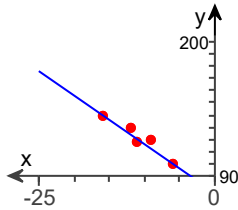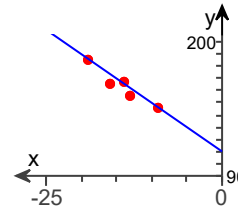
(c) Use a graphing utility to find the line of best fit.

Which of the following is the equation of the line of best fit?

   ○ **A.**   y = 3.8613x + 176.4307

   ○ **B.**   y = 3.9613x + 176.4307

   ○ **C.**   y = − 3.8613x + 176.4307

   ○ **D.**   y = − 3.9613x + 176.4307

(d) Use a graphing utility to draw the scatter diagram and graph the line of best fit on it.

Choose the correct graph below. All graphs are shown with a viewing window of $[− 25,0,5] \times [90,196,10]$.
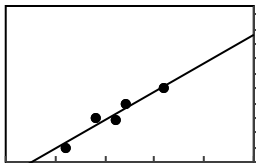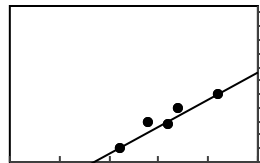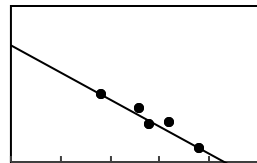
   ○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**
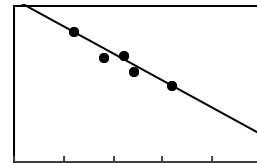
ID: 3.2.15

26. Determine the quadratic function f whose graph is given.

The vertex is (3, − 12) and the y-intercept is − 3.
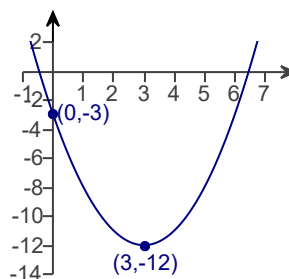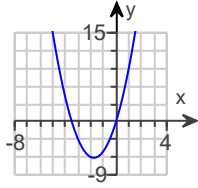
f(x) = _____ (Simplify your answer.)

ID: 3.3.47
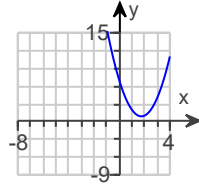
27. Given $f(x) = 2x^2 + 7x + 7$, answer the following.

   a) Graph the function.
   b) Determine the domain and range of the function.
   c) Determine where the function is increasing and where it is decreasing.

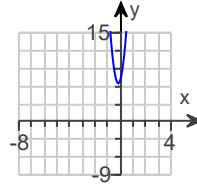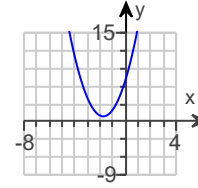   **a)** Choose the correct graph below.

   ○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**

   b) Determine the domain and range of the function.

   The domain is _____ .
   (Type your answer in interval notation. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

   The range is _____ .
   (Type your answer in interval notation. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

   c) Determine where the function is increasing and where it is decreasing. Select the correct choice below and, if necessary, fill in the answer box within your choice.

   ○ **A.** The function is increasing on the interval(s) _____ .
       (Type your answer in interval notation. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
   ○ **B.** The function is never increasing.

   Select the correct choice below and, if necessary, fill in the answer box within your choice.

   ○ **A.** The function is decreasing on the interval(s) _____ .
       (Type your answer in interval notation. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
   ○ **B.** The function is never decreasing.

   ID: 3.3.67

28.

   Farmer Ed has 5,000 meters of fencing, and wants to enclose a rectangular plot that borders on a river. If Farmer Ed does not fence the side along the river, what is the largest area that can be enclosed?

   x   x

   5,000 −2x
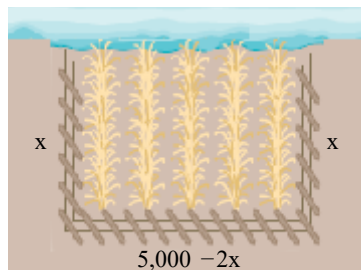
   The largest area that can be enclosed is _____ square meters.

