- You are also responsible for understanding all homework, quizzes, collabs and lectures.
- The following problems will NOT be graded. Do NOT turn in these problems.

1.

Find the distance $d(P_1, P_2)$ between the points P_1 and P_2.

$P_1 = (5, -3)$
$P_2 = (2,6)$

2.

Find the midpoint of the line segment joining the points P_1 and P_2.

$P_1 = (3, -4)$; $P_2 = (9, 8)$

3. Plot each point and form the right triangle ABC. Verify that the triangle is a right triangle, using the converse of the Pythagorean Theorem. Find its area

$A = (6, -2)$; $B = (0, -4)$; $C = (5,1)$

4.

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.

$f(x) = x^2 - 8x + 7$

5.

Find the average rate of change of $f(x) = x^3 - 6x + 2$:

(a) From -7 to -4
(b) From -3 to 1
(c) From 1 to 5

6.

Find the intercepts and graph the equation by plotting points.

$5x^2 + 4y = 20$

7.

(a) Find the intercepts of the graph of the equation.
(b) Test the equation for symmetry with respect to the x-axis, the y-axis, and the origin.
(c) Graph the equation by plotting points.

$x - y^2 = -9$

8.

Find an equation for the line with the given properties. Express your answer using either the general form or the slope-intercept form of the equation of a line.

   Containing the points $(-3,6)$ and $(-1,7)$

9.

A cereal company finds that the number of people who will buy one of its products in the first month that it is introduced is linearly related to the amount of money it spends on advertising. If it spends $60,000 on advertising, then 100,000 boxes of cereal will be sold, and if it spends $80,000 on advertising, then 200,000 boxes of cereal will be sold.

(a) Write an equation that relates the amount A spent on advertising to the number x of boxes the company aims to sell.

(b) How much advertising is needed to sell 600,000 boxes of cereal?

(c) Interpret the slope.

10.

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

11.

Find the domain of the function.

$$P(t) = \frac{\sqrt{t-5}}{4t-28}$$

12. Given $f(x) = 3x + 1$ and $g(x) = 5x - 6$

(a) Find $(f-g)(x)$

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

(c) Find the domain of $\left(\dfrac{f}{g}\right)(x)$

13.

Answer the questions about the following function.

$$f(x) = \frac{x + 3}{x - 11}$$

(a) Is the point $\left(3, -\frac{4}{3}\right)$ on the graph of f?

(b) If x = 4, what is f(x)? What point is on the graph of f?

(c) If f(x) = 2, what is x? What point(s) is (are) on the graph of f?

(d) What is the domain of f?

(e) List the x-intercepts, if any, of the graph of f.

(f) List the y-intercept, if there is one, of the graph of f.

(g) What are the zeros of f?

14.

Using the given graph of the function f, find the following.

(a) the intercepts, if any

(b) its domain and range

(c) the intervals on which it is increasing, decreasing, or constant

(d) whether it is even, odd, or neither
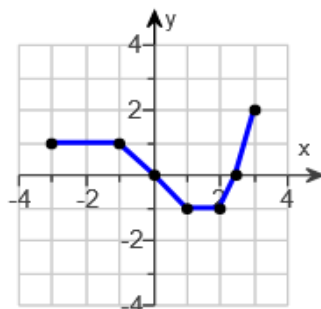
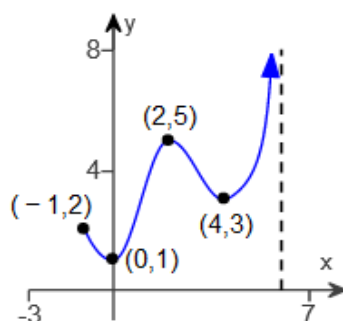

15.

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

$$h(x) = \frac{6x^3}{4x^2 + 2}$$

16.

For the graph of a function y = f(x) shown to the right, find the absolute maximum and the absolute minimum, if they exist. Identify any local maxima or local minima.

17.

$$f(x) = \begin{cases} -x + 2 & x < 0 \\ \sqrt{x} + 3 & x \geq 0 \end{cases}$$

(a) Find the domain of the function.
(b) Locate any intercepts.
(c) Graph the function.
(d) Based on the graph, find the range.

18.

Cost of Natural Gas In March 2017, Laclede Gas had the following rate schedule for natural gas usage in single-family residences.

|	
Monthly service charge	$19.50
Delivery charge	
First 30 therms	$0.91686/therm
Over 30 therms	$0
Natural gas cost	
First 30 therms	$0.277/therm
Over 30 therms	$0.5209/therm

The monthly charge for using x therms in a month is:

$$C = \begin{cases} 1.19386x + 19.50 & \text{if } 0 \leq x \leq 30 \\ 0.5209x + 39.6888 & \text{if } x > 30 \end{cases}$$

(a) What is the charge for using 20 therms in a month?
(b) What is the charge for using 150 therms in a month?

19.

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, − 1)
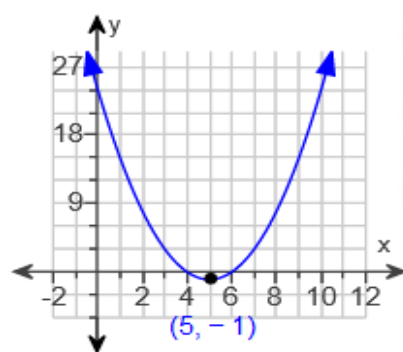
20.

