

Lösungen zu Termumformungen

①

Aufgabe 1:

$$1) 2x + 3y + 8x - 9y = 10x - 6y$$

$$2) a - 10b - 3a + 4b + 5a = 3a - 6b$$

$$3) 7c + 3a - 3c + x - 5a + 2x = 3x - 2a + 4c$$

$$4) m + 4k + 6m - 8k + l = 7m - 4k + l$$

$$5) 20t - t + 14x + 7y + 2x - 8y = 19t + 16x - y$$

$$6) x + a + 17x - 6 + 8a + 1 = 9a + 18x - 5$$

$$7) h - 2 + 3h - x + 9 + 5x + 2a = 2a + 4h + 4x + 7$$

$$8) 6z + 23 - 9z - 12w + 1 - w = 24 - 13w - 3z$$

$$9) 2x + z - 3u - 2x + 1 = z - 3u + 1$$

$$10) 8 + 8x - u + 3 - 2u - z + 14 + 1z = 8x - 3u + 25$$

Aufgabe 2:

$$1) 3a + (5x - 3a + b) - (6a + 3b - x) \\ = 3a + 5x - 3a + b - 6a - 3b + x = 6x - 6a - 2b$$

$$2) 7x - (-2m - 3) + (-5x + 8 - m) \\ = 7x + 2m + 3 - 5x + 8 - m = 2x + m + 11$$

$$3) m - (-p - 2m + x - 3) + (-2p - 1) \\ = m + p + 2m - x + 3 - 2p - 1 = 3m - p - x + 2$$

$$4) (5t - 12a) - (2 - a - t) = 5t - 12a - 2 + a + t = 6t - 11a - 2$$

$$5) -(20k - 7z) + 1 - (-z + k - 1) - k \\ = -20k + 7z + 1 + z - k + 1 - k \\ = 8z - 22k + 2$$

zu Aufg 2

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$$\begin{aligned} 6) & -h - (-h) + (-j+h) - (-j) \\ & = -h + h - j + h + j = h \end{aligned}$$

$$\begin{aligned} 7) & (-x) - (-2x-1) - (-1+x) \\ & = -x + 2x + 1 + 1 - x = 2 \end{aligned}$$

$$\begin{aligned} 8) & -(-3a) - (-b-a) - b \\ & = 3a + b + a - b = 4a \end{aligned}$$

$$\begin{aligned} 9) & -m - (-m) + (-7p) - 1 \\ & = -m + m - 7p - 1 = -7p - 1 \end{aligned}$$

$$\begin{aligned} 10) & -(x-2x) - (-a-4a) - (a-x) \\ & = -(-x) - (-5a) - (a-x) \\ & = x + 5a - a + x = 4a + 2x \end{aligned}$$

Aufgabe 3:

$$1) 3a \cdot 5b - 6ba = 15ab - 6ab = 9ab$$

$$2) 4x \cdot 5y + 2x - y = 20xy + 2x - y$$

$$3) m \cdot 6n \cdot 3p + m = 18mnp + m$$

$$4) 7c \cdot 2ab \cdot d = 14abcd$$

$$5) 3a + 5ab + 2a - 8ab + abc = 5a - 3ab + abc$$

$$6) 9xyz \cdot 6x - 3a \cdot 7bc + x = 54x^2yz - 21abc + x$$

$$\begin{aligned} 7) 4m \cdot (2n \cdot 3p) - 4p + 5p \cdot 3n &= 24mnp - 4p + 15np \\ &= 24mnp + 11np \end{aligned}$$

$$\begin{aligned} 8) (6a \cdot 2b - 4b \cdot 5a) \cdot 3a &= (12ab - 20ab) \cdot 3a \\ &= -8ab \cdot 3a = -24a^2b \end{aligned}$$

$$\begin{aligned} 9) 3x^2y + xy - 2xyx - x &= 3x^2y + xy - 2x^2y - x \\ &= x^2y + xy - x \end{aligned}$$

$$10) 9a \cdot 2ba - b^2a + 2a^2b = 18a^2b - b^2a + 2a^2b = 20a^2b - b^2a$$

Aufgabe 4:

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$$1) (2-3)(-a(-b)) = (-1)(ab) = -ab$$

$$2) (-m)(-p) - a(-b) + 3(-p)m = mp + ab - 3mp = ab - 2mp$$

$$3) -(-2)(a-3a) + (x-2x)y \\ = 2(-2a) + (-x)y = -4a - xy$$

$$4) a + 3(-b) - 4(-a) = a - 3b + 4a = 5a - 3b$$

$$5) -(x-6x) + (-a+2a)(5y-7y) \\ = -(-5x) + a(-2y) = 5x - 2ay$$

$$6) 3(-2x)y - (2-3)(y-5y)(-x) \\ = -6xy - (-1)(-4y)(-x) \\ = -6xy + 4xy = -2xy$$

$$7) (7-8)(4m-6m) - 2(-m(-1)+m) \\ = -(-2m) - 2(m+m) \\ = 2m - 2(2m) = 2m - 4m = -2m$$

$$8) -(-10b+7b) - (-9p+2p) \\ = -(-3b) - (-7p) = 3b + 7p$$

$$9) a(-x+7x) - (-x(-a)) \\ = a(6x) - (ax) = 6ax - ax = 5ax$$

$$10) 2(-3p) + (-p2)(10-12) \\ = -3p2 - p2(-2) \\ = -3p2 + 2p2 = -p2$$

Aufgabe 5:

