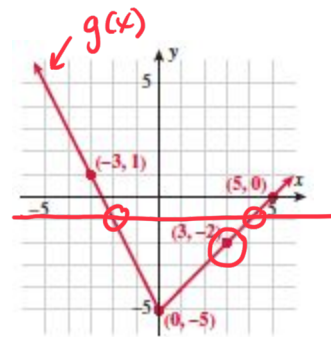Pre-Calculus Chapter 1 Practice Test

1.) (2.5 pts each, 5 pts total) Use the graph of $y = g(x)$ to answer the following:

$x = 3$ ↰

$g(x) = y$

a) $g(3) = -2$

$g(x) = -1$

$x = -2, 4$

a) g(3) = -2

(-3, 1)

(5, 0)

-5

(3, -2)

-5

(0, -5)

b) g(0)

2.) (5 pts each, 10 pts total) Evaluate the given quantities applying the following four functions:

$f(x) = 2x - 3$ $\qquad$ $F(x) = 4 - x^2$ $\qquad$ $g(x) = 5 + x$ $\qquad$ $G(x) = x^2 + 2x - 7$

a) $G(-3) - F(-1)$

$G(-3)$

$(-3)^2 + 2(-3) - 7$

$9 - 6 - 7 = \boxed{-4}$

$F(-1) = 4 - (-1)^2$

$4 - 1 = 3$

$-4 - 3 = \boxed{-7}$

b) $\dfrac{f(-6)}{g(4)}$

3.) (5 pts) Find the domain of the given function. Express the domain in interval notation.

a) $g(x) = \frac{\sqrt{4x-8}}{2x}$

domain → x values

$\square \neq 0$ → undefined

$\frac{2x}{2} \neq \frac{0}{2}$  $\{x \neq 0\}$

$\sqrt{\square}$

$4x - 8 \geq 0$
$+8 \quad +8$

$\boxed{\square} \geq 0$

$\frac{4x}{4} \geq \frac{8}{4}$  $\{x \geq 2\}$   cannot be → $i$ negative

$[2, \infty)$

4.) (5 pts each, 10 pts total) Determine whether the function is even, odd, or neither.

a) $f(x) = 2x^3 + x^2$

odd  even

neither

even

$f(-x) \to f(x)$
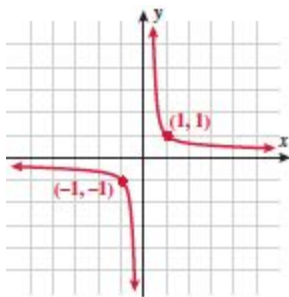
$f(x) = x^2$

$(-3)^2 \quad (3)^2$

$9 \; = \; 9$

odd  $f(-x) = -f(x)$

$f(x) = x^3$

$(-3)^3 \quad -(3)^3$

$-27 = -27$

b) $g(x) = |x| + x^2$

$y = x^4 + 3x^2$  even

$-2 \quad (-2)^4 + 3(-2)^2$

$16 + 12 \; \boxed{28}$  $f(-x) = f(x)$

$(2)^4 + 3(2)^2$
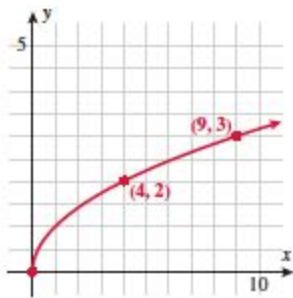
$16 + 12 \; \boxed{28}$

2

5.) (5 pts each, 10 pts total) For each of the following graphs: Name the graph, define the domain and range, and determine whether it is even, odd, or neither.

a)

(1, 1)
(-1, -1)

$f(x) = \frac{1}{x}$

Inverse or Reciprocal

odd

$D: (-\infty, 0) \cup (0, \infty)$

$X \neq 0$

$R: (-\infty, 0) \cup (0, \infty)$

$y \neq 0$

b)

(9, 3)
(4, 2)
10

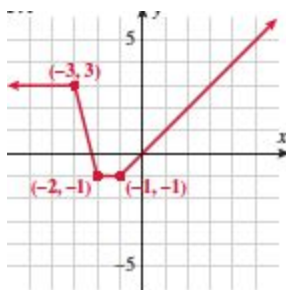6.) (5 pts) State the domain, range, and the x-intervals where the function is increasing, decreasing, or constant. Find where f(x) = 0.