   ID: 3.4.9

29. A suspension bridge with weight uniformly distributed along its length has twin towers that extend 80 meters above the road surface and are 400 meters apart. The cables are parabolic in shape and are suspended from the tops of the towers. The cables touch the road surface at the center of the bridge. Find the height of the cables at a point 100 meters from the center. (Assume that the road is level.)

The height of the cables is _____ meters.
(Simplify your answer.)

ID: 3.4.13

---

30. Solve the following inequality.

$$x^2 + 9x + 8 < 0$$

Select the correct choice below and, if necessary, fill in the answer box.

○ **A.** The solution set is _____.
(Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

○ **B.** There is no real solution.

ID: 3.5.7

---

31. Solve the inequality.

$$3x^2 + 1 < 2x$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The solution set is the set of all real numbers.

○ **B.** The solution set is _____.
(Type your answer in interval notation.)

○ **C.** The solution set is the empty set.

ID: 3.5.19

---

32. For $f(x) = rx + s$ and $g(x) = \dfrac{1}{r}(x - s)$, $r \neq 0$, find $(f \circ g)(x)$ and $(g \circ f)(x)$. Then determine whether $(f \circ g)(x) = (g \circ f)(x)$.

What is $(f \circ g)(x)$?

$(f \circ g)(x) = $ _____

What is $(g \circ f)(x)$?

$(g \circ f)(x) = $ _____

Does $(f \circ g)(x) = (g \circ f)(x)$?

○ Yes
○ No

ID: 5.1.51

---

33. The manufacturer of a computer is offering two discounts on last year's model computer. The first discount is a $200 rebate and the second discount is 20% off the regular price, p.

   (a) Write a function f that represents the sale price if only the rebate applies.

   (b) Write a function g that represents the sale price if only the 20% discount applies.

   (c) Find f o g and g o f. What does each of these functions represent? Which combination of discounts represents a better deal for the consumer?

(a) The sale price if only the rebate applies is f(p) = _____ .
(Simplify your answer.)

(b) The sale price if only the 20% discount applies is g(p) = _____ .
(Simplify your answer.)

(c) (f o g)(p) = _____   (Simplify your answer.)

(g o f)(p) = _____   (Simplify your answer.)

What does the function f o g represent?

   ○ A. The function f o g is the final price when the sale price is calculated after the rebate is given.
   ○ B. The function f o g is the original price of the computer.
   ○ C. The function f o g is the final price when the rebate is issued on the sale price.

What does the function g o f represent?

   ○ A. The function g o f is the original price of the computer.
   ○ B. The function g o f is the final price when the rebate is issued on the sale price.
   ○ C. The function g o f is the final price when the sale price is calculated after the rebate is given.

Which combination of discounts represents a better deal for the consumer?

   ○ A. g o f
   ○ B. They are the same.
   ○ C. The original price.
   ○ D. f o g

   ID: 5.1.75

34.
The function $f(x) = \dfrac{3}{7 + x}$ is one-to-one. Find its inverse and check your answer.

$f^{-1}(x) =$ _____   (Simplify your answer.)

   ID: 5.2.61

---

35. The inverse notation f^{-1} used in a pure mathematics problem is not always used when finding inverses of applied problems. Rather, the inverse of a function such as $C = C(q)$ will be $q = q(C)$. The following problem illustrates this idea.

Taking into account reaction time, the distance d (in feet) that a car requires to come to a complete stop while traveling r miles per hour is given by the following function.

$$d(r) = 6.98r - 90.36$$

(a) Express the speed r at which the car is traveling as a function of the distance d required to come to a complete stop. Verify your answer by checking that $r(d(r)) = r$, and $d(r(d)) = d$.

r(d) = _____
(Use integers or decimals for any numbers in the expression. Round to the nearest hundredth as needed.)

(b) Predict the speed that a car was traveling if the distance required to stop was 330 feet.

The car was traveling approximately _____ miles per hour.
(Round to the nearest whole number as needed.)

ID: 5.2.89

36. Convert the angle to a decimal in degrees.

1°5'3"

1°5'3" = _____ °
(Do not round until the final answer. Then round to two decimal places as needed.)

