

Lösungen Terme III

Ergebnisse:

E1	Ergebnisse
a)	$-\frac{2x-7}{2} + \frac{5-4x}{5} = 9\left(\frac{1}{2} - \frac{1}{5}x\right)$
b)	$3kx - (3-k)x = x(4k-3)$
c)	$\frac{8x-2}{2} - \frac{3}{8}(4x-4) = \frac{1}{2}(5x+1)$

E2	Ergebnisse
a)	$\frac{1}{3}(-2x+4) - \frac{4x-2}{3} = -2x+2$
b)	$x^2(x-6) - 2x^2(x-2) = -x^3 - 2x^2$
c)	$x(2-x) + 5(2-x) = (2-x)(x+5)$
d)	$(-x+2)(x-3) - \left(2 - \frac{1}{2}x\right)(x-3) = -\frac{1}{2}x^2 + \frac{3}{2}x$
e)	$6ax - 3ay + 4bx - 2by = (3a+2b)(2x-y)$
f)	$30sx - 5kx - 6sy + ky = (5x-y)(6s-k)$

E3	Ergebnisse
a)	$(x-5)\left(x + \frac{3}{2}\right) = x^2 - \frac{7}{2}x - \frac{15}{2}$
b)	$\left(\frac{2}{3}x - 2\right)(x+3) = \frac{2}{3}x^2 - 6$
c)	$\left(\frac{1}{2}x - \frac{5}{2}\right)(x+5) = \frac{1}{2}x^2 - \frac{25}{2}$
d)	$\frac{3}{2}(x+4)(x+4) = \frac{3}{2}x^2 + 12x + 24$
e)	$(3-2x)(-2x+3) = 9 - 12x + 4x^2$
f)	$\frac{x-5}{2}(2x+8) = x^2 - x - 20$

E4		Ergebnisse
a)		$(x+8)\left(\frac{1}{4}x+1\right) = \frac{1}{4}x^2 + 3x + 8$
b)		$\left(1-\frac{1}{5}x\right)\left(\frac{2}{5}x+2\right) = -\frac{2}{25}x^2 + 2$
c)		$\frac{x}{2}(2x-k)^2 = 2x^3 - 2kx^2 + \frac{k^2}{2}x$
d)		$-\frac{1}{8}(4-2x)^2 = -2 + 2x - \frac{1}{2}x^2$
e)		$x(x+3)(2x-5) = 2x^3 + x^2 - 15x$
f)		$(x-1)^3 = x^3 - 3x^2 + 3x - 1$

E5		Ergebnisse
a)		$x^2 + 14x + 49 = (x+7)^2$
b)		$4x^2 - 8x + 4 = 4(x-1)^2$
c)		$\frac{1}{2}x^2 - 8 = \frac{1}{2}(x-4)(x+4)$
d)		$1 - 2x + x^2 = (1-x)^2$
e)		$-\frac{1}{4} + x^2 = \left(x - \frac{1}{2}\right)\left(x + \frac{1}{2}\right)$
f)		$-x^2 + 6x - 9 = -(x-3)^2$
g)		$\frac{1}{5}x^2 + 2x + 5 = \frac{1}{5}(x+5)^2$
h)		$\frac{1}{4}x^2 - 3x + 9 = \frac{1}{4}(x-6)^2$
i)		$\frac{x^2}{2} - kx + \frac{k^2}{2} = \frac{1}{2}(x-k)^2$

E6		Ergebnisse	
a)	$a^2 - 4b^2 = (a-2b)(a+2b)$	b)	$4k^2 - 4k + 1 = (2k-1)^2$
c)	$25x^2 - 9 = (5x-3)(5x+3)$	d)	$x^4 + 2x^2 + 1 = (x^2+1)^2$
e)	$u^4 - 4u^3 + 4u^2 = u^2(u-2)^2$	f)	$x^3 - 7x^2 = x^2(x-7)$

E7	Ergebnisse
a)	$3\left(\frac{2-3k}{3}\right)^2 - 2\frac{2-3k}{3} = 3k^2 - 2k$
b)	$7(b+1) + 5(b+1)^2 = (5b+12)(b+1)$
c)	$(k-1)^2 - (k+1)^2 - (k^2+4) = -(k+2)^2$
d)	$(1-x)^3 + 3(1-x)(1+x)^2 = -4(x-1)(x^2+x+1)$

