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- 1) Consider the points (1,3) and (7,11)
  - a) Find the distance between the points.
  - b) Find the midpoint of the line segment connecting these two points.
  - c) If the points above are the endpoints of the diameter of a circle, write the equation of this circle.
  - d) Write the equation of the line, in general form, through the two points given above.
  - e) Graph the line and this circle.

- 2) Find the center and radius of the circle given by
 
$$2x^2 + 2y^2 - 12x - 20y = -60$$

- 3) Consider the equation of the following lines
 
$$L_1: 2x + 4y = 3$$

$$L_2: x = 5$$
  - a) Write the equation of the line perpendicular to  $L_1$ , in slope intercept form, that passes through the point (-7,4).
  - b) Write the equation of the line parallel to  $L_1$ , in general form, that passes through the point (-7,4).
  - c) Write the equation of the line perpendicular to  $L_2$ , that passes through the point (-7,4)
  - d) Write the equation of the line parallel to  $L_2$ , that passes through the point (-7,4)

- 4) Given  $f(x) = 3x^2 - 10x - 8$  and  $g(x) = \frac{\sqrt{x}}{2}$ , find  $\frac{f(x)}{g(x)}$  and its domain.

- 5) Given  $f(x) = \frac{9}{54-16x^2}$  and  $g(x) = -\frac{3}{2\sqrt{2x}}$ , find the composite function  $(f \circ g)(x)$  and its domain.

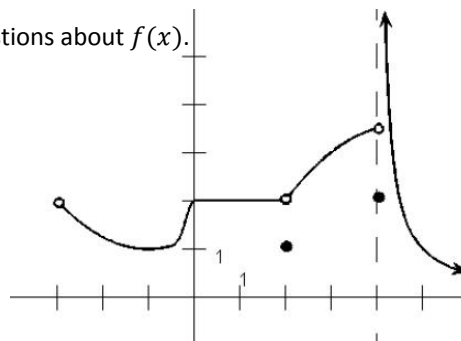
- 6) Consider the function,

$$f(x) = \begin{cases} |x| & \text{if } -2 \leq x < 0 \\ 1 & \text{if } x = 0 \\ x^3 & \text{if } x > 0 \end{cases}$$

- a) Find the domain of the function.
  - b) Evaluate  $f(-1)$  and  $f(1)$ .
  - c) Graph the function.
- 7) How is the graph of  $g(x) = a(x - h)^2 + k$  related to the graph of  $f(x) = x^2$  if the all the values of  $a, h,$  and  $k$  are all positive?

- 8) Refer to the graph drawn below and answer the following questions about  $f(x)$ .

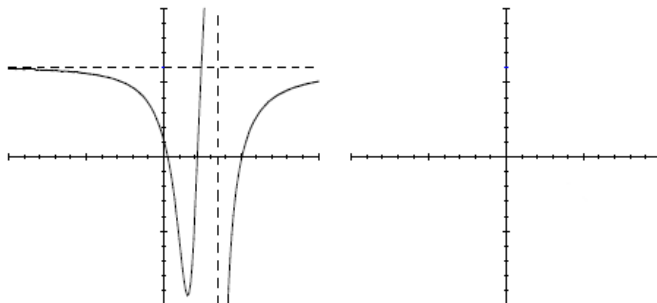
- a) What is the domain of  $f(x)$ ?
- b) What is the range of  $f(x)$ ?
- c) What is  $f(0)$ ? What is  $f(4)$ ?
- d) For what values of  $x$  does  $f(x) = -1$ ?
- e) On which intervals is  $f(x)$  decreasing?
- f) On which intervals is  $f(x)$  increasing?
- g) On which intervals is  $f(x)$  constant





- 9) Let  $f(x) = x^3$ . Let  $g(x)$  be the function whose graph is the graph of  $f$  moved 2 units to the right, compressed vertically by a factor of 2, shifted 3 units down, and finally reflected across the  $x$ -axis.
- What is the  $y$ -intercept of  $g$ ?
  - What is the average rate of change of  $g$  from 0 to 2?
  - What is the average rate of change of  $g$  from  $-2$  to  $x$ ? Simplify your answer.

- 10) Given the graph of  $f(x)$ . Draw the graph of  $f(x)$  after it has been shifted left by 2 units, then reflected about the  $y$ -axis, and finally shifted up 3 units.



- 11) Suppose you know that  $f$  is a function and that
- $$f(3) = -4$$

- What point is on the graph of  $f$ ?
- If  $f$  is even, what other point is on the graph?
- If  $f$  is odd, what other point is on the graph?
- If  $f$  is one-to-one, what point is on the graph of  $f^{-1}$ ?
- If  $g(x) = -1 + \sqrt{x^2 - 9}$ , what is  $(g \circ f)(3)$ ?
- If  $g(x) = -1 + \sqrt{x^2 - 9}$ , what is  $(f \circ g)(5)$ ?

- 12) Let  $f(x)$  be an odd function with  $(2,4)$  on its graph and let  $g(x)$  be an even function with  $(-2,5)$  on its graph.

- Find  $(f + g)(2)$
- Find  $\left(\frac{f}{g}\right)(-2)$
- If  $f(x)$  is one-to-one function. For what values of  $x$  does  $f(-x) = f(x)$ ?

- 13) Consider the one-to-one function...

$$f(x) = \frac{2x - 3}{8 - 3x}$$

- Find an expression for  $f^{-1}(x)$
  - What is the range of  $f(x)$ ?
  - What is the range of  $f^{-1}(x)$ ?
- 14) The function  $f(x) = -2(x - 3)^2 - 1$  is not one-to-one but can be made so by restricting its domain to a particular interval. If you are told the point  $(-9,1)$  is on the graph of the inverse function find  $f^{-1}(x)$  as well as the interval  $f$  was restricted to, to make it one-to-one.
- 15) The function  $f(x) = -2\sqrt{3 - x} + 2$  is one-to-one, graph  $f^{-1}(x)$  without finding the expression for  $f^{-1}(x)$ .