

Vermischte Aufgaben zu Termen
Teil II: Bruchterme

1. Bruchterme mit gleichen Nennern zusammenfassen und kürzen

Aufgabe 1.

a) $\frac{4}{x} - \frac{2}{x}$

b) $\frac{5b}{y} + \frac{3b}{y}$

c) $\frac{5a}{11b} + \frac{2a}{11b} - \frac{4a}{11b}$

d) $\frac{16ab}{3a} + \frac{14ac}{3a} - \frac{15ac}{3a}$

e) $\frac{4x}{3b} - \frac{18bx}{3b} + \frac{20x}{3b}$

f) $\frac{n+x}{3c} + \frac{n-x}{3b}$

g) $\frac{n+x}{4n} - \frac{n-x}{4n}$

h) $\frac{6ab+x}{5c} - \frac{ab-x}{5c}$

i) $\frac{2+a}{x} + \frac{2-2a+5b}{x}$

j) $\frac{3a+5b}{a} - \frac{5b+8a}{a}$

k) $\frac{xy+y}{5m} - \frac{xy-y}{5m}$

l) $\frac{x+7}{-2b} + \frac{3}{-2b} - \frac{x-6}{-2b}$

m) $\frac{5a+b}{-5x} - \frac{a+b}{-5x} - \frac{a+7b}{-5x}$

n) $\frac{11x+xy}{5y} - \frac{2x-4xy}{5y} - \frac{4x-5xy}{5y}$

o) $\frac{mx+my}{m+n} + \frac{nx+ny}{m+n}$

p) $\frac{mx-my}{m+n} + \frac{nx-ny}{m+n}$

q) $\frac{ax+y}{a+n} + \frac{nx-y}{a+n}$

r) $\frac{ax+ay}{a+n} + \frac{nx+ny}{a+n}$

s) $\frac{3x-2y}{u+w} - \frac{3x+2y}{u+w}$

t) $\frac{17ax-5ab}{5x+2b} - \frac{2ax-11ab}{5x+2b}$

u) $\frac{11by+18ax}{x-y} + \frac{7ax-2by}{x-y} - \frac{7ax-4by}{x-y}$

v) $\frac{7x}{x+1} + \frac{7}{7+x}$

w) $\frac{17ax-5ab}{5x+2b} + \frac{11ab-2ax}{2b+5x}$

x) $\frac{11ay+18ax}{x+y} + \frac{7ax-2ay}{x+y} - \frac{7ax-9ay}{x+y}$

y) $\frac{7x-5y}{x-y} + \frac{8x+3y}{x-y} - \frac{8x-9y}{x-y}$

z) $\frac{5c+4d}{c+d} - \frac{8c-13d}{c-d} + \frac{9c-11d}{c-d}$

2. Bruchterme erweitern, zusammenfassen und kürzen

Aufgabe 2.

$$\begin{array}{ll} a) \frac{3a-4b}{4} + \frac{a+6b}{3} - \frac{7a+b}{6} & b) \frac{2a+3b-c}{5} - \frac{5a+b+4c}{3} - 3a \\ c) \frac{4x-8y+5z}{2} - \frac{3x+7y-2z}{6} & d) \frac{4ab+6ac}{6} - \frac{5ab-7ac}{7} \\ e) \frac{8y+5x}{5} + \frac{3x-5y}{7} & f) \frac{16ac+12ab}{4} - \frac{20ac+26ab}{5} \\ g) \frac{a+3b}{2} + \frac{3a-b}{4} + \frac{2a-5y}{8} & h) \frac{3ax-4bx-5cx}{3} - \frac{7ax-4bx}{15} + 2cx \\ i) \frac{3a-4b}{2} - \frac{5a-10b}{10} - \frac{10ab-30b-8}{15} \end{array}$$

Aufgabe 3.

