

Domain

ALL REAL NUMBERS
EXCEPT ONES THAT
CAUSE:

1. A ZERO IN DENOMINATOR
2. A NEGATIVE NUMBER IN A RADICAL WITH AN EVEN INDEX

$$\sqrt[4]{x-7}$$

$$3. g(x) = \frac{1}{x^2+9} + \frac{5}{x^2-9}$$

$$x^2+9=0 \quad x^2-9=0$$

$$x^2=-9 \quad x^2=9$$

$$x = \pm\sqrt{-9} \quad x = \pm\sqrt{9}$$

$$x = \pm 3i \quad x = \pm 3$$

$$(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$$

$$4. g(x) = \frac{1}{\frac{2}{x+1} - 3}$$

$$x+1=0 \quad \frac{2}{x+1} - 3 = 0$$

$$x \neq -1 \quad \cancel{x+1} \left(\frac{2}{\cancel{x+1}} \right) - 3(x+1) = 0 \quad (x+1)$$

$$2 - 3x - 3 = 0 \quad -\frac{1}{3} = \frac{3x}{3}$$

$$-3x - 1 = 0 \quad -\frac{1}{3} \neq x$$

$$-1 = 3x$$

$$(-\infty, -1) \cup (-1, -\frac{1}{3}) \cup (-\frac{1}{3}, \infty)$$

$$5. g(x) = \sqrt{5x-25}$$

$$5x-25 \geq 0$$

$$5x \geq 25$$

$$\frac{5x}{5} \geq \frac{25}{5}$$

$$x \geq 5$$

$$[5, \infty)$$

$$6. h(x) = \sqrt{x-5} + \sqrt{x+2}$$

$$x-5 \geq 0 \quad x+2 \geq 0$$

$$x \geq 5 \quad x \geq -2$$

$$5, 6, \dots \quad -2, -1, \dots$$

$$[5, \infty)$$

$$7. f(x) = 3x^2 - 11x + 6 \quad g(x) = x - 3$$

$$f+g = (3x^2 - 11x + 6) + (x - 3)$$

$$= 3x^2 - 10x + 3$$

$$f-g = (3x^2 - 11x + 6) - (x - 3)$$

$$= 3x^2 - 11x + 6 - x + 3$$

$$= 3x^2 - 12x + 9$$

$$fg = (3x^2 - 11x + 6)(x - 3)$$

$$= 3x^3 - 11x^2 + 6x - 9x^2 + 33x - 18$$

$$= 3x^3 - 20x^2 + 39x - 18$$

$$\frac{f}{g} = \frac{3x^2 - 11x + 6}{x - 3} \quad \cancel{x-3}$$

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

$$= 3x - 2$$