

BM1, 1A, 6.11.2015

① a)  $-a^3 \cdot (-1)^3 = -a^3 \cdot (-1) = \underline{\underline{a^3}}$

b)  $-a^2 \cdot (-a^3) = -a \cdot a \cdot (-a) \cdot a \cdot a$   
oder

$-a \cdot a \cdot (-1) \cdot a \cdot a \cdot a = \underline{\underline{a^5}}$

② a)  $3a^3 + 3a^2 - 18a = 3a(a^2 + a - 6)$   
 $= \underline{\underline{3a(a-2)(a+3)}}$

b)  $-a^4b + 4a^3b^2 - 4a^2b^3 = -a^2b(a^2 - 4ab + 4b^2)$   
 $= \underline{\underline{-a^2b(a-2b)^2}}$

③  $\frac{8r-8s}{2s-2r} = \frac{8(r-s)}{2(s-r)} = -\frac{8(r-s)}{2(r-s)} = -\frac{8}{2} = \underline{\underline{-4}}$

④  $\frac{(x-y)^2}{(y-x)^3}$

1. Methode:

$(x-y)^2 = (y-x)^2$

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

$= -\frac{1}{\underline{\underline{x-y}}}$

2. Methode

$\frac{(x-y)^2}{(y-x)^3} = \frac{\cancel{(x-y)^2}}{(\cancel{y-x})^2(y-x)}$

$= \underline{\underline{\frac{1}{y-x}}}$

$$\textcircled{5} \quad \frac{4a^2 - 9b^2}{12a - 18b} = \frac{(2a+3b)(2a-3b)}{6(2a-3b)} = \frac{2a+3b}{6}$$

$$\textcircled{6} \quad \frac{\frac{x^2+x-2}{x^2+5x+6}}{\frac{x^2-2x+1}{x^2+2x-3}} = \frac{\frac{(x+2)(x-1)}{(x+2)(x+3)}}{\frac{(x-1)^2}{(x+3)(x-1)}} = \frac{\frac{x-1}{x+3}}{\frac{x-1}{x+3}}$$

$$= \frac{x-1}{x+3} \cdot \frac{x+3}{x-1} = \underline{\underline{1}}$$

$$\textcircled{7} \quad \begin{array}{l} a^2b^2 - 4 \longrightarrow (ab+2)(ab-2) \\ abc + abd + 2c + 2d \longrightarrow ab(c+d) + 2(c+d) = (ab+2)(c+d) \\ abc - abd - 2c + 2d \longrightarrow ab(c-d) - 2(c-d) = (ab-2)(c-d) \\ 4c^2 - 4d^2 \longrightarrow 4(c+d)(c-d) \end{array}$$

$$= \frac{(ab+2)(ab-2)}{(ab+2)(c+d)} \cdot \frac{4(c+d)(c-d)}{(ab-2)(c-d)} = \underline{\underline{4}}$$

$$\textcircled{8} \quad \frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \frac{yz}{xyz} + \frac{xz}{xyz} + \frac{xy}{xyz}$$

$$= \frac{xy + xz + yz}{xyz}$$

(9)  $\frac{1}{a^2} + \frac{1}{b^2} + \frac{2}{ab}$

kgV der Nenner =  $a^2b^2$

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

oder:  $\left(\frac{a+b}{ab}\right)^2$

(10)  $\frac{x}{x+1} - \frac{x+1}{x-1}$

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

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

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

11

$$\frac{a+3}{a^2-9} - \frac{1}{a-2} - \frac{4-a}{a^2-5a+6}$$

$$4-a = -(a-4)$$

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

$$\text{kgV: } (a-3)(a-2)(a+3)$$

$$= \frac{\cancel{(a+3)}(a+3)}{\cancel{(a+3)}(a-3)}$$

$$= \frac{(a+3)(a-2)}{(a+3)(a-3)(a-2)} - \frac{(a-3)(a+3)}{(a+3)(a-3)(a-2)} + \frac{(a-4)(a+3)}{(a+3)(a-3)(a-2)}$$

$$= \frac{a^2+a-6 - (a^2-9) + a^2-a-12}{(a)(a)(a)}$$

$$= \frac{a^2+a-6 - a^2+9 + a^2-a-12}{(a)(a)(a)}$$

$$= \frac{a^2-9}{(a+3)(a-3)(a-2)} = \frac{\cancel{(a+3)}(a-3)}{\cancel{(a+3)}(a-3)(a-2)}$$

$$= \frac{1}{a-2}$$