

## Alg 2: Homework 25

$$\textcircled{1} \left( \frac{9}{2} + \frac{3}{2x} \right) \frac{2x}{1}$$
$$\left( \frac{9x}{2} - \frac{1}{2x} \right) \frac{2x}{1}$$

$$= \frac{9x + 3}{9x^2 - 1}$$

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

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

$$\textcircled{3} \frac{\left( 1 + \frac{2}{y+1} \right) (y+1)(y-1)}{\left( 1 + \frac{4}{y-1} \right) (y+1)(y-1)}$$

$$= \frac{(y+1)(y-1) + 2(y-1)}{(y+1)(y-1) + 4(y+1)}$$

$$= \frac{y^2 - 1 + 2y - 2}{y^2 - 1 + 4y + 4}$$

$$= \frac{y^2 + 2y - 3}{y^2 + 4y + 3}$$

$$= \frac{(y-1)(y+3)}{(y+1)(y+3)}$$

$$= \boxed{\frac{y-1}{y+1}}$$

$$\textcircled{2} \frac{15x^2 - 14x - 8}{9x^2 - 16x}$$

$$= \frac{(3x-4)(5x+2)}{x(9x^2-16)}$$

$$= \frac{(3x-4)(5x+2)}{x(3x+4)(3x-4)}$$

$$= \boxed{\frac{5x+2}{x(3x+4)}}$$

$$(4) \quad \frac{2x+7}{6} - \frac{2x-9}{10} = 3 \quad [\text{LCD} = 30]$$

$$\frac{5}{30} \left( \frac{2x+7}{1} \right) - \frac{3}{30} \left( \frac{2x-9}{1} \right) = 30(3)$$

$$5(2x+7) - 3(2x-9) = 90$$

$$10x + 35 - 6x + 27 = 90$$

$$4x + 62 = 90$$

$$4x = 28$$

$$\boxed{x = 7}$$

$$(5) \quad \frac{1}{k-2} = \frac{6}{k^2 - 2k} \quad [\text{LCD} = k(k-2)]$$

$$\frac{k(k-2)}{1} \left( \frac{1}{k-2} \right) = k(k-2) \left( \frac{6}{k(k-2)} \right)$$

$$\boxed{k = 6}$$

$$(6) \quad \frac{x}{x-3} - \frac{4}{x} = \frac{3}{x-3}$$

$$\frac{x(x-3)}{1} \left( \frac{x}{x-3} \right) - \frac{x(x-3)}{1} \left( \frac{4}{x} \right) = \frac{x(x-3)}{1} \left( \frac{3}{x-3} \right)$$

$$x^2 - 4(x-3) = 3x \quad \text{Check } (x=4)$$

$$x^2 - 4x + 12 = 3x \quad \frac{4}{4-3} - \frac{4}{4} = \frac{3}{4-3}$$

$$x^2 - 7x + 12 = 0 \quad \frac{4}{4} - 1 = \frac{3}{1}$$

$$(x-4)(x-3) = 0$$

$$x-4=0 \quad \vee \quad x-3=0$$

$$\boxed{x=4}$$

$$\vee \quad x=3 \quad \text{rejected}$$

$$\text{undef.} \rightarrow \frac{3}{3-3} - \frac{4}{3} = \frac{3}{3-3} \quad \text{undefined}$$