Find the standard form of the equation of the circle with center (− 6,5) and tangent to the line y = 3.

21.

Find an equation for the line with the given properties. Express your answer using either the general form or the slope-intercept form of the equation of a line.

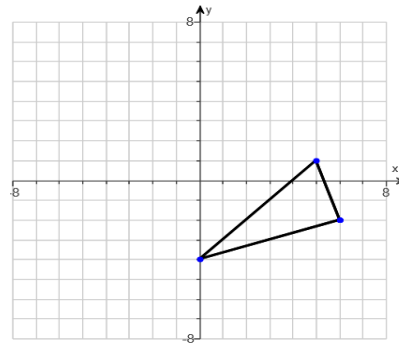Perpendicular to the line $y = -\dfrac{1}{3}x - 2$; containing the point $(-2, -6)$

1. $3\sqrt{10}$

2. $(6, 2)$

3.

Area = 10
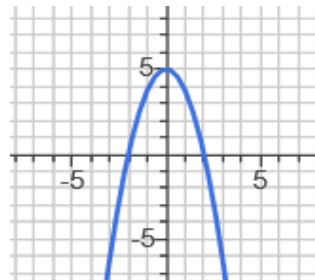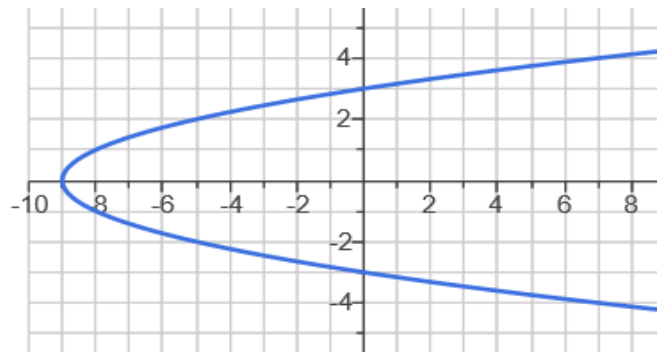

4. $2x + h - 8$

5. 87, 1, 25

6.

$(2,0),(-2,0),(0,5)$

7.

$(0,-3),(0,3),(-9,0)$

The graph is symmetric with respect to the x-axis.

8.

$$y = \frac{1}{2}x + \frac{15}{2}$$
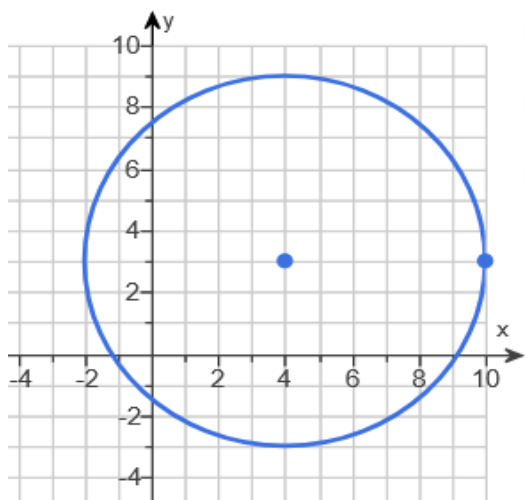
9. (a) $A = \frac{1}{5}x + 40000$ (b) $160,000

(c) $0.20 must be spent on advertising to sell one additional box of cereal.

10.

(a) The center is $(4,3)$.

The radius is r = 6.

(b)

(c)

$$\left(4 - 3\sqrt{3}, 0\right), \left(4 + 3\sqrt{3}, 0\right), \left(0, 3 - 2\sqrt{5}\right), \left(0, 3 + 2\sqrt{5}\right)$$

11.

$[5,7) \cup (7, \infty)$

12. (a) $-2x + 7$ (b) 90 (c) $\left\{ x \mid x \neq \frac{6}{5} \right\}$

13. (a) No (b) -1, $(4, -1)$ (c) 25, $(25, 2)$ (d) $(-\infty, 11) \cup (11, \infty)$ (e) $(-3, 0)$ (f) $\left(0, \frac{-3}{11}\right)$ (g) -3

14. (a) $(0, 0)$, $\left(\frac{5}{2}, 0\right)$ (b) $[-3, 3]$, $[-1, 2]$

(c)

The graph is increasing on $[2,3]$.

The graph is decreasing on $[-1,1]$.

The graph is constant on $[-3,-1],[1,2]$

(d) The function is neither odd nor even.

15. Odd

16. No absolute max. Absolute min is $f(0)=1$. Local max is $f(2)=5$. Local min are $f(0)=1$ and $f(4)=3$

17.

a) $(-\infty,\infty)$

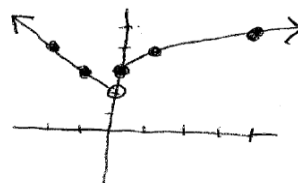b) $(0, 3)$

c)

x	$-x+2$
0	2
-1	3
-2	4

x	$\sqrt{x}+3$
0	3
1	4
4	5

d) $(2,\infty)$

18 a) \$43.38   b) \$117.82.

19. It is a function

(a) The domain is $(-\infty,\infty)$. The range is $[-1,\infty)$.

(b) The intercepts are $(6,0),(4,0),(0,24)$

(c) The graph is not symmetric with respect to the x-axis, y-axis, or the origin.

20.

$(x+6)^2 + (y-5)^2 = 4$

21. $y = 3x$