ID: 6.1.25

37. Convert the angle in degrees to radians.

180°

180° = _____ radian(s)
(Simplify your answer. Type an exact answer in terms of π. Use integers or fractions for any numbers in the expression.)

ID: 6.1.41

38. Find the central angle θ which forms a sector of area 15 square inches of a circle of radius 5 inches.

$\theta \approx$ _____ radians
(Type an integer or decimal rounded to three decimal places as needed.)

ID: 6.1.83

39. Find the exact value of the expression. Do not use a calculator.

sin $60°$ **cos** $60°$

Type the exact value of the expression.

sin $60°$ **cos** $60°$ = _____
(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

ID: 6.2.35

40. Find the exact values of the six trigonometric functions of the given angle. If any are not defined, say "not defined." Do not use a calculator.

$210°$

Select the correct choice below and fill in any answer boxes within your choice.
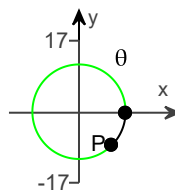
  ○ **A.** $\sin 210° = \underline{\hspace{2cm}}$
       (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

  ○ **B.** The function value is not defined.

Select the correct choice below and fill in any answer boxes within your choice.

  ○ **A.** $\cos 210° = \underline{\hspace{2cm}}$
       (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

  ○ **B.** The function value is not defined.

Select the correct choice below and fill in any answer boxes within your choice.

  ○ **A.** $\tan 210° = \underline{\hspace{2cm}}$
       (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

  ○ **B.** The function value is not defined.

Select the correct choice below and fill in any answer boxes within your choice.

  ○ **A.** $\cot 210° = \underline{\hspace{2cm}}$
       (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

  ○ **B.** The function value is not defined.

Select the correct choice below and fill in any answer boxes within your choice.

  ○ **A.** $\sec 210° = \underline{\hspace{2cm}}$
       (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

  ○ **B.** The function value is not defined.

Select the correct choice below and fill in any answer boxes within your choice.

  ○ **A.** $\csc 210° = \underline{\hspace{2cm}}$
       (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

  ○ **B.** The function value is not defined.

ID: 6.2.55

41. The point P = (8, − 8) on the circle $x^2 + y^2 = r^2$ is also on the terminal side of an angle θ in standard position. Find **sin** θ, **cos** θ, **tan** θ, **csc** θ, **sec** θ, and **cot** θ.

sin θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

cos θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

tan θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

csc θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

sec θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

cot θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

ID: 6.2.81

---

42. Name the quadrant in which the angle θ lies.

     cos $\theta > 0$,   **sec** $\theta < 0$

Choose the correct answer below.

- ◯ **A.** The angle θ lies in quadrant IV.
- ◯ **B.** The angle θ lies in quadrant I or III.
- ◯ **C.** The angle θ lies in quadrant II.
- ◯ **D.** The angle θ does not exist.

ID: 6.3.31

43. Find the exact value of each of the remaining trigonometric functions of θ.

sec $\theta = 5$,   **cot** $\theta < 0$

---

sin $\theta =$ _____

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

cos $\theta =$ _____

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

tan $\theta =$ _____

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

cot $\theta =$ _____

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

csc $\theta =$ _____

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

ID: 6.3.53

---

44. Match the given function to one of the graphs.

$y = -4 \sin(2x)$

Choose the correct graph below.
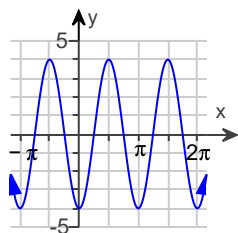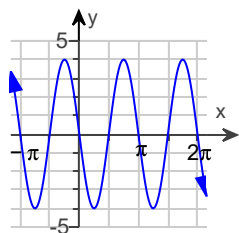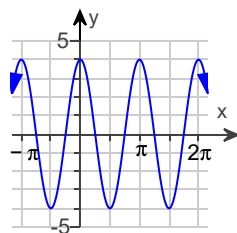
○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**
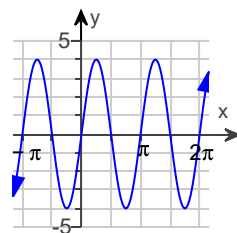
ID: 6.4.25

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45. The voltage V produced by an ac generator is $V = 120 \sin(180\pi t)$. Use this information to answer the questions below.