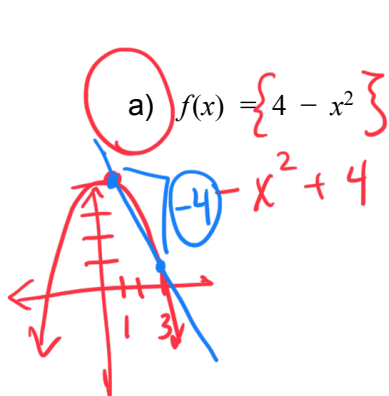$D: \mathbb{R} \; (-\infty, \infty)$

$R: [-1, \infty)$

$x^5$ increasing: $(-1, \infty)$

constant $(-\infty, -3)$ and $(-2, -1)$

decreasing $(-3, -2)$

(-3, 3)
(-2, -1)   (-1, -1)

$f(x) = 0$

$\left\{ \begin{array}{c} x = 0 \\ x \approx 2.2 \end{array} \right\}$

3

7.) (5 pts each, 10 pts total) Find the average rate of change for the function from:

$x_1 = 1$ to $x_2 = 3$.

a) $f(x) = \{4 - x^2\}$

$-x^2 + 4$

$\boxed{-4}$

b) $g(x) = \sqrt{x^2 - 1}$

$x^2$

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

$$\frac{[4 - (3)^2] - [4 - (1)^2]}{3 - 1}$$

$$\frac{[4 - 9] - [4 - 1]}{2}$$

$$\frac{-5 - 3}{2} = -\frac{8}{2} \quad \boxed{-4}$$

slope of the secant line

8.) (5 pts each, 10 pts total) Find the difference quotient for the following functions:

a) $f(x) = x^2 + 2x$

slope of tangent the line

b) $g(x) = 5x - x^2$

$$\frac{f(x+h) - f(x)}{h}$$

FOIL

$$\frac{(x+h)^2 + 2(x+h) \ominus [x^2 + 2x]}{h}$$

$$\frac{x^2 + 2hx + h^2 + 2x + 2h - x^2 - 2x}{h}$$

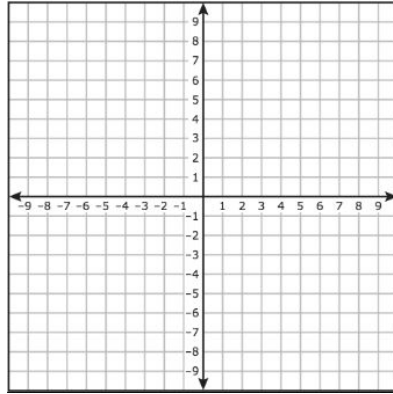$$\frac{2hx + h^2 + 2h}{h} \quad \boxed{2x + 2 + h}$$

4

9.) (5 pts each, 10 pts total) Draw the parent function. Next, describe, in words, the transformation. Draw the function and include the vertex, if applicable.
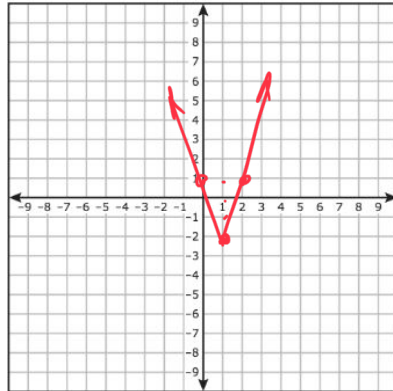
a) $f(x) = (x - 5)^2 + 6$



b) $f(x) = |3x - 3| - 2$

$$\left(|3|(x-1)\right| -2$$



5

10.)    (5 pts) Evaluate the functions for the specified values, if possible.

$$f(x) = 3x - 5 \qquad\qquad g(x) = x^2 + 2$$

a)  $(f - g)(4)$

$$(f - g)(x)$$
$$x = 4$$

$$f(4) - g(4)$$
$$[3(4) - 5] - [(4)^2 + 2]$$
$$[12 - 5] - [16 + 2]$$
$$7 - 18 = \boxed{-11}$$

11.)    (5 pts each, 10 pts total) Evaluate the functions for the specified values, if possible.

$$f(x) = 3x - 5 \qquad\qquad g(x) = x^2 + 2$$

a)  $f(g(x))$

b)  $(g \circ f)(1)$

$$g(f(1))$$

$$f(1) = 3(1) - 5$$
$$\boxed{-2}$$

$$(-2)^2 + 2$$
$$4 + 2 = \boxed{6}$$

12.)    (5 pts each, 10 pts total) Find the inverse of each of the following functions.

a) $f(x) = \frac{x-2}{3}$

$y = \frac{x-2}{3}$

$3(x) = \left(\frac{y-2}{3}\right)3$

$\boxed{y = 3x+2}$

$3x = y - 2$
$+2 \qquad +2$

b) $g(x) = x^2 + 6$