More Domain Problems

- The denominator of a fraction cannot equal zero. Thus, any values that make a denominator zero are excluded from the domain.
- When finding the domain of a function, we are dealing with real numbers only. Thus, the radicand of a square root must be greater than or equal to zero.

Examples: Find the domain each of the following functions.

1. $f(x) = 3x^2 - 8x + 1$

2. $g(x) = \dfrac{x+5}{x^2+3x+2}$

3. $h(x) = \sqrt{1-x} - 9$

4. $f(x) = \dfrac{x+3}{\sqrt{2x-5}}$

5. $f(x) = \dfrac{1}{x^2-9} + \dfrac{3}{x^2+4}$

6. $f(x) = \dfrac{5}{\dfrac{4}{x}+2}$

7. $f(x) = \sqrt{x+1} - \sqrt{x-3}$

Basic Operations on Functions

1. $(f + g)(x) = f(x) + g(x)$

2. $(f - g)(x) = f(x) - g(x)$

3. $(fg)(x) = f(x) \cdot g(x)$

4. $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$

Example: Let $f(x) = 2x + 3$ and $g(x) = 2x^2 + x - 3$. Find $f + g$, fg, $\frac{f}{g}$, and their domains.

Page 310 #45: Let $f(x) = \frac{8x}{x - 2}$ and $g(x) = \frac{6}{x + 3}$. Find $f - g$, $\frac{f}{g}$, and their domains.

Composition of Functions

$(f \circ g)(x) = f(g(x))$

$(g \circ f)(x) = g(f(x))$

Example: Let $f(x) = 3x - 2$ and $g(x) = 2x^2 - 3x + 1$. Find $(f \circ g)(x)$, $(g \circ f)(x)$, $(f \circ g)(-1)$, and $(g \circ f)(2)$.

Page 310 #70: Let $f(x) = \frac{x}{x+5}$ and $g(x) = \frac{6}{x}$. Find $(f \circ g)(x)$ and its domain.