(a) What is the amplitude of the voltage V?

The amplitude of the voltage is _____.

What is the period of the voltage V?

T = _____ (Type an integer or a simplified fraction.)

(b) Which of the following shows a graph of the voltage V over two periods, beginning at t = 0?
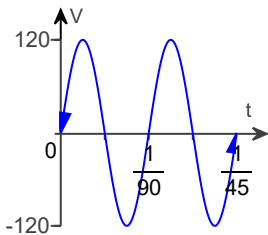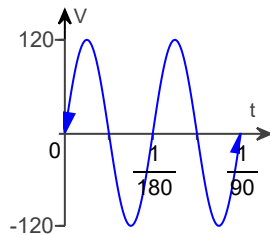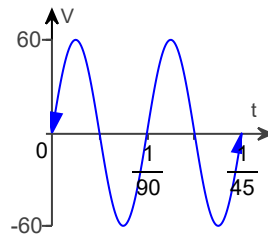
○ **A.** ○ **B.** ○ **C.** ○ **D.**
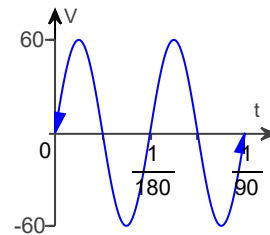
(c) If a resistance R = 60 ohms is present, what is the current I? [Hint: Use Ohm's Law, V = IR.]

I = _____ $\sin(180\pi t)$
(Round to the nearest tenth as needed.)

(d) What is the amplitude of the current I?

The amplitude of the current is _____.
(Round to the nearest tenth as needed.)

What is the period of the current I?

T = _____ (Type an integer or a simplified fraction.)

(e) Which of the following shows a graph of the current I over two periods, beginning at t = 0?
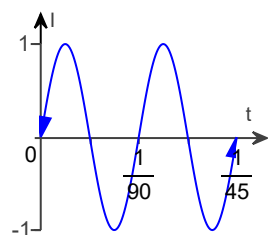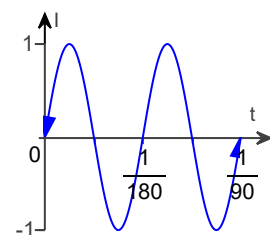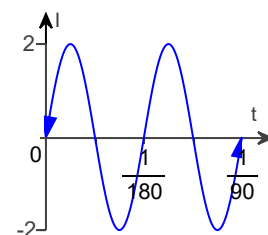
○ **A.** ○ **B.** ○ **C.** ○ **D.**
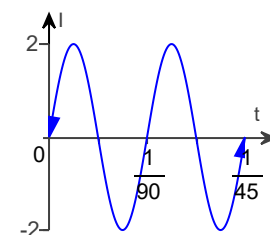
ID: 6.4.89

46. For what numbers x, $-\pi \le x \le 3\pi$, does the graph of $y = 7\,\textbf{sec}\,x$ have vertical asymptotes?

Choose the correct values of x below.

○ **A.** $-\pi,\ 0,\ \pi,\ 2\pi,\ 3\pi$

○ **B.** $-\dfrac{\pi}{2},\ \dfrac{\pi}{2},\ \dfrac{3\pi}{2},\ \dfrac{5\pi}{2}$

○ **C.** $-\dfrac{\pi}{2},\ \dfrac{3\pi}{2},\ \dfrac{5\pi}{2}$

○ **D.** $-\dfrac{\pi}{2},\ 0,\ \dfrac{\pi}{2},\ \dfrac{3\pi}{2},\ \dfrac{5\pi}{2}$

ID: 6.5.13

47. Graph the following function. Show at least two cycles. Use the graph to determine the domain and range of the function.

$y = -8\,\textbf{cot}\,x$

Choose the correct graph below.