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Ausführliche Lösungen:

A1	Ausführliche Lösung
	a) $-\frac{2x-7}{2} + \frac{5-4x}{5} \quad \text{HN} = 10$ $-\frac{5(2x-7)}{5 \cdot 2} + \frac{2(5-4x)}{2 \cdot 5} = -\frac{10x-35}{10} + \frac{10-8x}{10}$ $= \frac{-(10x-35)+10-8x}{10} = \frac{-10x+35+10-8x}{10}$ $= \frac{-18x+45}{10} = \frac{9(-2x+5)}{10} = 9 \cdot \frac{5-2x}{10} = 9 \left(\frac{5}{10} - \frac{2x}{10} \right) = 9 \left(\frac{1}{2} - \frac{1}{5}x \right)$
A1	Ausführliche Lösung
	b) $3kx - (3-k)x = 3kx - 3x + kx = 4kx - 3x = x(4k-3)$
A1	Ausführliche Lösung
	c) $\frac{8x-2}{2} - \frac{3}{8}(4x-4) = \frac{8x-2}{2} - \frac{12x-12}{8} = \frac{8x-2}{2} - \frac{4(3x-3)}{8}$ $= \frac{8x-2}{2} - \frac{3x-3}{2} = \frac{8x-2-(3x-3)}{2} = \frac{8x-2-3x+3}{2} = \frac{5x+1}{2} = \frac{1}{2}(5x+1)$
A2	Ausführliche Lösung
	a) $\frac{1}{3}(-2x+4) - \frac{4x-2}{3} = \frac{-2x+4}{3} - \frac{4x-2}{3} = \frac{-2x+4-(4x-2)}{3}$ $= \frac{-2x+4-4x+2}{3} = \frac{-6x+6}{3} = \frac{3(-2x+2)}{3} = \underline{\underline{-2x+2}}$
A2	Ausführliche Lösung
	b) $x^2(x-6) - 2x^2(x-2) = x^3 - 6x^2 - 2x^3 + 4x^2 = x^3 - 2x^3 - 6x^2 + 4x^2 = \underline{\underline{-x^3 - 2x^2}}$
A2	Ausführliche Lösung
	c) $x(2-x) + 5(2-x) \quad (2-x) \text{ ausklammern}$ $x(2-x) + 5(2-x) = \underline{\underline{(2-x)(x+5)}}$
A2	Ausführliche Lösung
	d) $(-x+2)(x-3) - \left(2 - \frac{1}{2}x\right)(x-3) = -x^2 + 3x + 2x - 6 - \left[2x - 6 - \frac{1}{2}x^2 + \frac{3}{2}x\right]$ $= -x^2 + 5x - 6 - 2x + 6 + \frac{1}{2}x^2 - \frac{3}{2}x = -x^2 + \frac{1}{2}x^2 + 3x - \frac{3}{2}x = \underline{\underline{-\frac{1}{2}x^2 + \frac{3}{2}x}}$

