5 Rationale Zahlen

5.7 Übungen Frommenwiler

45. b) $\frac{x-5}{y-4x}\cdot\frac{(-1)}{(-1)}=\underline{\underline{\frac{-x+5}{4x-y}}}$

c) $\frac{pq}{p+q}\cdot\frac{q-p}{q-p}=\underline{\underline{\frac{pq^2-p^2q}{q^2-p^2}}}$

d) $\frac{5x}{3x-2}\cdot\frac{3x+2}{3x+2}=\underline{\underline{\frac{15x^2+10x}{9x^2-4}}}$

46. b) $\frac{4-a}{1-a}\cdot\frac{(-1)}{(-1)}=\underline{\underline{\frac{a-4}{a-1}}}$

d) $\frac{-a(a-1)}{-b}\cdot\frac{(-1)}{(-1)}=\underline{\underline{\frac{a(a-1)}{b}}}=\underline{\underline{\frac{a^2-a}{b}}}$

e) $\frac{(n-1)(n-2)}{-n}\cdot\frac{(-1)}{(-1)}=\underline{\underline{\frac{(1-n)\cdot(n-2)}{n}}}$ oder $\underline{\underline{\frac{(n-1)(2-n)}{n}}}$ oder $\underline{\underline{\frac{-n^2+3n-2}{n}}}$

f) $\frac{(x-y)^2}{-x-y}\cdot\frac{(-1)}{(-1)}=\frac{(x^2-2xy+y^2)(-1)}{x+y}=\underline{\underline{\frac{-x^2+2xy-y^2}{x+y}}}$

47. a) $\frac{\overset{2}{\cancel{6}}\,a(a-b)}{\cancel{3}(a^2-2ab+b^2)}=\frac{2a\cancel{(a-b)}}{(a-b)^{\cancel{2}}}=\underline{\underline{\frac{2a}{a-b}}}$

c) $\frac{a+b-a^2}{a+b}$ → der Zähler kann nicht faktorisiert werden!

somit: → der Bruch kann nicht gekürzt werden!

d) $\dfrac{(x-y)(x+y)(-1)}{(y-x)(y-x)(-1)} = \dfrac{(-x+y)(x+y)}{(y-x)(-y+x)} = \dfrac{x+y}{x-y}$

f) $\dfrac{(-1)(d^2+cd-12c^2)}{(d-5c)(d+4c)} = \dfrac{(-1)(d+4c)(d-3c)}{(d-5c)(d+4c)} = \dfrac{3c-d}{d-5c}$

48. a) $\dfrac{x^2(x^2-4x+4)}{x(x^4-8x^2+16)} = \dfrac{x(x-2)^2}{(x^2-4)^2} = \dfrac{x(x-2)^2}{[(x-2)(x+2)]^2} = \dfrac{x(x-2)^2}{(x-2)^2(x+2)^2} = \dfrac{x}{(x+2)^2}$

c) $\dfrac{\overbrace{(x-y)^2-z^2}^{\text{Binomtyp: } a^2-b^2}}{\underbrace{(x+z)^2-y^2}_{\text{Binomtyp: } a^2-b^2}} = \dfrac{[(x-y)-z][(x-y)+z]}{[(x+z)-y][(x+z)+y]} = \dfrac{(x-y-z)(x-y+z)}{(x-y+z)(x+y+z)} = \dfrac{x-y-z}{x+y+z}$

d) $\dfrac{(a^2-1)(a^2+1)}{a^2(a+1)+a+1} = \dfrac{(a-1)(a+1)(a^2+1)}{a^2(a+1)+1(a+1)} = \dfrac{(a+1)(a-1)(a^2+1)}{(a+1)(a^2+1)} = a-1$

e) $\dfrac{2u(2u-3)}{2(4u^3-8u^2-9u+18)} =$

$\dfrac{2u(2u-3)}{2[4u^2(u-2)-9(u-2)]} =$

$\dfrac{2u(2u-3)}{2(u-2)(4u^2-9)} =$

$\dfrac{2u(2u-3)}{2(u-2)(2u-3)(2u+3)} = \dfrac{u}{(u-2)(2u+3)}$

f) $\dfrac{(3n+2)(n+2)}{(n-2)^2}$ → kann nicht gekürzt werden!

49. a) $\dfrac{a^2-b^2+ax-bx}{a^2-\underbrace{\left(b^2+2bx+x^2\right)}_{\text{Binom}}}=$

$\dfrac{(a-b)(a+b)+x(a-b)}{\underbrace{a^2-(b+x)^2}_{\text{Binomtyp: } a^2-b^2}}=$

$\dfrac{(a-b)\left[(a+b)+x\right]}{\left[a-(b+x)\right]\left[a+(b+x)\right]}=\dfrac{a-b}{a-b-x}$

b) $\dfrac{(p-q)\left[-2(p+q)(p-q)+(p-q)^2+(p+q)^2\right]}{5p^2\left(p^2-2pq+q^2\right)}=$

$\dfrac{(p-q)\left[-2(p+q)(p-q)+(p-q)^2+(p+q)^2\right]}{5p^2(p-q)^2}=$

$\dfrac{-2\left(p^2-q^2\right)+p^2-2pq+q^2+p^2+2pq+q^2}{5p^2(p-q)}=$

$\dfrac{-2p^2+2q^2+p^2-2pq+q^2+p^2+2pq+q^2}{5p^2(p-q)}=\dfrac{4q^2}{5p^2(p-q)}$

oder

$\dfrac{(p-q)\overbrace{\left[-2(p+q)(p-q)+(p-q)^2+(p+q)^2\right]}^{\text{Binom: }(\;)^2-2\cdot(\;)\cdot(\;)+(\;)^2=[(\;)-(\;)]^2}}{5p^2\underbrace{\left(p^2-2pq+q^2\right)}_{\text{Binom}}}=$

$\dfrac{(p-q)\left[(p-q)-(p+q)\right]^2}{5p^2(p-q)^2}=\dfrac{[p-q-p-q]^2}{5p^2(p-q)}=\dfrac{(-2q)^2}{5p^2(p-q)}=\dfrac{4q^2}{5p^2(p-q)}$