

## Bruchterme

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### Addition und Subtraktion

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Vereinfache

a)  $\frac{4}{n} + \frac{5}{n} - \frac{2}{n}$

b)  $\frac{a+b}{4} - \frac{c+d}{4}$

c)  $\frac{a^3}{a^2-1} - \frac{a^2}{a^2-1}$

d)  $\frac{a}{b} - \frac{c}{b}$

e)  $\frac{5x-3y}{6} + \frac{7x+12y}{6}$

f)  $\frac{2y}{3x} + \frac{5y}{3x} - \frac{4y}{3x}$

g)  $\frac{-a}{b} - \frac{2a}{b}$

h)  $\frac{1}{a+1} + \frac{a}{a+1}$

i)  $\frac{4a}{a-1} - \frac{4}{a-1}$

j)  $\frac{ab}{b^2-2bc+c^2} - \frac{ac}{b^2-2bc+c^2}$

k)  $\frac{a+b}{n} - \frac{a-b}{n}$

l)  $\frac{4x}{4x^2+7x+3} + \frac{3}{4x^2+7x+3}$

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Vereinfache

a)  $4a - \frac{4a^2+5}{a-1}$

b)  $\frac{17a-15}{39} - \frac{8a+9}{26}$

c)  $\frac{5c}{6a^3} + \frac{c}{3a^2}$

d)  $5a - 1 + \frac{3}{a}$

e)  $\frac{5a+3b}{c} - 3a - b$

f)  $\frac{1}{a} + \frac{1}{a^2} + \frac{1}{a^3}$

g)  $1 - \frac{c-d}{c+d}$

h)  $\frac{8}{m} - \frac{11}{n} + \frac{6}{p}$

i)  $\frac{5}{2ac} + \frac{3}{5cd}$

j)  $\frac{5b^2}{8} + \frac{3b^2}{6}$

k)  $\frac{2a-3b}{24} - \frac{5a+b}{32} - \frac{9a-4b}{40} - \frac{b}{80}$

l)  $\frac{3a-c}{12ac} - \frac{5a-b}{10ab} - \frac{7b-c}{15bc} + \frac{4ac-3ab}{30abc}$

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Vereinfache

$$a) \frac{2}{x+y} - \frac{2}{x-y}$$

$$b) \frac{a}{ab-b^2} - \frac{c}{ac-bc}$$

$$c) \frac{2}{a} + \frac{4a-b}{a^2+ab}$$

$$d) \frac{2v+3w}{2v+w} - \frac{2v-w}{2v} - \frac{2v+3w}{w}$$

$$e) \frac{1}{a-2} - \frac{1}{a-3}$$

$$f) \frac{x-y}{x+3y} - \frac{x+y}{3y}$$

$$g) \frac{1}{a+b} + \frac{1}{a}$$

$$h) \frac{3}{m+3} - \frac{2}{m+1} - \frac{1}{m+1}$$

$$i) \frac{9x-13}{6x-15y} + \frac{2x+3}{8x-20y} - \frac{7 \cdot (x-1)}{4x-10y}$$

$$j) \frac{7}{3a+6b} - \frac{1}{2a+4b} - \frac{5}{4a+8b}$$

$$k) \frac{x-y}{x} - \frac{x^2+y^2}{x^2-xy}$$

$$l) \frac{4}{x-1} + \frac{3}{1-x}$$

$$m) \frac{a-7}{2a-1} - \frac{3a+2}{3a+1}$$

$$n) \frac{15}{3x-9} - \frac{4}{4-12x}$$

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Vereinfache

$$a) \frac{a}{a-b} - \frac{b}{a+b} - \frac{2ab}{a^2-b^2}$$

$$b) \frac{a-3}{4a^2-28a+49} - \frac{a+2}{4a^2-49}$$

$$c) \frac{x+3}{2x+3} - \frac{x+4}{2x-3} + \frac{21}{4x^2-9}$$

$$d) \frac{2p-1}{10p-6} - \frac{p}{25p^2-9} - \frac{3p+2}{15p+9}$$

$$e) \frac{a^2+b^2}{2ab} - \frac{a}{a+b} - \frac{b}{a-b} + \frac{a^3+2ab^2+b^3}{2a^3-2ab^2}$$

$$f) \frac{2n^2+16}{n^4-16} - \frac{n}{n+2} + 1$$

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## Multiplikation und Division