○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**
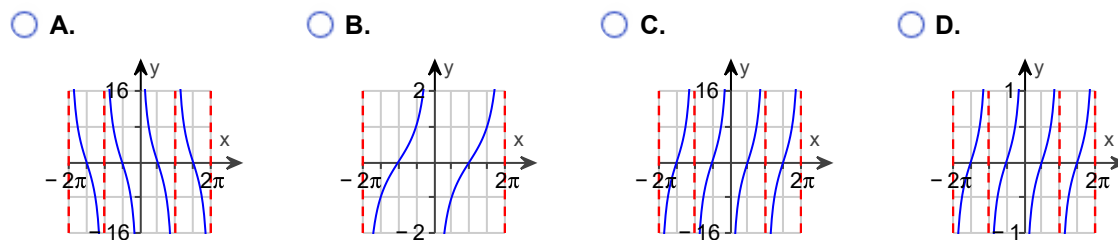
Use the graph to determine the domain of $y = -8\,\textbf{cot}\,x$.

○ **A.** All real numbers

○ **B.** $\{x\,|\,x \ne \dfrac{k\pi}{4},\ k \text{ is an odd integer}\}$

○ **C.** $\{x\,|\,x \ne \dfrac{k\pi}{2},\ k \text{ is an odd integer}\}$

○ **D.** $\{x\,|\,x \ne k\pi,\ k \text{ is an integer}\}$

Use the graph to determine the range of $y = -8\,\textbf{cot}\,x$.

○ **A.** All real numbers

○ **B.** $\{y\,|\,y \le -8\}$

○ **C.** $\{y\,|\,y \ge 8\}$

○ **D.** $\{y\,|\,y \ge -8 \text{ and } y \le 8\}$

ID: 6.5.19

48. Find the amplitude, period, and phase shift of the function. Graph the function. Be sure to label key points. Show at least two periods.

$$y = -5\sin\left(3x + \frac{\pi}{2}\right)$$

What is the amplitude?

_____

(Simplify your answer. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)
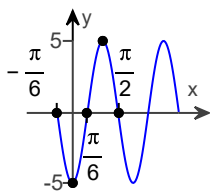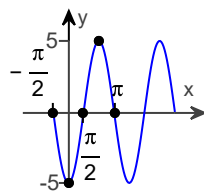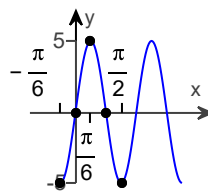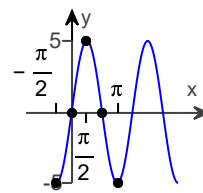
What is the period?

_____

(Simplify your answer. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)

What is the phase shift?

_____

(Simplify your answer. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)

Choose the correct graph below.

○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**

ID: 6.6.7

49. Graph the function.

$$y = -\cot\left(6x + \frac{\pi}{2}\right)$$

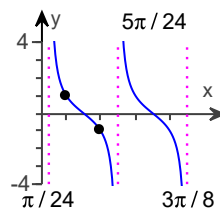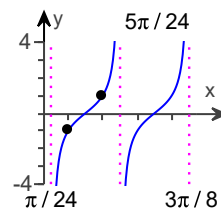Choose the correct graph of $y = -\cot\left(6x + \frac{\pi}{2}\right)$.
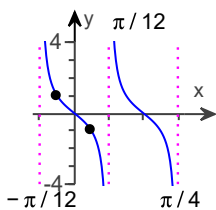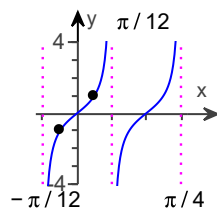
○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**

ID: 6.6.23

1. A. y = <u>-17.60</u>	(Round to two decimal places as needed. Use a comma to separate answers as needed.)

   A. x = <u>12.57</u>	(Round to two decimal places as needed. Use a comma to separate answers as needed.)

---

2. $2\sqrt{101}$

   $\sqrt{202}$

   $\sqrt{202}$

   (1) isosceles right triangle

---

3. A. The intercept(s) is/are <u>$(4,0),(-4,0),(0,-32)$</u> .

   (Type an ordered pair. Use a comma to separate answers as needed. Type each answer only once.)