$$\begin{array}{ll} a) \frac{5x+3y}{3a} - \frac{2x+5y}{6b} - \frac{8x+6y}{6ab} & b) \frac{8x+7y}{10x} - \frac{9x-5y}{15x} - \frac{2}{3} \\ c) \frac{4a-3n}{2} + \frac{3a-8}{7n} - \frac{1}{2} & d) \frac{3x}{4b} + \frac{3ax}{8ab} - \frac{6x}{12a} \\ e) \frac{7ad}{5c} - \frac{3d}{8c} & f) \frac{8axy}{20dn} - \frac{12ady}{36nx} \\ g) \frac{ap}{nx} + \frac{ar}{ns} - \frac{ax}{ny} & h) \frac{4x}{5y} + \frac{12nx}{15my} - \frac{16ax}{20cy} \\ i) \frac{14ax}{27bn} - \frac{63adx}{18nb} + \frac{84ax}{54bn} & j) \frac{3\pi Ddh}{36} + \frac{2\pi D^2h}{24} + \frac{\pi d^2h}{12} \\ k) \frac{n-x}{4a} - \frac{n+x}{5a} + \frac{n+x}{3a} & l) \frac{2x+4n}{2x} + \frac{2x-4n}{6x} - \frac{x}{12x} \\ m) \frac{4}{a} + \frac{3}{b+c} & n) \frac{3}{4} - \frac{b}{a-b} \\ o) \frac{a}{y-c} + \frac{a}{x+b} & p) \frac{4x}{4c-3d} - \frac{3x}{3a-4b} \\ q) \frac{5x}{a+b} - \frac{3y}{cd} + \frac{4x}{a+b} + \frac{8y}{cd} + \frac{x}{cd} & r) \frac{12b}{n+x} + \frac{3a}{cy} - \frac{3b}{n+x} + \frac{4a}{cy} + \frac{b}{2cy} \\ s) \frac{7ab(n-x)}{16nx} + \frac{21ab(x-y)}{20xy} - \frac{14ab(y-n)}{12ny} \\ t) \frac{5a-7b}{9a+6b} - \frac{3x+5y}{6x+6y} + \frac{8by+ax-3ay-10bx}{2(3ax+3ay+2bx+2by)} \\ u) \frac{5x-4y}{8x-20y} - \frac{3a+c}{2a+2c} + \frac{14ax-52ay-22cy+2cx}{8(2ax+2cx-5ay-5cy)} \\ v) \frac{7x+3y}{10x+5y} - \frac{9a+2b}{14a+21b} - \frac{381bx+159by+20ay}{105(4ax+6bx+2ay+3by)} \end{array}$$

3. Bruchterme multiplizieren, faktorisieren und kürzen

Aufgabe 4.

$$a) \frac{6x}{bc} \cdot \frac{bc}{18x}$$

$$c) \frac{12a}{5b} \cdot \frac{28}{3} \cdot \frac{15x}{14a}$$

$$e) \left(-\frac{15ab}{76xy}\right) \cdot \left(-\frac{4x}{5b}\right) \cdot \left(-\frac{38y}{5}\right)$$

$$g) \frac{6ab}{5(x+y)} \cdot \frac{25(x+y)}{3b}$$

$$i) \frac{x-5}{6y} \cdot \frac{4x}{5-x} \cdot \left(-\frac{33y}{8}\right)$$

$$k) \frac{4x+8}{12y-6} \cdot \frac{3x-6}{4y+2} \cdot \frac{5+10y}{x+2}$$

$$m) \frac{a+c}{ac} \cdot \frac{a-c}{x} \cdot \frac{by}{a+c} \cdot \frac{cx}{a-b}$$

$$o) \frac{x^2-y^2}{(x+y)^2} \cdot (2x+2y)$$

$$q) \frac{5x+5}{x^2-y^2} \cdot (x-y)$$

$$s) \frac{3c-2a}{15ab} \cdot \frac{5x+2b}{3c} \cdot \frac{9bc}{15cx+6bc-10ax-4ab}$$

$$b) \frac{125bx}{10ay} \cdot \frac{30ay}{25xz}$$

$$d) \frac{21abc}{34xyz} \cdot \frac{35z}{4n} \cdot \left(-\frac{68y}{49bc}\right)$$

$$f) \frac{a-b}{5} \cdot 10 \cdot \frac{2}{a-b}$$

$$h) \frac{m+n}{a-b} \cdot \frac{x-a}{m-n} \cdot \frac{a-b}{a-x}$$

$$j) \frac{a+b}{4x+4y} \cdot \frac{5x+5y}{a-b}$$

$$l) \frac{4x-3y}{a-3b} \cdot \frac{3b-a}{36x-27y}$$

$$n) \frac{a+b}{n} \cdot \frac{c+d}{a-b} \cdot \frac{nx}{a+b} \cdot \frac{a-b}{c+d}$$

$$p) \frac{a^2-b^2}{(a+b)^2} \cdot \frac{a+b}{(a-b)}$$

$$r) \frac{a-4}{3(a^2-16)} \cdot (3a+12)$$

Aufgabe 5.

