Section 3.3 and 3.4 – Checking Your understanding

Answer the following four questions, show as many steps as you need to, write clearly and neatly.

1. Perform the indicated operations, assume non zero denominators.

$$\frac{4}{x^2-4}+\frac{1}{2-x}-\frac{1}{x+2}$$

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

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

$$\frac{4-(x+2)-(x-2)}{(x+2)(x-2)} \rightarrow \frac{4-x-2-x+2}{(x+2)(x-2)}$$

$$\frac{4-2x}{(x+2)(x-2)} \rightarrow \frac{-2(x-2)}{(x-2)(x+2)} \rightarrow \boxed{\frac{-2}{(x+2)}}$$

2. Perform the indicated operations, assume non zero denominators.

$$\frac{2x+8}{x^2+5x+6}-\frac{x-1}{x^2+3x+2}-\frac{x+5}{x^2+4x+3}$$

$$\frac{2(x+4)}{(x+2)(x+3)}-\frac{x-1}{(x+2)(x+1)}-\frac{x+5}{(x+3)(x+1)} \qquad (x+1)(x+2)(x+3)$$

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

$$\boxed{\frac{1}{(x+2)(x+3)}}$$

$$\frac{2(x^2+4x+x+4)-(x^2-x+3x-3)-(x^2+5x+2x+10)}{(x+1)(x+2)(x+3)}$$

$$\frac{2x^2+10x+8-x^2-2x+3-x^2-7x-10}{(x+1)(x+2)(x+3)}$$

3. Simplify the combined operations.

$$\left(1-\frac{4}{x^2}\right)\div\left(\frac{2}{x^2}-\frac{1}{x}\right)$$

$\left(\frac{x^2-4}{x^2}\right)\div\left(\frac{2-x}{x^2}\right)$

$\frac{(x-2)(x+2)}{x^2}\cdot\frac{x^2}{-x+2}$

$\frac{(x-2)(x+2)}{-(x-2)}$

$\frac{(x+2)}{-1}$ $\boxed{-x-2}$

4. Simplify the Combined Operation

$$\frac{\frac{x}{x^2-4}-\frac{2x}{x^2+x-6}}{\frac{2x}{x^2+x-6}-\frac{x}{x^2-4}}$$

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

$\frac{\frac{x}{(x+4)(x-4)}-\frac{2x}{(x+3)(x-2)}}{-\left(\frac{x}{(x+4)(x-4)}-\frac{2x}{(x+3)(x-2)}\right)}$ $\frac{1}{-1}$ $\boxed{-1}$