8. $\dfrac{x^2 - y^2}{x^2 + 2xy + y^2} \times \dfrac{xy + y^2}{x^2 - xy}$

Solution:

$$\frac{x^2 - y^2}{x^2 + 2xy + y^2} \times \frac{xy + y^2}{x^2 - xy} = \frac{(x + y)(x - y)}{(x + y)^2} \times \frac{y(x + y)}{x(x - y)}$$

$$= \frac{y}{x}$$

9. $\dfrac{x^4 - 8x}{2x^2 + 5x - 3} \times \dfrac{2x - 1}{x^2 + 2x + 4} \times \dfrac{x + 3}{x^2 - 2x}$

Solution: $2x^2 + 5x - 3 = (2x - 1)(x + 3)$

$$\frac{x^4 - 8x}{2x^2 + 5x - 3} \times \frac{2x - 1}{x^2 + 2x + 4} \times \frac{x + 3}{x^2 - 2x} = \frac{x(x - 2)(x^2 + 2x + 4)}{(2x - 1)(x + 3)} \times \frac{2x - 1}{x^2 + 2x + 4} \times \frac{x + 3}{x(x - 2)}$$

$$= \frac{x}{x} = \mathbf{1}$$

10. $\dfrac{6x^2 - x - 2}{8x^2 + 6x + 1} \times \dfrac{12x^2 + 7x - 12}{9x^2 + 6x - 8} \times \dfrac{12x^2 - 13x - 4}{12x^2 - 25x + 12}$

Solution:

$$6x^2 - x - 2 = 6x^2 - 4x + 3x - 2$$
$$= 2x(3x - 2) + 1(3x - 2) = (3x - 2)(2x + 1)$$

$$8x^2 + 6x + 1 = 8x^2 + 4x + 2x + 1$$
$$= 4x(2x + 1) + 1(2x + 1) = (2x + 1)(4x + 1)$$

$$12x^2 - 7x - 12 = 12x^2 + 16x - 9x - 12$$
$$= 4x(3x + 4) - 3(3x + 4) = (3x + 4)(4x - 3)$$

$$9x^2 + 6x - 8 = 9x^2 + 12x - 16x - 8$$
$$= 3x(3x + 4) - 2(3x + 4) = (3x + 4)(3x - 2)$$

$$12x^2 - 13x - 4 = 12x^2 - 16x + 3x - 4$$