   A. The graph is symmetric with respect to the y-axis.

---

4. A. The intercept(s) is/are <u>$(0,0)$</u> .(Type an ordered pair. Use a comma to separate answers as needed.)

   No

   No

   Yes

---

5. A. The solution set is $\{-4.96,\ -1.18,\ 0.14,\ 1.00\}$.

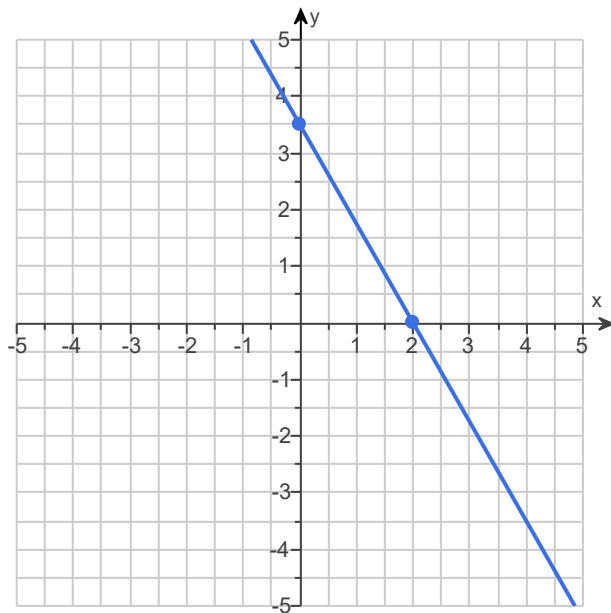   (Round to two decimal places as needed. Use a comma to separate answers as needed.)

---

6. A. The solution set is $\{$ <u>7</u> $\}$. (Simplify your answer.)

---

7. x = -8

---

8. x + 4y = -28

9. A. The x-intercept is _____**2**_____.(Type an integer or a simplified fraction.)

   A. The y-intercept is _____$\dfrac{7}{2}$_____.(Type an integer or a simplified fraction.)
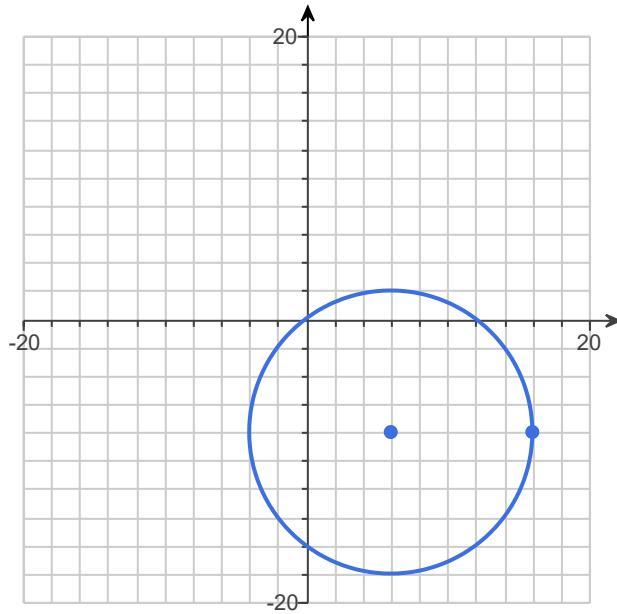

---

10. $\left(\dfrac{7}{2}, 4\right)$

$\dfrac{3}{2}$

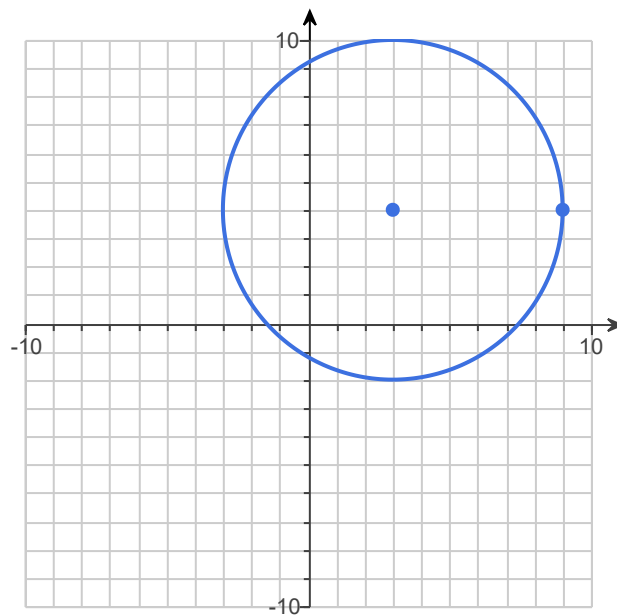$\left(x - \dfrac{7}{2}\right)^2 + (y - 4)^2 = \dfrac{9}{4}$

---

11. $(x-6)^2 + (y+8)^2 = 100$

$x^2 + y^2 - 12x + 16y = 0$

___

12. $(3,4)$

6

A. The intercept(s) is/are $\underline{(3-2\sqrt{5},0),(3+2\sqrt{5},0),(0,4-3\sqrt{3}),(0,4+3\sqrt{3})}$.

(Type an ordered pair. Use a comma to separate answers as needed. Type exact answers for each coordinate, using radicals as needed.)

