

8. Solve each equation by first identifying the LCD and then clearing the fractions.

$$\text{LCD} = (x+5)$$

a) $1 = \frac{24}{x^2} + \frac{10}{x}$ $\text{LCD} = x^2$
 $x \neq 0$

b) $\frac{x}{x+5} = x + \frac{3}{x+5}$ $x \neq -5$

$$x^2(1) = \frac{x^2}{1} \left(\frac{24}{x^2} + \frac{10}{x} \right)$$

$$\frac{(x+5)}{1} \left(\frac{x}{(x+5)} \right) = \frac{(x+5)}{1} \left(x + \frac{3}{(x+5)} \right)$$

$$x^2 = 24 + 10x \quad \text{add } -10x$$

$$x^2 - 10x = 24 \quad \text{then add}$$

$$x^2 - 10x - 24 = 0$$

-24 to each side.

$$(x-12)(x+2) = 0$$

$$x-12=0 \quad \text{or} \quad x+2=0$$

$$x=12, \quad x=-2$$

$$\boxed{x=12, -2}$$

$$x = x(x+5) + 3$$

$$x = x^2 + 5x + 3$$

$$-x = \quad \quad -x$$

$$0 = x^2 + 4x + 3$$

$$0 = (x+3)(x+1)$$

$$x+3=0 \quad \text{or} \quad x+1=0$$

$$\boxed{x=-3, -1}$$

c) $\frac{1}{x} = 1 - \frac{15}{x^2 - 3x}$ $\text{LCD} = x(x-3)$

$$\frac{1}{x} = 1 - \frac{15}{x(x-3)}$$

$$x(x-3) \left(\frac{1}{x} \right) = \frac{x(x-3)}{1} \left(1 - \frac{15}{x(x-3)} \right)$$

$$x-3 = x(x-3) - 15$$

$$x-3 = x^2 - 3x - 15$$

$$-x + 3 = \quad \quad -x + 3$$

$$0 = x^2 - 4x - 12$$

$$0 = (x-6)(x+2)$$

$$x-6=0 \quad \text{or} \quad x+2=0$$

$$\boxed{x=6, -2}$$