September 7, 2020 Week #2 In-Class Worksheet Name:

Instructions: Complete the exercises below. Be sure to show all of your work and write in complete sentences where appropriate.

1. What is the distance from the point $(-2, -4)$ to the point $(1, 3)$?

2. Find the slopes of the following lines:

   (a) $y = 2x + 1$

   (b) $y = 1 - 2x$

   (c) $3x + 4y = 1$

   (d) The line through $(1, -2)$ and $(4, 3)$.

3. Find equations for the following lines:

   (a) The line with slope 4 and y-intercept $(0, 10)$.

   (b) The line through the points $(3, 5)$ and $(-3, -10)$.

   (c) The horizontal line through $(2, 12)$.

   (d) The line parallel to $y = 2x + 1$ and passing through the point $(\frac{1}{4}, -2)$.

   (e) The line perpendicular to $y = \frac{1}{3}x + 1$ and through the point $(-2, -5)$.

4. Let $f(x) = x^2 - 2x$, Find $f(0), f(5)$ and $f\left(\frac{1}{2}\right)$.

5. Let $g(x) = 4x + 1$

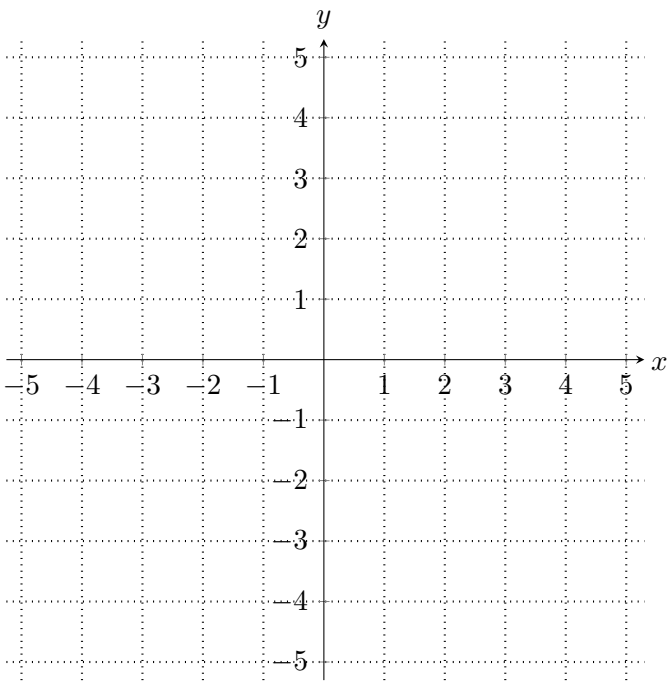
   (a) Find $g(3)$.

   (b) Find and simplify $g(3 + h)$.

   (c) Find and simplify the expression

$$\frac{g(3+h) - g(3)}{h}.$$

6. Graph the equation $y = x^2 + 1$ on the axes below. Label at least two points on the graph.



7. Find the domains of the following functions. Write your answer in interval notation.

(a) $f(x) = \frac{1}{(x+1)(x-2)}$

(b) $g(x) = \sqrt{x + 10}$

8. A gas company will pay a property owner \$5000 for the right to drill on his land for natural gas an \$0.10 for each thousand cubic feet of gas extracted from the land. Express the amount of money the landowner will reseive as a function of the amount of gas extracted from the land. (Hint: first define a variable.)

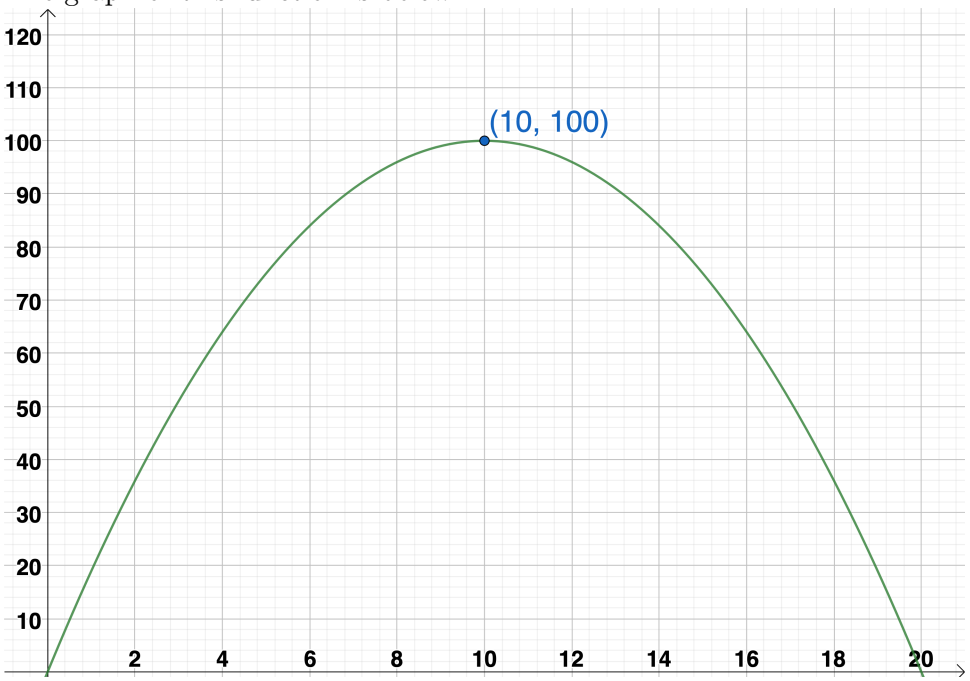
9. Suppose that the cost (in millions of dollars) to remove x percent of a certain pollutant is given by the cost-benefit function

$$f(x) = \frac{20x}{102 - x} \quad \text{for } 0 \leq x \leq 100.$$

   (a) Find the cost to remove 85% of the pollutant. *Write your answer in a complete sentence with units.*

   (b) Find the cost to remove the final 5% of the pollutant. *Write your answer in a complete sentence with units.*

10. A ball is thrown in the air. It's height in feet is a function of the time after it was thrown in seconds. The graph of this function is below.



(a) What is the practical interpretation of the point (10, 100)?

(b) At what time does the ball hit the ground?