

4.3

$$1) \frac{x^2 - 1}{x^2 + 6x + 9} \cdot \frac{x^2 - 9}{x + 1} = \frac{(x - 1)(x + 1)}{(x + 3)^2} \cdot \frac{(x - 3)(x + 3)}{x + 1} = \frac{(x - 1)(x - 3)}{x + 3}$$

$$2) \frac{x^2 + ax}{x - a} \cdot \frac{ax - x^2}{x^3} = \frac{x(x + a)}{x - a} \cdot \frac{x(a - x)}{x^3} \\ = \frac{x(x + a)}{x - a} \cdot \frac{-x(x - a)}{x^3} = -\frac{x + a}{x}$$

$$3) \frac{x^2 + 1}{x + 1} : \frac{x^4 - 1}{x^2 - 5x + 6} = \frac{x^2 + 1}{x + 1} \cdot \frac{x^2 - 5x + 6}{x^4 - 1} = \frac{x^2 + 1}{x + 1} \cdot \frac{(x - 2)(x - 3)}{(x^2 - 1)(x^2 + 1)} = \\ \frac{x^2 + 1}{x + 1} \cdot \frac{(x - 2)(x - 3)}{(x - 1)(x + 1)(x^2 + 1)} = \frac{(x - 2)(x - 3)}{(x - 1)(x + 1)^2}$$

$$4) \frac{(x + 4)(x - 3)}{x^2 - 3x} : \frac{x^2 - 6x + 9}{2x^2 - 8x + 6} = \frac{(x + 4)(x - 3)}{x^2 - 3x} \cdot \frac{2x^2 - 8x + 6}{x^2 - 6x + 9} \\ = \frac{(x + 4)(x - 3)}{x(x - 3)} \cdot \frac{2(x^2 - 4x + 3)}{(x - 3)^2} \\ = \frac{(x + 4)(x - 3)}{x(x - 3)} \cdot \frac{2(x - 1)(x - 3)}{(x - 3)^2} \\ = \frac{2(x + 4)(x - 1)}{x(x - 3)}$$

$$5) \frac{x^2 + xy}{x - y} \cdot \frac{xy - x^2}{x^3} = \frac{x(x + y)}{x - y} \cdot \frac{x(y - x)}{x^3} \\ = \frac{x(x + y)}{x - y} \cdot \frac{-x(x - y)}{x^3} = -\frac{x + y}{x}$$

$$6) \frac{x^2 - xy}{x^2 + xy} \cdot \frac{x^2 - y^2}{3xy^2} \cdot \frac{x^2 y^2}{x^2 - 2xy + y^2} = \frac{x(x - y)}{x(x + y)} \cdot \frac{(x - y)(x + y)}{3xy^2} \cdot \frac{x^2 y^2}{(x - y)^2} \\ = \frac{x}{3}$$