MT-150 Unit 3 Assignment.

Name _____

Directions: Complete the assignment in black ink. Do not write on the margins. Show your work. Fax all the pages of your completed assignment for grading in a single fax.
Fax number (toll free): (866) 840-9130

1. [4 points] Which of the following represents a function?

a. {(1,0), (2,3), (16,-3), (2,2), (1.5,0)} **Answer** _____

b. { (2,6),(3,6),(4,7),(5,8) } **Answer** _____

c. $x = y^2 - 4$ **Answer** _____

d. $x^2 + y = 7$ **Answer** _____

2. Let $f(x) = x^2 - 3x + 4$.

(a) [2 points] Find $f(3)$.

**Answer** _____

(b) [2 points] Find $f(x+2)$ and simplify the result.

**Answer** _____

3. Find the domain of each the following functions:

(a) [2 points] $f(x) = \dfrac{x-4}{x+5}$

**Answer** _____

(b) [2 points] $g(x) = \sqrt{5x-1}$

**Answer** _____

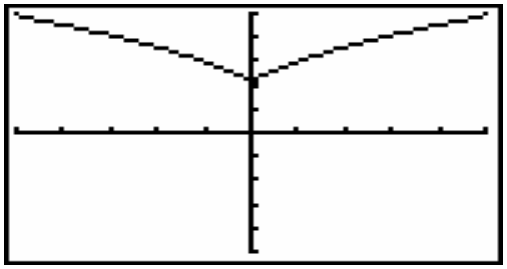
4. [2 points each] If $f(x) = \begin{cases} x+7, x<-1 \\ x^2+1, x \geq -1 \end{cases}$, what is

a. $f(-5)$ **Answer** _____

b. $f(-1)$ **Answer** _____

c. $f(6)$ **Answer** _____

5. The graph of $f(x) = x^{2/3} + 2$ is shown below:



Answer the following questions pertaining to the function $f(x)$.

(a) [2 points] Find the range of the function $f(x)$.

**Answer** _____

(b) [3 points] Describe the increasing and decreasing behavior of $f(x)$.

**Answer** _____

6. [3 points] Determine whether the following function is even, odd, or neither.
$f(x) = 2x^4 - 4x^2 + 5$ Show your **work.**

**Answer** _____

**7.** [3 points] Write the function for the following transformation: "The graph of $f(x) = \sqrt{x}$ is shifted four units to the left and reflected about the *x*-axis".

**Answer** _____

8. Let *f*(*x*) and *g*(*x*) be defined as follows: $f(x) = 2x^2 - x$, $g(x) = 4x - 9$

a. [2 points] Find $(f \circ g)(x)$.

**Answer** _____

b**.** [2 points] Find the domain of $(f \circ g)(x)$.

**Answer** _____

9. [4 points] The cost of producing $x$ units in a manufacturing process is given by the function

$$C(x) = 3.25x + 60.$$

The revenue obtained from selling $x$ units is given by

$$R(x) = 4.78x - 0.0053x^2$$

Assuming that the number of units produced is equal to the number of units sold, determine the profit, $P$, as a function of the number of units sold and simplify the result. (**Hint**: $\text{Pr}\,ofit = \text{Re}\,venue - Cost$)

**Answer** _____

10. [3 points] Find the inverse of the function: $f(x) = 7 - 3x$

**Answer** _____

11. [4 points] The graph of $y = f(x)$ is shown below. On the grid provided, sketch the graph of $y = -f\left(\frac{1}{2}(x+2)\right)$.