A2	Ausführliche Lösung
e)	$\underbrace{6ax - 3ay}_{3a \text{ ausklammern}} + \underbrace{4bx - 2by}_{2b \text{ ausklammern}} = \underbrace{3a(2x - y)}_{(2x-y) \text{ ausklammern}} + \underbrace{2b(2x - y)}_{(2x-y) \text{ ausklammern}}$ $= (2x - y)(3a + 2b) = \underline{\underline{(3a + 2b)(2x - y)}}$
A2	Ausführliche Lösung
f)	$\underbrace{30sx - 6sy}_{6s \text{ ausklammern}} - \underbrace{5tx + ty}_t \text{ ausklammern}$ $\underbrace{6s(5x - y)}_{(5x-y) \text{ ausklammern}} - t(5x - y) = \underline{\underline{(5x - y)(6s - t)}}$
A3	Ausführliche Lösung
a)	$(x - 5)\left(x + \frac{3}{2}\right) = x^2 + \frac{3}{2}x - 5x - 5 \cdot \frac{3}{2} = x^2 - \frac{7}{2}x - \frac{15}{2}$
A3	Ausführliche Lösung
b)	$\left(\frac{2}{3}x - 2\right)(x + 3) = \frac{2}{3}x^2 + 3 \cdot \frac{2}{3}x - 2x - 6 = \frac{2}{3}x^2 + 2x - 2x - 6 = \underline{\underline{\frac{2}{3}x^2 - 6}}$
A3	Ausführliche Lösung
c)	$\left(\frac{1}{2}x - \frac{5}{2}\right)(x + 5) = \frac{1}{2}x^2 + 5 \cdot \frac{1}{2}x - \frac{5}{2}x - 5 \cdot \frac{5}{2} = \frac{1}{2}x^2 + \frac{5}{2}x - \frac{5}{2}x - \frac{25}{2} = \underline{\underline{\frac{1}{2}x^2 - \frac{25}{2}}}$
A3	Ausführliche Lösung
d)	$\frac{3}{2}\underbrace{(x + 4)(x + 4)}_{1. \text{ bin. Formel}} = \frac{3}{2}(x^2 + 8x + 16) = \frac{3}{2}x^2 + \frac{3}{2} \cdot 8x + \frac{3}{2} \cdot 16 = \underline{\underline{\frac{3}{2}x^2 + 12x + 24}}$
A3	Ausführliche Lösung
e)	$(3 - 2x)(-2x + 3) = -6x + 9 + 4x^2 - 6x = \underline{\underline{4x^2 - 12x + 9}}$
A3	Ausführliche Lösung
f)	$\frac{x - 5}{2}(2x + 8) = \frac{(x - 5)(2x + 8)}{2} = \frac{2x^2 + 8x - 10x - 40}{2}$ $= \frac{2x^2 - 2x - 40}{2} = \frac{2(x^2 - x - 20)}{2} = \underline{\underline{x^2 - x - 20}}$
A4	Ausführliche Lösung
a)	$(x + 8)\left(\frac{1}{4}x + 1\right) = \frac{1}{4}x^2 + x + \frac{8}{4}x + 8 = \frac{1}{4}x^2 + x + 2x + 8 = \underline{\underline{\frac{1}{4}x^2 + 3x + 8}}$

A4	Ausführliche Lösung
	b) $\left(1 - \frac{1}{5}x\right)\left(\frac{2}{5}x + 2\right) = \frac{2}{5}x + 2 - \frac{1}{25}x^2 - \frac{2}{5}x = -\frac{2}{25}x^2 + 2$
A4	Ausführliche Lösung
	c) $\frac{x}{2} \underbrace{(2x - k)^2}_{2. \text{ bin. Formel}} = \frac{x}{2} (4x^2 - 4kx + k^2) = 2x^3 - 2kx^2 + \frac{k^2}{2}x$
A4	Ausführliche Lösung
	d) $-\frac{1}{8} \underbrace{(4 - 2x)^2}_{2. \text{ bin. Formel}} = -\frac{1}{8} (16 - 16x + 4x^2) = -2 + 2x - \frac{1}{2}x^2 = -\frac{1}{2}x^2 + 2x - 2$
A4	Ausführliche Lösung
	e) $x(x+3)(2x-5) = x(2x^2 - 5x + 6x - 15) = x(2x^2 + x - 15) = 2x^3 + x^2 - 15x$
A4	Ausführliche Lösung
	f) $(x-1)^3 = (x-1)(x-1)^2 = (x-1)(x^2 - 2x + 1)$ $= x^3 - 2x^2 + x - x^2 + 2x - 1 = x^3 - 3x^2 + 3x - 1$
A5	Ausführliche Lösung
	a) $\underbrace{x^2 + 14x + 49}_{1. \text{ bin. Formel}} = (x+7)^2$
A5	Ausführliche Lösung
	b) $4x^2 - 8x + 4 = 4 \underbrace{(x^2 - 2x + 1)}_{2. \text{ bin. Formel}} = 4(x-1)^2$
A5	Ausführliche Lösung
	c) $\frac{1}{2}x^2 - 8 = \frac{1}{2} \underbrace{(x^2 - 16)}_{3. \text{ bin. Formel}} = \frac{1}{2}(x-4)(x+4)$
A5	Ausführliche Lösung
	d) $1 - 2x + x^2 = \underbrace{x^2 - 2x + 1}_{2. \text{ bin. Formel}} = (x-1)^2$ Merke: $(1-x)^2 = (x-1)^2$ denn $(1-x)^2 = [(-1) \cdot (x-1)]^2 = (-1)^2 \cdot (x-1)^2 = 1 \cdot (x-1)^2 = (x-1)^2$

