

1) Wandle in ein Produkt um :

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

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

$$0,09a^2 - 1,44b^2 = (0,3a+1,2b)(0,3a-1,2b) \quad 1600x^2 - 90000y^2 = (40x+300y)(40x-300y)$$

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

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

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

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

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

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

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

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

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

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

$$500r^2 - 12500s^2 = 500 \cdot (r^2 - 25s^2) = 500 \cdot (r+5s)(r-5s)$$

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

3) Hebe gemeinsame Faktoren heraus und kürze. HEFT !

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

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

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

$\frac{5 \cdot \cancel{(a+3)} \cdot \cancel{(a-3)}}{5 \cdot 3 \cdot \cancel{(a+3)}}$ $= \frac{7 \cdot \cancel{(1-d)}}{4 \cdot (1+d) \cdot \cancel{(1-d)}}$ $= \frac{2 \cdot \cancel{(a+1)} \cdot \cancel{(a-1)}}{3 \cdot 6 \cdot \cancel{(a-1)}}$

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