NAME: _____

1. Suppose $f(x) = 9\left(x + \dfrac{5}{7}\right)^2 + \dfrac{4}{5}$.

   (a) (0.5 pt) Give the coordinates of the vertex of the graph of this function.

   (b) (0.5 pt) Determine if the vertex of this graph is a maximum point or a minimum point. Explain how you know.

2. Suppose $f(x) = 4 - 9x - 3x^2$

   (a) (1 pt) Give the coordinates of the vertex of the graph of this function.

   (b) (0.5 pt) Determine if the vertex of this graph is a maximum point or a minimum point. Explain how you know.

3. A sidewalk espresso stand finds that the weekly profit for their business is a function of the price they charge per cup. If x is the price (in dollars) of one cup, the weekly profit P (in dollars) is given by
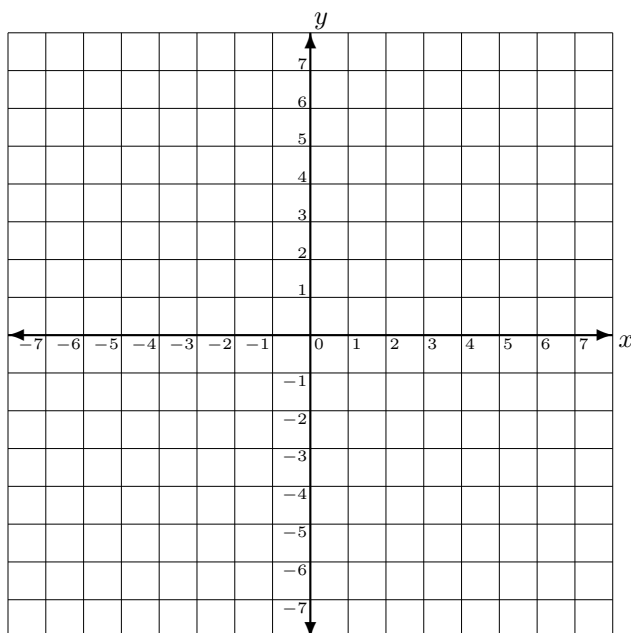
$$P(x) = -2900x^2 + 7250x - 2900$$

(a) (1 pt) What price x per cup produces the maximum profit?

(b) (0.5 pt) What is the maximum weekly profit?

4. (1.5 pts) Graph the following function:

$$f(x) = \begin{cases} 3x + 4 & \text{if } x \leq -2 \\ 1 & \text{if } -2 < x \leq 3 \\ -2x + 10 & \text{if } x > 3 \end{cases}$$

5. (1 pt) Solve: $6\,|7x + 3| - 48 = 0$

6. (1.5 pts) Suppose the graph of $y = \sqrt[3]{x}$ is shifted right 6 units, reflected about the $x-$axis, vertically compressed by a factor of $\dfrac{2}{5}$, and shifted down 9 units. What is the equation that gives the new graph?

7. (1 pt) How is the graph of $y = 3\sqrt{x+7} + 6$ transformed from the graph of $y = \sqrt{x}$. Be specific!
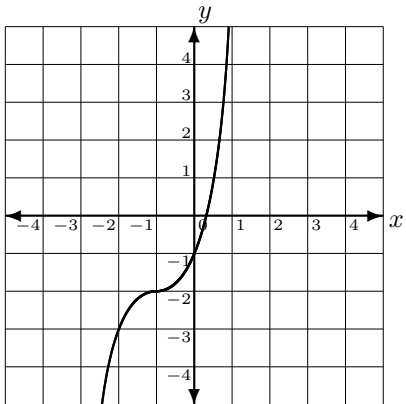
8. (0.5 pt each) Find the following if $f(x) = \begin{cases} 8 - 4x - 2x^2 & \text{if } x \leq -2 \\ 6x + 1 & \text{if } -2 < x \leq 4 \\ 5x - x^2 & \text{if } x > 4 \end{cases}$
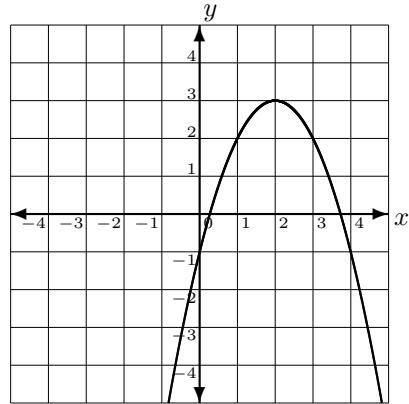
(a) $f(2) =$

(b) $f(-3) =$

9. (1 pt each) Determine the equation of the given graph of a function. (Note there are no vertical stretches or compressions.)

(a)

(c)

(b)