Test 1 **Name:** _____

Score: _____

- MUST SHOW WORK TO GET FULL CREDIT (NO WORK = NO CREDIT, PARTIAL WORK = PARTIAL CREDIT).
- SIMPLIFY ALL ANSWERS.

1. (6 points) Find the domain.

$$P(t) = \frac{\sqrt{t-3}}{4t-16}$$

2. (8 points)

Find the difference quotient of f; that is, find $\frac{f(x+h)-f(x)}{h}$, $h \neq 0$, for the following function. Be sure to simplify.

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

3. (6 points)

Determine algebraically whether the given function is even, odd, or neither.

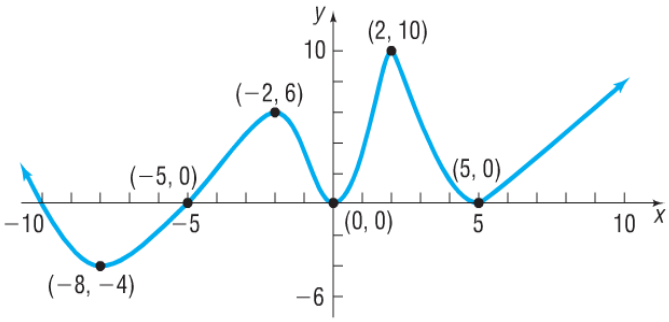
$$h(x) = \frac{2x^3}{6x^2 - 2}$$

Reminder: SHOW WORK

4. (6 points)

What is the average rate of change of $f(x) = x^3 - 4x + 6$ from -1 to 5?

5. (7 points)



a) Find the intervals on which the function is increasing, decreasing or constant.

b) Find any absolute minima, absolute maxima, local minima and local maxima. Give BOTH coordinates.

6. (8 points)

The function f is defined as follows.

$$f(x) = \begin{cases} x + 4 & \text{if } -3 \le x < 1 \\ 7 & \text{if } x = 1 \\ -x + 2 & \text{if } x > 1 \end{cases}$$

(a) Find the domain of the function.
Write the answer as an interval.

(b) Locate any intercepts.

(c) Graph the function.

(d) Based on the graph, find the range.
Write the answer as an interval.

7. (8 points)

(a) Find the intercepts of the graph of the equation.
(b) Test the equation for symmetry with respect to the x-axis, the y-axis, and the origin.
(c) Graph the equation by plotting points.

$x - y^2 = -16$

8. (8 points)

A cereal company finds that the number of people who will buy one of its products in the first month that it is introduced is linearly related to the amount of money it spends on advertising. If it spends $50,000 on advertising, then 100,000 boxes of cereal will be sold, and if it spends $80,000 on advertising, then 200,000 boxes of cereal will be sold.

(a) Write an equation that relates the amount A spent on advertising to the number x of boxes the company aims to sell.

(b) How much advertising is needed to sell 500,000 boxes of cereal?

(c) Interpret the slope.

9. (9 points)

For the equation $x^2 + y^2 - 8x - 6y - 11 = 0$, do the following.

(a) Find the center (h,k) and radius r of the circle.
(b) Graph the circle.
(c) Find the intercepts, if any.

10 . (7 points) Given $f(x) = 3x - 1$ and $g(x) = 5x + 6$

(a) Find $(f - g)(2)$

(b) Find $(f \cdot g)(x)$

(c) Find the domain of $\left(\frac{f}{g}\right)(x)$

11. (6 points)

Find the slope and y-intercept of the line. Graph the line.

$4x - 3y = 12$

12. (9 points)

Answer the questions about the following function.

$$f(x) = 3x^2 - x - 2$$

(a) Is the point $(-1,2)$ on the graph of f?
(b) If $x = 2$, what is $f(x)$? What point is on the graph of f?
(c) If $f(x) = -2$, what is x? What point(s) are on the graph of f?
(d) What is the domain of f?
(e) List the x-intercept(s), if any, of the graph of f.
(f) List the y-intercept, if there is one, of the graph of f.
(g) What are the zeros of f?

13. (6 points)

For the point P(25,10) and Q(32,15), find the distance d(P,Q) and the coordinates of the midpoint M of the segment PQ.

Leave answers in EXACT form.

14. (6 points)

A telephone company offers a monthly cellular phone plan for $34.99. It includes 300 anytime minutes plus $0.25 per minute for additional minutes. The following function is used to compute the monthly cost for a subscriber, where x is the number of anytime minutes used.

$$C(x) = \begin{cases} 34.99 & \text{if } 0 < x \leq 300 \\ 0.25x - 40.01 & \text{if } x > 300 \end{cases}$$

Round to the nearest cent

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