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$$1) 5(3x-2) = 15x - 10$$

$$2) 7(4x-3y) - 8(2x+5y) \\ = 28x - 21y - 16x - 40y = 12x - 61y$$

$$3) -4a(2x-3) + 2x(4a-3) \\ = -8ax + 12a + 8ax - 6x = 12a - 6x$$

$$4) (5a-4) \cdot 5 - 2(8a-10) \\ = 25a - 20 - 16a + 20 = 9a$$

$$5) 2x(2-2x+5y) - 2y(5x-2) \\ = 4x - 4x^2 + 10xy - 10xy + 4y \\ = 4x - 4x^2 + 4y$$

$$6) (3y+4x)(2x+5y) \\ = 6xy + 15y^2 + 8x^2 + 20xy = 26xy + 8x^2 + 15y^2$$

$$7) (a+3b)(4b-2) = 4ab - 2a + 12b^2 - 6b$$

$$8) (5x^2-8x)(2x^3+4) \\ = 10x^5 + 20x^2 - 16x^4 - 32x$$

$$9) (2x-3y-2)(4-2x+2y) \\ = 8x - 4x^2 + 4xy - 12y + 6xy - 6y^2 - 8 + 4x - 4y \\ = 12x - 4x^2 + 10xy + 16y - 6y^2 - 8$$

$$10) (-3x)(2x+3y) - (2x-3y)(3+4x-2y) \\ = -6x^2 - 9xy - (6x + 8x^2 - 4xy - 9y - 12xy + 6y^2) \\ = -6x^2 - 9xy - 6x - 8x^2 + 4xy + 9y + 12xy - 6y^2 \\ = 7xy - 14x^2 - 6x + 9y - 6y^2$$

Zu Aufg 5:

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$$11) (5x + 6y)^2 = 25x^2 + 60xy + 36y^2$$

$$12) (4a - 3b)^2 = 16a^2 - 24ab + 9b^2$$

$$\begin{aligned} 13) & (-3m + 7n)^2 - (6n - m)^2 \\ &= 9m^2 - 42mn + 49n^2 - (36n^2 - 12mn + m^2) \\ &= 9m^2 - 42mn + 49n^2 - 36n^2 + 12mn - m^2 \\ &= 8m^2 - 30mn + 13n^2 \end{aligned}$$

$$\begin{aligned} 14) & (2a + 6b)(2a - 6b) + (6b + a)^2 \\ &= 4a^2 - 36b^2 + 36b^2 + 12ab + a^2 \\ &= 5a^2 + 12ab \end{aligned}$$

Aufgabe 6:

$$1) ax + 2ay - 3a = a(x + 2y - 3)$$

$$2) 4xm - 6xn + 2x = 2x(2m - 3n + 1)$$

$$3) 5x^2 - 10x = 5x(x - 2)$$

$$4) 18a^3 + 6a^2 - 12a = 6a(3a^2 + a - 2)$$

$$5) 25x^2 - 20xy + 4y^2 = (5x - 2y)^2$$

$$6) 9a^2 - 16 = (3a + 4)(3a - 4)$$

$$\begin{aligned} 7) & 2ax - 6x + 6ay - 36y \\ &= x(2a - 6) + 3y(2a - 6) \\ &= (2a - 6)(x + 3y) \end{aligned}$$

$$\begin{aligned} 8) & 24am - 18an - 20bm + 15bn \\ &= 6a(4m - 3n) - 5b(4m - 3n) \\ &= (4m - 3n)(6a - 5b) \end{aligned}$$

Aufgabe 7:

1) $\frac{3ax}{6a} = \frac{x}{2}$

2) $\frac{5ax+5bx}{15x^2} = \frac{5x(a+b)}{15x^2} = \frac{a+b}{3x}$

3) $\frac{12a^2+4a}{8a^2} = \frac{4a(3a+1)}{8a^2} = \frac{3a+1}{2a}$

4) $\frac{11a+11b}{a^2+2ab+b^2} = \frac{11(a+b)}{(a+b)^2} = \frac{11}{a+b}$

5) $\frac{4a^2-12ab+9b^2}{10a-15b} = \frac{(2a-3b)^2}{5(2a-3b)} = \frac{2a-3b}{5}$

