

$$1. \quad 5 : \frac{x-y}{x+y} - \frac{4x+4y}{x-y} \quad \text{c.e.: } x+y \neq 0; x-y \neq 0$$

$$= 5 \cdot \frac{x+y}{x-y} - \frac{4x+4y}{x-y} = \frac{5x+5y}{x-y} - \frac{4x+4y}{x-y} = \frac{5x+5y-4x-4y}{x-y} = \frac{x+y}{x-y}$$

$$2. \quad \frac{a^2b - b^3}{a^2 - 2ab + b^2} : \frac{a^2 + 2ab + b^2}{a^3 - ab^2} \cdot \frac{1}{ab}$$

$$= \frac{b(a^2 - b^2)}{(a-b)^2} : \frac{(a+b)^2}{a(a^2 - b^2)} \cdot \frac{1}{ab} = \quad \text{c.e.: } a \neq 0; b \neq 0$$

$$a-b \neq 0; \quad a+b \neq 0$$

$$= \frac{b(a-b)(a+b)}{(a-b)^2} \cdot \frac{a(a-b)(a+b)}{(a+b)^2} \cdot \frac{1}{ab} = 1$$

$$3. \quad \left(1 + \frac{1}{b}\right) \left(b - \frac{4}{b}\right) \cdot \frac{b^2}{b^2 + 2 + 3b} \quad \text{c.e.: } b \neq 0$$

$$b+1 \neq 0; \quad b+2 \neq 0$$

$$= \frac{b+1}{b} \cdot \frac{b^2-4}{b} \cdot \frac{b^2}{(b+1)(b+2)} = \frac{b+1}{b} \cdot \frac{(b+2)(b-2)}{b} \cdot \frac{b^2}{(b+1)(b+2)} = b-2$$

$$4. \quad \frac{2}{9x+9} - \frac{x-1}{3-3x^2} - 1 \quad \text{c.e.: } x+1 \neq 0$$

$$x-1 \neq 0$$

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

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

$$= \frac{2+3-9(1+x)}{9(x+1)} = \frac{2+3-9-9x}{9(x+1)} = -\frac{9x+4}{9(x+1)}$$

$$5. \left[\left(\frac{1}{a^2} - \frac{1}{b^2} \right) : \left(\frac{1}{a} - \frac{1}{b} \right) \right] : \frac{a+b}{ab}$$

$$c.e.: a \neq 0; b \neq 0$$

$$b - a \neq 0; a + b \neq 0$$

$$= \frac{b^2 - a^2}{a^2 b^2} : \frac{b - a}{ab} : \frac{a + b}{ab} = \frac{(b - a)(b + a)}{a^2 b^2} \cdot \frac{ab}{b - a} \cdot \frac{ab}{a + b} = 1$$

$$6. \frac{8 - a}{a^3 + 2a^2 - a - 2} - \frac{2}{a^2 + a - 2} + \frac{4}{a^2 + 3a + 2}$$

$$= \frac{8 - a}{a^2(a + 2) - (a + 2)} - \frac{2}{(a + 2)(a - 1)} + \frac{4}{(a + 2)(a + 1)} =$$

$$= \frac{8 - a}{(a + 2)(a^2 - 1)} - \frac{2}{(a + 2)(a - 1)} + \frac{4}{(a + 2)(a + 1)} =$$

$$= \frac{8 - a}{(a + 2)(a - 1)(a + 1)} - \frac{2}{(a + 2)(a - 1)} + \frac{4}{(a + 2)(a + 1)} =$$

$$c.e.: a + 2 \neq 0$$

$$a - 1 \neq 0; a + 1 \neq 0$$

$$= \frac{8 - a - 2(a + 1) + 4(a - 1)}{(a + 2)(a - 1)(a + 1)} = \frac{8 - a - 2a - 2 + 4a - 4}{(a + 2)(a - 1)(a + 1)} =$$

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