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Vereinfache

$$a) \frac{8a}{27b} \cdot \frac{9bc}{16a}$$

$$b) 3a \cdot \frac{4}{5a}$$

$$c) \frac{-a}{b} \cdot \frac{-b}{c} \cdot \frac{-c}{a}$$

$$d) 24x^2y^2 \cdot \frac{-2x^3}{11y^3}$$

$$e) \frac{-21u^2v}{26v^4} \cdot \frac{-39v}{28uw^3}$$

$$f) \left(-\frac{a}{b}\right)^3$$

$$g) \frac{p}{q} \cdot pq$$

$$h) (-a) \cdot \frac{-b}{c}$$

$$i) a \cdot \frac{-b}{c}$$

$$j) \frac{-x^2y}{28z^3} \cdot \frac{7z^2}{x^2y^2}$$

$$k) \frac{9a}{4b} \cdot 6ab$$

$$c) \left(\frac{-2}{ab^2}\right)^3$$

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Vereinfache

$$a) 4z \cdot \frac{z+1}{8z^2+12z}$$

$$b) \frac{5x+5y}{8x-8y} \cdot \frac{20x-20y}{3x+3y}$$

$$c) \frac{5a^2}{5b-3} \cdot \frac{9-15b}{10ac}$$

$$d) \frac{5}{q^2-1} \cdot (q-1)$$

$$e) \frac{x^2+y^2}{x^2-y^2} \cdot \frac{x-y}{xy}$$

$$f) \frac{7r^2s}{12 \cdot (r-s)} \cdot \frac{(2s-2r)^2}{21rs^2}$$

$$g) \frac{d}{d^2-10d+25} \cdot (d-5)$$

$$h) (3x+3y) \cdot \frac{9}{x+y}$$

$$i) \frac{d-1}{18d} \cdot \frac{12d^2}{1-d}$$

$$j) \frac{t}{4u+4v} \cdot \frac{3u^2-3v^2}{t^2+t}$$

$$k) \frac{v^2+4v+4}{3t-3} \cdot \frac{9t-9}{v^2+2v}$$

$$j) \frac{x^2-6xy+9y^2-z^2}{5m-5n} \cdot \frac{m^4-n^4}{x-3y+z}$$

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Vereinfache

$$a) \frac{u^2}{v^2} : u$$

$$b) \frac{5km}{6} : \frac{3k}{2m}$$

$$c) 19r^2s^2 : \frac{19r^2s^2}{23t}$$

$$d) \frac{112u^2}{19xyz} : \frac{-7u}{19xyz}$$

$$e) \frac{xy}{wz} : yz$$

$$f) 21u^2v : \frac{7u^3}{9v^2}$$

$$g) \left(-\frac{78f}{85h^3}\right) : \left(-\frac{48f^2}{17h^3}\right)$$

$$h) \frac{x^3}{z} : \left(-\frac{x^2}{z}\right)$$

$$i) \frac{-14xy}{9z^3} : \frac{21x^2}{99z^2}$$

j)  $-\frac{72a^9}{c} : (-24a^3)$

k)  $\left(-\frac{abc}{3}\right) : ab^2$

l)  $\frac{9c^2d}{ab} : 3cd^2$

Vereinfache

a)  $\frac{25a^2-1}{3} : (5a+1)$

b)  $\frac{m^2-8m+16}{a^2} : \frac{m-4}{a^2-a}$

c)  $(1-p) : \frac{4(p-1)}{3}$

d)  $\frac{a+b}{c} : (2a+2b)$

e)  $\frac{15}{a+b} : \frac{3}{a+b}$

f)  $\frac{12x-12y}{a+b} : 12a$

g)  $\frac{xy-y^2}{x+y} : \frac{3x+3y}{x-y}$

h)  $(m^2-n^2) : \frac{m+n}{m-n}$

i)  $\frac{162a^9}{a^2-2ab+b^2} : \left(-\frac{36a^3}{b-a}\right)$

j)  $\frac{a^4-1}{ac-c^2} : \frac{4a+4}{a^2-ac-ab+bc}$

k)  $(a-b)(a-c) : \frac{a^2-b^2}{a-c}$

l)  $\frac{m^2-m}{m+2} : \frac{m^2-1}{4m+8}$

Vereinfache

a)  $xy\left(\frac{x}{y} - \frac{y}{x}\right)$

b)  $\left(c - \frac{d}{c}\right)\left(c + \frac{d}{c}\right)$

c)  $\left(\frac{n}{2} - \frac{1}{n}\right)^2$

d)  $-\frac{r^2}{s^2}\left(\frac{s}{r} - \frac{s^2}{r^2} + \frac{s^3}{r^3}\right)$

e)  $(u-z)\left(\frac{u}{u-z} - \frac{z}{u^2-z^2}\right)$

f)  $\left(\frac{p}{q}-1\right)^2 - \left(\frac{p}{q}+1\right)^2$

g)  $\frac{u^2-v^2}{u^2+v^2}\left(\frac{u}{u+v} + \frac{v}{u-v}\right)$

h)  $\left(\frac{x}{3} - \frac{y}{2}\right)\left(\frac{x}{2} + y\right) - \left(\frac{x}{3} + y\right)\left(\frac{x}{2} - y\right)$

Vereinfache

$$\text{a) } \left( a^2 + \frac{a}{b} \right) : \frac{a}{b}$$

$$\text{b) } \left( \frac{x^4}{y^2} - x^3 \right) : \left( -\frac{x^2}{y} \right)$$

$$\text{c) } \left( x^2 - \frac{1}{y^2} \right) : \left( x + \frac{1}{y} \right)$$

$$\text{d) } \left( 4xy - \frac{2x}{y} \right) : \frac{2x}{y}$$

$$\text{e) } \left( \frac{x^2y}{4} - \frac{5xy^2}{6} - 10 \right) : \frac{5xy}{8}$$

$$\text{f) } \left( u^2 + \frac{u}{v} \right) : \frac{u}{v}$$

$$\text{g) } \left( 4x - \frac{5xy}{7z} + \frac{9xy^2}{14z^2} \right) : \left( -\frac{3xy}{7z^2} \right)$$

$$\text{h) } \left( 1 - \frac{1}{n^2} \right) : \left( 1 + \frac{1}{n} \right)$$

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