6) $\frac{10x^2-10y^2}{5x-5y} = \frac{10(x^2-y^2)}{5(x-y)} = \frac{2(x+y)(x-y)}{x-y} = 2(x+y)$

Aufgabe 8:

1) $\frac{4a}{5x} \cdot 20xy = \frac{4a}{5x} \cdot \frac{20xy}{1} = 16ay$

2) $\frac{35a}{4x} \cdot \frac{8xy}{7b} = \frac{10ay}{b}$

3) $\frac{21x^2}{5y^2} \cdot \frac{15ay}{7x^3b} = \frac{9a}{bxy}$

4) $\frac{-3a}{b} \cdot \frac{ab}{-c} \cdot \left(-\frac{2c^2}{3b}\right) = -\frac{3a}{b} \cdot \frac{ab}{c} \cdot \frac{2c^2}{3b} = -\frac{2a^2c}{b}$

5) $\frac{x^2}{2a} : \frac{2x^2}{5a} = \frac{x^2}{2a} \cdot \frac{5a}{2x^2} = \frac{5}{4}$

6) $\frac{2a^2x}{5b^2} : 2ax = \frac{2a^2x}{5b^2} \cdot \frac{1}{2ax} = \frac{a}{5b^2}$

7) $4x : \frac{2y}{3x} = \frac{4x}{1} \cdot \frac{3x}{2y} = \frac{6x^2}{y}$, 8) nächste Seite! →

Zu Aufg 8:

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$$\begin{aligned} 8) \quad \left(-\frac{x^2-4}{59}\right) : \left(-\frac{x+2}{49}\right) &= \frac{x^2-4}{59} \cdot \frac{49}{x+2} \\ &= \frac{(x+2)(x-2)}{59} \cdot \frac{49}{x+2} = \frac{49(x-2)}{59} \end{aligned}$$

Aufgabe 9:

$$\begin{aligned} 1) \quad \frac{3}{a^2} - \frac{2a-b}{a^2} - \frac{b+3}{a^2} &= \frac{3-(2a-b)-(b+3)}{a^2} \\ &= \frac{3-2a+b-b-3}{a^2} = \frac{-2a}{a^2} = -\frac{2}{a} \end{aligned}$$

$$2) \quad \frac{x}{5} + \frac{y}{15} = \frac{3x+y}{15}$$

$$3) \quad \frac{3a}{2} - \frac{4}{2a} = \frac{3a^2-4}{2a}$$

$$4) \quad \frac{2}{9a} + \frac{1}{6a^2} + \frac{1}{4ab} = \frac{8ab+6b+9a}{36a^2b}$$

$$\begin{aligned} 5) \quad \frac{x+y}{a-b} + \frac{x-y}{b-a} &= \frac{x+y}{a-b} - \frac{x-y}{a-b} \\ &= \frac{x+y-(x-y)}{a-b} = \frac{x+y-x+y}{a-b} = \frac{2y}{a-b} \end{aligned}$$

$$6) \quad \frac{5}{x-y} - \frac{3}{2(x-y)} = \frac{10-3}{2(x-y)} = \frac{7}{2(x-y)}$$

Aufg 10: nächste Seite! →

Aufgabe 10:

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$$\begin{aligned} 1) \left(\frac{b}{a} - 1\right) \cdot \frac{ab}{a-b} &= \frac{b-a}{a} \cdot \frac{ab}{a-b} \\ &= \frac{-(a-b)}{a} \cdot \frac{ab}{a-b} = -b \end{aligned}$$

$$\begin{aligned} 2) \frac{2}{xy} : \left(\frac{1}{x} + \frac{1}{y}\right) &= \frac{2}{xy} : \frac{y+x}{xy} \\ &= \frac{2}{xy} \cdot \frac{xy}{x+y} = \frac{2}{x+y} \end{aligned}$$

$$\begin{aligned} 3) \left(\frac{x}{y} - \frac{y}{x}\right) : \left(\frac{1}{y} - \frac{1}{x}\right) &= \frac{x^2 - y^2}{xy} : \frac{x-y}{xy} \\ &= \frac{(x+y)(x-y)}{xy} \cdot \frac{xy}{x-y} = x+y \end{aligned}$$

$$\begin{aligned} 4) \left(\frac{b}{a-b} + 1\right) \cdot \left(1 - \frac{a-b}{a}\right) &= \left(\frac{b}{a-b} + \frac{a-b}{a-b}\right) \cdot \left(\frac{a}{a} - \frac{a-b}{a}\right) \\ &= \frac{b+a-b}{a-b} \cdot \frac{a-(a-b)}{a} = \frac{a}{a-b} \cdot \frac{a-a+b}{a} \\ &= \frac{a}{a-b} \cdot \frac{b}{a} = \frac{b}{a-b} \end{aligned}$$