ÜZ: Division von Termen – Herausheben gemeinsamer Faktoren – Grundl. A.

1) Dividiere: $42\,r^6 : 7\,r^5 =$ $6r$

$27\,x^3\,y^2 : 9\,x\,y =$ $3x^2y$

$(-21\,m^6) : (-7\,m^4) =$ $3m$

$45\,c^7\,d^5 : (-9\,c^4\,d^3) =$ $-5c^3d^2$

$(100\,r\,s - 60\,r\,t) : 10\,r =$ $10s - 6t$

$(40\,e^3f + 32\,e\,f^3) : (-8\,ef) =$ $-5e^2 - 4f^2$

2) Hebe gemeinsame Faktoren heraus :

$7y^3 - 7y^2z =$ $7y^2 \cdot (y - z)$

$a^2b\,c - a\,b^2c =$ $abc \cdot (a - b)$

$16\,e^3f^2 + 24\,e^2f^3 =$ $8e^2f^2(2e + 3f)$

3) Hebe heraus und kürze soweit wie möglich !

$\frac{12k - 24m}{6} = \frac{6 \cdot (2k - 4m)}{6} = 2k - 4m$ $\qquad \frac{14r + 21rs}{7r} = \frac{7r \cdot (2 + 3s)}{7r} = 2 + 3s$

ÜZ – Dividieren von Termen – Herausheben gemeinsamer Faktoren – Grundl. A.

a) Dividiere: $21\,b^6 : 3\,b^4 =$ $7b^2$

$30\,x^3\,y^2 : 6\,x\,y =$ $5x^2y$

$(-35\,a^7) : (-7\,a^3) =$ $+5a^4$

$16\,y^5\,z^3 : (-8\,y^4\,z^3) =$ $-2y$

$(100\,a\,b - 25\,b\,c) : 5\,b =$ $20a - 5c$

$(12\,x^2y + 30\,x\,y^2) : 6\,x =$ $2xy + 5y^2$

b) Hebe gemeinsame Faktoren heraus :

$9\,a^3 - 9\,a^2c =$ $9a^2 \cdot (a - c)$

$x^2y\,z - x\,y^2z =$ $xyz \cdot (x - y)$

$12\,r^3s^2 + 18\,r^2s^3 =$ $6r^2s^2 \cdot (2r + 3s)$

c) Hebe heraus und kürze soweit wie möglich !

$\frac{8e + 12f}{4} = \frac{4(2e + 3f)}{4} = 2e + 3f$ $\qquad \frac{15y - 20yz}{10y} = \frac{5y \cdot (3 - 4z)}{10y} = \frac{3 - 4z}{2}$

1) Wandle in ein Produkt um :

$u^2 - v^2 = (u+v)(u-v)$ $r^2 - 25s^2 = (r+5s)(r-5s)$ $16a^2 - 100b^2 = (4a+10b)(4a-10b)$

$64x^2 - 81y^2 = (8x+9y)(8x-9y)$ $1 - 9k^2 = (1+3k)(1-3k)$ $121g^2 - 400 = (11g+20)(11g-20)$

$0{,}09a^2 - 1{,}44b^2 = (0{,}3a+1{,}2b)(0{,}3a-1{,}2b)$ $1600x^2 - 90\,000y^2 = (40x+300y)(40x-300y)$

$\left(\frac{4}{9}x^2 - \frac{1}{25}\right) = \left(\frac{2}{3}x+\frac{1}{5}\right)\left(\frac{2}{3}x-\frac{1}{5}\right)$ $\left(\frac{16}{49}a^2 - \frac{4}{81}b^2\right) = \left(\frac{4}{7}a+\frac{2}{9}b\right)\left(\frac{4}{7}a-\frac{2}{9}b\right)$

$x^2 + 2xy + y^2 = (x+y)^2$ $r^2 - 2rs + s^2 = (r-s)^2$

$x^2 + 14xy + 49y^2 = (x+7y)^2$ $a^2 + 20a + 100 = (a+10)^2$

$36 - 12b + b^2 = (6-b)^2$ $x^2 - 10xy + 25y^2 = (x-5y)^2$

2) Hebe zuerst heraus, dann wende eine binomische Formel an.

$7a^2 + 14ab + 7b^2 = 7\cdot(a^2+2ab+b^2) = 7\cdot(a+b)^2$

$8a^2 - 128b^2 = 8\cdot(a^2-16b^2) = 8\cdot(a+4b)\cdot(a-4b)$

$45x^2 + 30xy + 5y^2 = 5\cdot(9x^2+6xy+y^2) = 5\cdot(3x+y)^2$

$810u^2 - 360uv + 40v^2 = 10\cdot(81u^2-36uv+4v^2) = 10\cdot(9u-2v)^2$

$11a^2 + 44ab + 44b^2 = 11\cdot(a^2+4ab+4b^2) = 11\cdot(a+2b)^2$

$500r^2 - 12\,500s^2 = 500\cdot(r^2-25s^2) = 500\cdot(r+5s)(r-5s)$

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

3) Hebe gemeinsame Faktoren heraus und kürze. HEFT !

a) $\frac{s^2-s}{s^2-1} = \frac{s\cdot(s-1)}{(s+1)(s-1)}$ b) $\frac{c^2-2c}{c^2-4} = \frac{c\cdot(c-2)}{(c+2)(c-2)}$ c) $\frac{1-x^2}{1+x} = \frac{(1+x)(1-x)}{(1+x)}$ d) $\frac{a^2+ab}{a^2-b^2} = \frac{a\cdot(a+b)}{(a-b)(a+b)}$

e) $\frac{a^2-25}{2a+10} = \frac{(a+5)(a-5)}{2(a+5)}$ f) $\frac{b^2-16}{(b-4)^2} = \frac{(b+4)(b-4)}{(b-4)(b-4)}$ g) $\frac{6x^2y+2xy^2}{18x^2-2y^2} = (*)$ h) $\frac{(3a+4b)^2}{9a^2-16b^2} = \frac{(3a+4b)(3a+4b)}{(3a+4b)(3a-4b)}$

i) $\frac{5a^2-45}{15a+45} = \frac{5\cdot(a^2-9)}{15\cdot(a+3)} = \frac{5\cdot(a+3)(a-3)}{5\cdot3\cdot(a+3)}$ j) $\frac{7-7d}{4-4d^2} = \frac{7(1-d)}{4\cdot(1-d)^2} = \frac{7\cdot(1-d)}{4\cdot(1+d)\cdot(1-d)}$ k) $\frac{a^2-9}{4a+12} = \frac{(a+3)(a-3)}{4\cdot(a+3)}$ l) $\frac{4a^2-4}{6a-6} = \frac{4\cdot(a^2-1)}{6\cdot(a-1)} = \frac{2\cdot2\cdot(a+1)(a-1)}{3\cdot2\cdot(a-1)}$

$(*)\ \frac{2xy(3x+y)}{2\cdot(9x^2-y^2)} = \frac{2xy(3x+y)}{2(3x-y)(3x+y)} = \frac{xy}{3x-y}$