

Name _____

1. (8 pts) Determine whether the relation below represents a function. What is the domain and what is the range?

$$\{(-3,6), (7, 5), (4, 9), (-5, 6)\}$$

2. (5 pts) Determine whether the equation $x^2 - y = 9$ defines y as a function of x . If it does *not*, show/explain why not.

3. Let $f(x) = \frac{4}{x-4}$. Determine the following, if possible. If not possible, state why:

a. (2 pts) $f(2)$

b. (2 pts) $f(3)$

c. (2 pts) $f(4)$

4. (7 pts) Find the domain of $g(x) = \frac{x^2 + 5x + 17}{x^2 - x - 12}$.

5. (4 pts) Let $f(x) = 3x^2$. Find the average rate of change of f from $x = -1$ to $x = 1$.

6. Let $f(x) = 2x - 6$ and $g(x) = \sqrt{x - 3}$.

a. (5 pts) Determine the domain of f .

b. (5 pts) Determine the domain of g .

c. Find the following functions and state the domain of each.

i. (3 pts) $(f + g)(x)$

ii. (3 pts) $(f \cdot g)(x)$

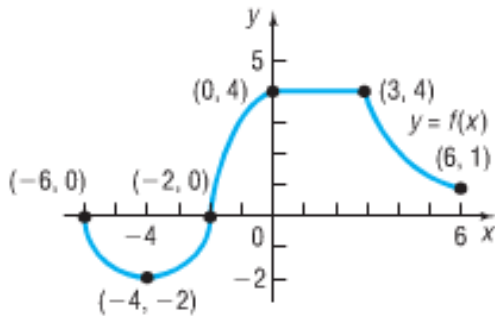
iii. (3 pts) $\left(\frac{f}{g}\right)(x)$

7. Determine algebraically whether each function is even, odd, or neither.

a. (2 pts) $h(x) = 4x^2 + 6x^6 - 2$

b. (2 pts) $g(x) = 3x^3 - 5$

8. Use the graph of the function f , below, to find:



a. (5 pts) The intercepts (Express answers in ordered pairs.)

b. (5 pts) The domain and range.

c. The local extreme points (Give actual points on the graph.)

i. (2 pts) Does f have any local maxima? Where?

ii. (2 pts) Does f have any local minima? Where?

d. The intervals on which f is increasing, decreasing, or constant.

i. (2 pts) f is increasing on

ii. (2 pts) f is decreasing on

iii. (2 pts) f is constant on

9. Graph each of the following functions using the techniques of shifting, compressing, stretching, and/or reflecting. Start with the graph of the basic function and show all stages.

a. (6 pts) $g(x) = -(x - 7)^2 - 11$

b. (7 pts) $g(x) = \sqrt{4-x} + 5$

10. (8 pts) Sketch the graph of $f(x) = \begin{cases} x+1 & \text{if } -5 \leq x < 1 \\ 1 & \text{if } x = 1 \\ x-1 & \text{if } 1 < x \leq 3 \end{cases}$. Include all intercepts.

State the domain and range.

