

4.4

$$1) \frac{x+4}{x^2+x-12} \cdot \frac{x^2-x-6}{2x+4} = \frac{x+4}{(x-3)(x+4)} \cdot \frac{(x-3)(x+2)}{2(x+2)} = \frac{1}{2}$$

$$2) \frac{2x^2+3x-2}{x^2-2x+1} \cdot \frac{x-1}{4x^2-16} = \frac{(2x-1)(x+2)}{(x-1)^2} \cdot \frac{x-1}{4 \underbrace{(x^2-4)}_{(x-2)(x+2)}} = \frac{2x-1}{4(x-1)(x-2)}$$

Expliquons encore la factorisation de $2x^2+3x-2$:

$$\Delta = 3^2 - 4 \cdot 2 \cdot (-2) = 25 = 5^2 \quad x_1 = \frac{-3+5}{2 \cdot 2} = \frac{1}{2} \quad x_2 = \frac{-3-5}{2 \cdot 2} = -2$$

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

$$3) \frac{x^3-3x^2+4x-12}{x-2} : \frac{x-3}{x^2-4} = \frac{x^3-3x^2+4x-12}{x-2} \cdot \frac{x^2-4}{x-3}$$

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

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

$$= (x^2+4)(x+2)$$

$$4) (1+x) : \frac{x^2}{x^2-6x-7} = (x+1) \cdot \frac{x^2-6x-7}{x^2} = (x+1) \cdot \frac{(x-7)(x+1)}{x^2}$$

$$= \frac{(x+1)^2(x-7)}{x^2}$$

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

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

$$= \frac{x(y-1)+(y-1)}{3x(x+1)} \cdot \frac{4x(x+2)}{x(y-1)+2(y-1)}$$

$$= \frac{(y-1)(x+1)}{3x(x+1)} \cdot \frac{4x(x+2)}{(y-1)(x+2)}$$

$$= \frac{4}{3}$$