$$a) \left(\frac{5ax}{c} + \frac{3}{4} - \frac{7a}{4c}\right) \cdot \frac{2c}{x}$$

$$c) -\frac{8rs}{9xy} \cdot \left(\frac{9yz}{4rs} - \frac{3yz}{32rs} - \frac{5z}{64s}\right)$$

$$e) \frac{20a}{3b} \cdot \left(\frac{9b}{8a} - \frac{6b}{25a} + 3b\right)$$

$$g) \left(\frac{x}{3} + \frac{y}{4}\right) \cdot \left(\frac{9}{x} - \frac{8}{y}\right)$$

$$i) \left(\frac{3a}{x} + 2a - \frac{4a}{6x}\right) \cdot \left(-\frac{2x}{3a}\right)$$

$$k) \left(\frac{1}{a} + \frac{1}{b}\right)^2$$

$$m) \left(\frac{3u}{4v} - \frac{5x}{6y}\right)^2$$

$$o) \left(\frac{x}{y} + \frac{y}{x}\right)^2$$

$$b) \frac{32efg}{14eh-5ef+12gh} \cdot \left(\frac{7eh}{8fg} - \frac{5e}{16g} + \frac{3h}{4f}\right)$$

$$d) \frac{3ax}{5b+14c-40d} \cdot \left(\frac{5b}{24a} + \frac{7c}{12a} - \frac{5d}{3a}\right)$$

$$f) -\left(\frac{a-b}{x+y} - \frac{3(a-b)}{2(x+y)} - \frac{1}{6d}\right) \cdot \frac{2(x+y)}{3(a-b)}$$

$$h) \left(\frac{3y}{10x} - \frac{6b}{15a}\right) \cdot \left(\frac{5x}{18y} - \frac{3a}{4b} + \frac{5ax}{9by}\right)$$

$$j) \frac{15x}{2} \cdot \left(\frac{5}{3x} - \frac{a}{15}\right) - \frac{2}{13x} \cdot \left(2x - \frac{13bx}{4}\right)$$

$$l) \left(\frac{a-b}{6(x+y)} - \frac{3(a-b)}{2(x+y)}\right) \cdot \left(\frac{x+y}{a-b} - \frac{2(x+y)}{3(a-b)}\right)$$

$$n) \left(\frac{1}{x} + \frac{1}{y}\right) \cdot (x-y) - (x+y) \cdot \left(\frac{1}{x} - \frac{1}{y}\right)$$

4. Bruchterme dividieren, faktorisieren und kürzen

Aufgabe 6.

$$a) \frac{48xyz}{3c} : (4xz)$$

$$b) \frac{26a}{7} : \frac{29a}{14b}$$

$$c) \frac{3a}{4b} : \frac{6ad}{2b}$$

$$d) \left(-\frac{33x}{5}\right) : \frac{55x}{10a}$$

$$e) \frac{4a}{35b} : \frac{8x}{63b}$$

$$f) \frac{12ab}{5xy} : \frac{2b}{5x}$$

$$g) (-18xy) : \left(-\frac{9y}{3a}\right)$$

$$h) -\frac{9ab}{2c} : (2a)$$

$$i) \frac{a}{a+b} : \frac{x}{a+b}$$

$$j) \frac{ax+bx}{a-b} : (a+b)$$

$$k) \frac{6x+3y}{4a-4b} : \frac{12ax+6ay}{7ax-7bx}$$

$$l) \frac{6(x+y)}{15(x-y)} : \frac{3(x+y)}{5(x-y)}$$

$$m) \left(\frac{3ax}{4bc} : \frac{6ad}{8c}\right) : \frac{18x}{2b}$$

$$n) \left(\frac{12bx-12by}{5bx} : \frac{27b-27c}{4cn}\right) : \frac{16bx-16by}{5bx-5cx}$$

$$o) \left(\left(\frac{2x}{4} : \frac{1}{3}\right) : \frac{x}{5}\right) : (4a)$$

$$p) \left(\frac{a(a-1)}{a(x-1)} : \frac{5(1-a)}{a(x+1)}\right) : \frac{1}{15(1-x)}$$

$$q) \left(\frac{2x-4}{by-3b} : \frac{6-3x}{xy+3x}\right) : \frac{y+3}{3b-by}$$

$$r) \left(\frac{3cnx-3bcx}{5ab} : \frac{9nx-9bx}{10bx+10by}\right) : \frac{4cx+4cy}{3ad}$$

$$s) \frac{3ab(a+b)}{5xy(c-d)} : \frac{3a+3b}{5c-5d} + \frac{5ab(b+c)}{4dx} : \frac{5by+5cy}{16d} - \frac{ab(3a+b)}{5cx} : \frac{y(6a+2b)}{10c}$$

Aufgabe 7.

$$a) \frac{\frac{m}{a}}{\frac{n}{a}}$$

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

$$c) \frac{\frac{y}{2}}{\frac{3}{3}}$$

$$d) \frac{\frac{18ab}{25xy}}{\frac{9b}{5y}}$$

$$e) \frac{x+\frac{x}{b}}{1+\frac{1}{b}}$$

$$f) \frac{c-\frac{d}{a}}{c+\frac{d}{a}}$$

$$g) \frac{\frac{a}{b}-\frac{x}{y}}{\frac{a}{b}+\frac{x}{y}}$$

$$h) \frac{\frac{1}{x}+y}{\frac{1}{x}-y}$$

$$i) \frac{\frac{2m-3n}{3r} - \frac{m+4n}{2t}}{\frac{4t-3r}{6n} - \frac{t+2r}{m}}$$

$$j) \frac{\frac{4a-5b}{5x} - \frac{2a-3b}{3y}}{\frac{12y-10x}{15b} - \frac{y-x}{a}}$$