A5	Ausführliche Lösung
e)	$-\frac{1}{4} + x^2 = \underbrace{x^2 - \frac{1}{4}}_{3. \text{ bin. Formel}} = \left(x - \frac{1}{2}\right) \left(x + \frac{1}{2}\right)$
A5	Ausführliche Lösung
f)	$-x^2 + 6x - 9 = -\underbrace{(x^2 - 6x + 9)}_{2. \text{ bin. Formel}} = \underline{\underline{-(x-3)^2}}$
A5	Ausführliche Lösung
g)	$\frac{1}{5}x^2 + 2x + 5 = \frac{1}{5}\underbrace{(x^2 + 10x + 25)}_{1. \text{ bin. Formel}} = \underline{\underline{\frac{1}{5}(x+5)^2}}$
A5	Ausführliche Lösung
h)	$\frac{1}{4}x^2 - 3x + 9 = \frac{1}{4}\underbrace{(x^2 - 12x + 36)}_{2. \text{ bin. Formel}} = \underline{\underline{\frac{1}{4}(x-6)^2}}$
A5	Ausführliche Lösung
i)	$\frac{x^2}{2} - kx + \frac{k^2}{2} = \frac{1}{2}\underbrace{(x^2 - 2kx + k^2)}_{2. \text{ bin. Formel}} = \underline{\underline{\frac{1}{2}(x-k)^2}}$
A6	Ausführliche Lösung
a)	$\underbrace{a^2 - 4b^2}_{3. \text{ bin. Formel}} = \underline{\underline{(a-2b)(a+2b)}}$
A6	Ausführliche Lösung
b)	$\underbrace{4k^2 - 4k + 1}_{2. \text{ bin. Formel}} = \underline{\underline{(2k-1)^2}}$
A6	Ausführliche Lösung
c)	$\underbrace{25x^2 - 9}_{3. \text{ bin. Formel}} = \underline{\underline{(5x-3)(5x+3)}}$
A6	Ausführliche Lösung
d)	$\underbrace{x^4 + 2x^2 + 1}_{1. \text{ bin. Formel}} = \underline{\underline{(x^2+1)^2}}$
A6	Ausführliche Lösung
e)	$u^4 - 4u^3 + 4u^2 = u^2 \underbrace{(u^2 - 4u + 4)}_{2. \text{ bin. Formel}} = \underline{\underline{u^2(u-2)^2}}$

A6	Ausführliche Lösung
f)	$x^3 - 7x^2 = \underline{\underline{x^2(x-7)}}$

A7	Ausführliche Lösung
a)	$3\left(\frac{2-3k}{3}\right)^2 - 2\frac{2-3k}{3} = \frac{3\left[(2-3k)^2\right]}{9} - \frac{2(2-3k)}{3}$ $= \frac{(2-3k)^2}{3} - \frac{4-6k}{3} = \frac{4-12k+9k^2-(4-6k)}{3} = \frac{4-12k+9k^2-4+6k}{3}$ $= \frac{9k^2-6k}{3} = \frac{3(3k^2-2k)}{3} = \underline{\underline{3k^2-2k}}$

A7	Ausführliche Lösung
b)	$7(b+1) + 5(b+1)^2 = (b+1)[7+5(b+1)]$ $= (b+1)[7+5b+5] = \underline{\underline{(b+1)(5b+12)}}$

A7	Ausführliche Lösung
c)	$(k-1)^2 - (k+1)^2 - (k^2+4) = k^2 - 2k + 1 - (k^2 + 2k + 1) - k^2 - 4$ $= k^2 - 2k + 1 - k^2 - 2k - 1 - k^2 - 4 = -k^2 - 4k - 4 = -(k^2 + 4k + 4) = \underline{\underline{-(k+2)^2}}$

A7	Ausführliche Lösung
d)	$(1-x)^3 + 3(1-x)(1+x)^2 = (1-x)\left[(1-x)^2 + 3\cdot(1+x)^2\right]$ $= (1-x)\left[1-2x+x^2 + 3(1+2x+x^2)\right] = (1-x)\left[1-2x+x^2 + 3+6x+3x^2\right]$ $= (1-x)(4x^2 + 4x + 4) = 4(1-x)(x^2 + x + 1) = \underline{\underline{-4(x-1)(x^2 + x + 1)}}$