Pre-calc Review
Name: *Solutions*
Math 251, Calculus I, Fall 2018

Section 1.1

2. f and g are not equal because $f(1)$ is undefined and g(1) =1.

4. (a). The point $(-4, -2)$ is on the graph of f, so $f(-4) = -2$. The point $(3, 4)$ is on the graph of g, so $g(3) = 4$.

   (b). We are looking for the values of x for which the y values are equal. The y values for f and g are equal at the points $(-2, 1)$ and $(2, 2)$, so the desired values of x are -2 and 2.

   (c). $f(x) = -1$ is equivalent to $y = -1$. When $y = -1$, we have $x = -3$ and $x = 4$.

   (d). As x increases from 0 to 4, y decreases from 3 to -1. Thus, f is decreasing on the interval $[0, 4]$.

   (e). The domain of f consists of all x-values on the graph of f. For this function, the domain is $-4 \le x \le 4$. The range of f consists of all y-values on the graph of f. For this function, the range is $-2 \le y \le 3$.

   (f). The domain of $g$is $[-4, 3]$ and the range is $[0.5, 4]$.

31. $f(x) = \dfrac{x + 4}{x^2 - 9}$ is defined for all x except when $x = x^2 - 9 \Leftrightarrow 0 = (x+3)(x-2) \Leftrightarrow$ $x = -3, 3$, so the domain is all real numbers except $x = -3, 3$ or $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$.

33. All real numbers.

Section 1.2

1. (a) logarithmic,   (b) root function,   (c) rational,   (d) quadratic,   (e) exponetial,   (f) trigonometric

3. (a) g and h are even functions (symmetric with respect to the y-axis) and f is an odd function (symmetric with respect to the origin). So (b) $[y = x^5]$ must be f. Since g is flatter than h near the origin we must be (c) $[y = x^8]$ matched with g and (a) $[y = x^2]$ matched with h.

Section 1.3

3. (a). (graph 3) The graph of f is shifted 4 units to the right and has equation $y = f(x - 4)$.

   (b). (graph 1) The graph of f is shifted 3 units upward and has equation $y = f(x) + 3$.

   (c). (graph 4) The graph of f is shrunk vertically by a factor of 3 and has equation $f(x) = \frac{1}{3}f(x)$.

(d). (graph 5) The graph of f is shifted 4 units to the left and reflected about the x-axis. Its equation is $y = f(x + 4)$.

(e). (graph 2) The graph of f is shifted 6 units to the left and stretched vertically by a factor of 2. Its equation is $y = 2f(x + 6)$.

9. $y = -x^2$ is a reflection about the x-axis. Use desmos to visualize plots.

19. Strech $y = \sin(x)$ horizontally by a factor of 2.

53. (a). $g(2) = 5$ so $f(g(2)) = f(5) = 4$

(b). $g(f(0)) = g(0) = 3$.

(c). $f(g(0)) = f(3) = 0$

(d). $g(f(6)) = g(6)$. This value is not defined.

(e). $g(g(-2)) = 4$.

(f). $f(f(4)) = -2$.

Section 1.4

(1a). 4

(4a). x^{4n-3}.

Section 1.5

(21). $f^{-1}(x) = \frac{1}{3}(x - 1)^2 - \frac{2}{3}$

(51a). $x = \frac{1}{4}(7 - \ln 6$