___

13. $(x+6)^2 + (y-4)^2 = 9$

___

14. $3x^2 + x - 9$

   B. The domain is {x| x is any real number}.

   $-3x^2 + x - 9$

   B. The domain is {x| x is any real number}.

   $3x^3 - 27x^2$

   B. The domain is {x| x is any real number}.

   $\dfrac{x - 9}{3x^2}$

   A. The domain is $\left\{x\middle|\quad \mathbf{x \neq 0}\quad\right\}$.
   (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

   5

   -53

   -162

   $-\dfrac{2}{9}$

---

15. $2x + h - 2$

---

16. -6

   -6

   6

   -3

   Negative

   Positive

   $-12, -2,8$

   $-12 < x < -2, 8 < x \le 12$

   $-14 \le x \le 12$

   $-6 \le y \le 9$

   $-12, -2,8$

   -3

   3

   1

   $-14, 4$

   -6

17. Yes

    A. The domain is ____ $(-\infty,\infty)$ ____ . The range is ____ $[-4,\infty)$ ____ .(Type your answers in interval notation.)

    A. The intercepts are __(7,0),(3,0),(0,21)__ (Type an ordered pair. Use a comma to separate answers as needed.)

    D. The graph is not symmetric with respect to the x-axis, y-axis, or the origin.
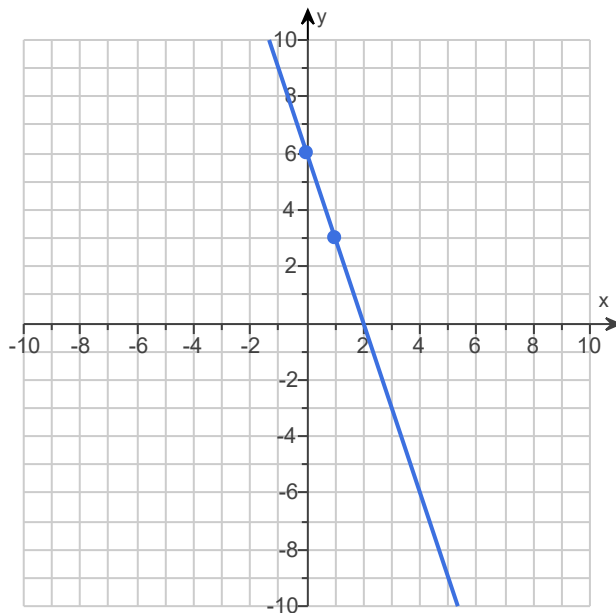
18. Neither

19. 0

    18

    9

20. x + 2

    0

    x
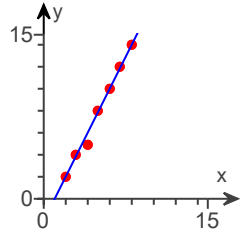
    0

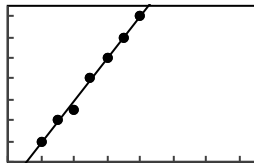21. $\left(\dfrac{1}{6}x\right)^3$

22. -3

    6

    -3

    B. decreasing

23. A. The function is linear. The equation of the line is **y = − 2x + 3** .(Type your answer in slope-intercept form.)
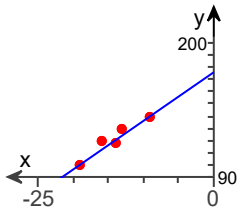
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24. $2x - 2$

B.

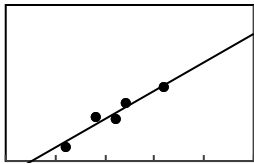D. $y = 2.0357x - 2.321$

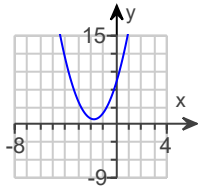D.

