

## Alg 2: Homework 19

$$\textcircled{1} \quad \frac{6x}{x-3} \div \frac{2x}{1}$$

$$= \frac{\cancel{6x}}{x-3} \cdot \frac{1}{\cancel{2x}} = \boxed{\frac{3}{x-3}}$$

$$\textcircled{2} \quad \frac{3}{x-3} + \frac{x}{3-x} \cdot \frac{(-1)}{(-1)}$$

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

$$\textcircled{3} \quad \frac{x^3 - 36x}{x^2 + 7x + 6} \cdot \frac{6x^2 - x^3}{x^2 + x}$$

$$= \frac{x(x^2 - 36)}{(x+6)(x+1)} \cdot \frac{x(x+1)}{x^2(6-x)}$$

$$= \frac{x(x+6)(x-6) \cdot x(x+1)}{(x+6)(x+1) \cdot x^2(6-x)} = \boxed{-1}$$

$$\textcircled{4} \quad \frac{(5x+3) \cdot 2}{x \cdot 2} \cdot \frac{x-1}{2x}$$

$$= \frac{10x+6}{2x} \cdot \frac{x-1}{2x}$$

$$= \frac{(10x+6) \cdot (x-1)}{2x \cdot 2x}$$

$$= \frac{10x+6-x+1}{2x} = \boxed{\frac{9x+7}{2x}}$$

$$\textcircled{5} \frac{x^2 - 12x + 27}{x^2 - 81} \cdot \frac{x+9}{3-x}$$

$$= \frac{\cancel{(x-9)} (x-3)^{(-1)} \cancel{(x+9)}}{\cancel{(x-9)} \cancel{(x+9)} (3-x)} = \boxed{-1}$$

$$\textcircled{6} \frac{x-6}{x^2-9} + \frac{5}{x-3}$$

$$= \frac{x-6}{(x+3)(x-3)} + \frac{5}{x-3} \cdot \frac{(x+3)}{(x+3)}$$

$$= \frac{x-6}{(x+3)(x-3)} + \frac{5x+15}{(x+3)(x-3)}$$

$$= \frac{6x+9}{(x+3)(x-3)} \quad \text{or} \quad \boxed{\frac{6x+9}{x^2-9}}$$

$$\textcircled{7} \frac{4}{x^2-8x-9} + \frac{5x}{x-9} - \frac{x}{x+1}$$

$$= \frac{4}{(x-9)(x+1)} + \frac{5x}{(x-9)(x+1)} \cdot \frac{(x+1)}{(x+1)} - \frac{x}{(x+1)} \cdot \frac{(x-9)}{(x-9)}$$

$$= \frac{4 + 5x^2 + 5x - x^2 + 9x}{(x-9)(x+1)}$$

$$= \boxed{\frac{4x^2 + 14x + 4}{(x-9)(x+1)}}$$