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

$$l) \frac{12}{a^2-9} : \frac{3}{a+9}$$

$$m) \frac{a^2b}{a+5} : \frac{ab^2}{(a+5)^2}$$

$$n) \frac{ux-x^2}{uv+v^2} : \frac{(x-u)^2}{(u+v)^2}$$

Aufgabe 8.

- a) $(8ac - 4adx - a) : (2a)$ b) $(30ac - 15bcd + 35cx) : (5c)$
- c) $(24nx - 12bx + 16cx) : (-4x)$ d) $(36ab + 60ac - 24ax) : (-6a)$
- e) $(-24ab + 28ax - 56bx) : (-14abx)$ f) $\frac{-12x^2 + 33x^2y - 24x^4}{-3x^2}$
- g) $\left(\frac{18bc}{5x} + \frac{21abc}{2y} - \frac{12ab}{5c}\right) : (3ab)$ h) $\left(\frac{25cx}{16by} + \frac{5bx}{8cy}\right) : \frac{5x}{4y}$
- i) $\left(\frac{15x}{28ab} - \frac{20x}{21b} + \frac{10x}{7a}\right) : \frac{5x}{7a}$ j) $\left(\frac{22pq}{3n} - \frac{99ps}{5v} + \frac{55ps}{7w}\right) : (11pq)$
- k) $(24ab + 36ac - 60bc) : \frac{12abc}{3x}$ l) $\left(-\frac{15ab}{8xy} - \frac{25ac}{12x} + \frac{5a}{16y}\right) : \left(-\frac{25ab}{6xy}\right)$
- m) $\left(\frac{35ab}{6cx} - \frac{15b}{2x} + \frac{45a}{8c}\right) : \left(-\frac{5ab}{2c}\right)$

Aufgabe 9.

- a) $(36x - 54z) : (4x - 6z)$ b) $(35ac - 45bc) : (7a - 9b)$
- c) $(6n + 4x - 14z) : (3n + 2z - 7z)$ d) $(cx + cy + dx + dy) : (x + y)$
- e) $(12ax + 16bx + 12by + 24bz) : (3a + 4b)$ f) $(30ab - 18ab - 40a + 24) : (3b - 4)$
- g) $(15ax - 6ay - 20bx + 8by) : (5x - 2y)$ h) $(6ax - 3x - 12a + 6) : (2a - 1)$
- i) $(15cx - 12bx + 8by - 10cy) : (-4b + 5c)$ j) $(2ax + ay + 2bx + by) : (2x + y)$
- k) $\frac{16px - 8py - 32qx + 16qy}{8x - 4y}$
- l) $\frac{8ax + 16bx - 24cx - 10ay - 20by + 30cy}{2a + 4b - 6c}$
- m) $\frac{14ax + 10bx - 6cx - 21ap - 15bp + 9cp}{7a + 4b - 6c}$
- n) $\left(\frac{10b}{6} - \frac{175mnxy}{36acd} + \frac{24abcd}{10xy} - 7mn\right) : \left(\frac{50xy}{18a} + 4cd\right)$
- o) $\left(\frac{126ax}{8b} - \frac{27nx}{4b} + \frac{14ab}{12x} - \frac{bn}{2x}\right) : \left(\frac{18x}{2b} + \frac{4b}{6x}\right)$
- p) $(15ax - 10ac + 5ad - 6bx + 4bc - 2bd) : (5a - 2b)$
- q) $\frac{16bx + 8ax - 24cx - 20by - 10ay + 30cy}{2a + 4b - 6c}$

Aufgabe 10.

$$a) (x^2 - 4x - 21) : (x + 3) \quad b) (x^2 - 14x + 45) : (x - 9)$$

$$c) (x^2 - y^2) : (x - y) \quad d) (a^3 + 1) : (a + 1)$$

$$e) (6x^2 + 29x + 35) : (3x + 7) \quad f) (35x^2 + 8x - 3) : (5x - 1)$$

$$g) (u^3 + 8) : (u + 2) \quad h) (x^4 - 1) : (x - 1)$$

$$i) (x^2 + 3x - 8) : (x + 5) \quad j) (2x^3 + 5x - 7) : (2x - 7)$$

$$k) (x^2 - 2) : (x + 1) \quad l) (x^3 + 2x^2 - x - 1) : (x + 2)$$