

Add & Subtract Rational Expressions

Perform the indicated operations for each problem below.

$$\text{a) } \frac{5}{x-2} + \frac{3x}{4x-8}$$

$$\text{b) } \frac{7m}{m-3} + \frac{5m}{3-m}$$

$$\text{c) } \frac{b^2}{b^2-2bc+c^2} - \frac{b}{b-c}$$

$$\text{d) } \frac{x}{x^2-1} - \frac{2x}{x^2+x-2}$$

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Perform the indicated operations for each problem below.

$$\text{a) } \frac{5}{x-2} + \frac{3x}{4x-8}$$

$$\begin{aligned} & \frac{5}{x-2} + \frac{3x}{4x-8} \\ &= \frac{5}{20} + \frac{3x}{4(x-2)} \\ &= \frac{3x+20}{4(x-2)} \end{aligned}$$

$$\text{b) } \frac{7m}{m-3} + \frac{5m}{3-m}$$

$$\begin{aligned} & \frac{7m}{m-3} + \frac{5m}{3-m} \\ &= \frac{7m}{m-3} + \frac{-5m}{m-3} \\ &= \frac{7m-5m}{m-3} \\ &= \frac{2m}{m-3} \end{aligned}$$

$$\text{c) } \frac{b^2}{b^2-2bc+c^2} - \frac{b}{b-c}$$

$$\begin{aligned} & \frac{b^2}{b^2-2bc+c^2} - \frac{b}{b-c} \\ &= \frac{b^2}{(b-c)(b-c)} - \frac{b}{(b-c)(b-c)} \\ &= \frac{b^2-b}{(b-c)^2} \\ &= \frac{bc}{(b-c)^2} \end{aligned}$$

$$\text{d) } \frac{x}{x^2-1} - \frac{2x}{x^2+x-2}$$

$$\begin{aligned} & \frac{x}{x^2-1} - \frac{2x}{x^2+x-2} \\ &= \frac{x}{(x-1)(x+1)} - \frac{2x}{(x-1)(x+2)} \\ &= \frac{x(x+2)}{(x-1)(x+1)(x+2)} - \frac{2x(x+1)}{(x-1)(x+1)(x+2)} \\ &= \frac{x^2+2x-2x-2x}{(x-1)(x+1)(x+2)} \\ &= \frac{-x^2}{(x-1)(x+1)(x+2)} \end{aligned}$$

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