---

25. $4x + 176$

A.

A. $y = 3.8613x + 176.4307$

A.

---

26. $x^2 - 6x - 3$

---

27. D.

$(-\infty,\infty)$

$\left[\dfrac{7}{8},\infty\right)$

A. The function is increasing on the interval(s) $\left(-\dfrac{7}{4},\infty\right)$.

(Type your answer in interval notation. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

A. The function is decreasing on the interval(s) $\left(-\infty,-\dfrac{7}{4}\right)$.

(Type your answer in interval notation. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

28. 3,125,000

29. 20

30. A. The solution set is $(-8,-1)$.

(Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

31. C. The solution set is the empty set.

32. x

x

Yes

33. $p-200$

$0.8p$

$0.8p-200$

$0.8p-160$

C. The function f ∘ g is the final price when the rebate is issued on the sale price.

C. The function g ∘ f is the final price when the sale price is calculated after the rebate is given.

D. f ∘ g

34. $\dfrac{3 - 7x}{x}$

35. $\dfrac{d + 90.36}{6.98}$

    60

36. 1.08

37. π

38. 1.200

39. $\dfrac{\sqrt{3}}{4}$

40. A. $\mathbf{sin}\,210^\circ = \underline{\quad -\dfrac{1}{2} \quad}$

    (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

    A. $\mathbf{cos}\,210^\circ = \underline{\quad -\dfrac{\sqrt{3}}{2} \quad}$

    (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

    A. $\mathbf{tan}\,210^\circ = \underline{\quad \dfrac{\sqrt{3}}{3} \quad}$

    (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

    A. $\mathbf{cot}\,210^\circ = \underline{\quad \sqrt{3} \quad}$

    (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

    A. $\mathbf{sec}\,210^\circ = \underline{\quad -\dfrac{2\sqrt{3}}{3} \quad}$

    (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

    A. $\mathbf{csc}\,210^\circ = \underline{\quad -2 \quad}$

    (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

41. $-\dfrac{\sqrt{2}}{2}$

   $\dfrac{\sqrt{2}}{2}$

   -1

   $-\sqrt{2}$

   $\sqrt{2}$

   -1

---

42. D. The angle θ does not exist.

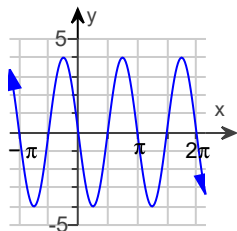43. $-\dfrac{2\sqrt{6}}{5}$

   $\dfrac{1}{5}$

   $-2\sqrt{6}$

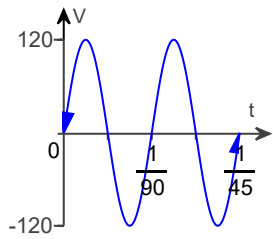 $-\dfrac{\sqrt{6}}{12}$

   $-\dfrac{5\sqrt{6}}{12}$
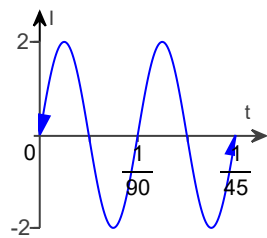

44.

   B.

---

45. 120

$\dfrac{1}{90}$

A.

2.0

2.0

$\dfrac{1}{90}$

D.

46.

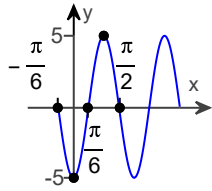B. $-\dfrac{\pi}{2}, \dfrac{\pi}{2}, \dfrac{3\pi}{2}, \dfrac{5\pi}{2}$
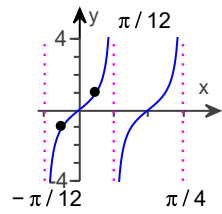

47.

C.
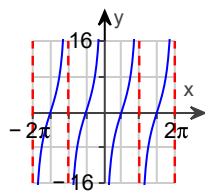
D. {x|x ≠ kπ, k is an integer}

A. All real numbers

---

48. 5

$$\frac{2\pi}{3}$$

$$-\frac{\pi}{6}$$

A.

49.

B.