MT-150 Unit 4 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] $f(x) = -3x^2 + 12x - 8$, find the vertex and x-intercepts of the quadratic equation.

Vertex _____

x-intercepts _____

2. [6 points] Graph the functions $f(x) = 2x^2 - 5x + 14$ and $g(x) = x^2 - 9x + 20$. Use the graphs to answer the following questions.

a) On what interval(s) is $f(x)$ increasing?

Answer _____

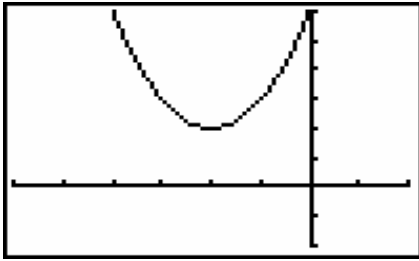b) What are zeros of $g(x)$.

Answer _____

c) Find x-values where the graphs of $f(x)$ and $g(x)$ intersect.

Answer _____

3. [2 points] Use the graph of $y = x^2$, to find a formula for the function $y = f(x)$ whose graph is given below:

Answer _____

4. [4 points] A company that produces computers terminals analyzes production and finds that they should make a profit $P(x)$ in dollars for selling x terminals per month, where $P(x) = -0.1x^2 + 160x - 20000$.

a) Find using calculator how many terminals should be sold per month for the maximum profit. (make your window x min 0, x max 1500, y min -21300, y max 50000)

Answer _____

b) The maximum profit

Answer _____

5. [4 points] Algebraically find all the real zeros of the polynomial function.
$f(x) = x^3 - 3x^2 + 4$. List the multiplicities of each zeros. Show your work.

Answer _____

6. [2 points] Determine the left and right behavior of the graph:
$$f(x) = -x^5 + 2x^2 - 1.$$

Answer _____

7. [2 points] Given $f(x) = x^4 - 3x^3 + x^2 - 6x - 5$, determine the possible number of negative real zeros.

Answer _____

8. [3 points] Use synthetic division to find $f(3)$: $f(x) = x^4 + 2x^2 - x - 1$. Show your work.

Answer _____

9. [3 points] Factor the polynomial $x^3 - 4x^2 - 7x + 10$ completely if -2 is a zero.

Answer _____

10. [2 points] Find a polynomial function with the given zeros: -2,-2,1,3.

Answer _____

11. [2 points] Reduce: $\dfrac{x^2 - 8x + 12}{5x - 30}$.

Answer _____

12. [2 points] Multiply, then simplify: $\dfrac{2 - x}{x^2 + 4} \cdot \dfrac{x + 2}{x^2 + 5x - 14}$.

Answer _____

13. [2 points] Divide, then simplify: $\dfrac{x + y}{x^3 - x^2} \div \dfrac{x^2 + y^2}{x^2 - x}$.

Answer _____

14. Solve for x: $\dfrac{2x-5}{x-3} = \dfrac{4x+1}{2x}$.

Answer _____

15. [4 points] Vincent's boat will go 13 miles per hour in still water. If he can go 13 miles downstream in the same amount of time as it takes to go 8 miles upstream, then what is the speed of the current?

Answer _____

16. [8 points] For the function $f(x) = \dfrac{x}{16x^2 - 9}$

a. Find the x-intercept(s).

Answer _____

b. Find the y-intercept(s).

Answer _____

c. Find the equation of the horizontal asymptote(s).

Answer _____

d. Find the equation of the vertical asymptote(s).

Answer _____