

**Übungen** zu 1.6.3

**Dividieren von Termen mit Vorzeichen**

Berechnen Sie oder vereinfachen Sie so weit wie möglich die Quotienten:

1.  $\frac{-27}{9}$
2.  $\frac{15}{-5}$
3.  $\frac{-25}{-5}$
4.  $\frac{-24}{6}$
5.  $\frac{-3a}{5b}$
6.  $\frac{15an}{-3b}$
7.  $\frac{-20xy}{-4ab}$
8.  $\frac{-9ab}{3xy}$
9.  $(-180a) : 3c$
10.  $\frac{16x}{6b}$
11.  $\frac{-36bc}{-8xz}$
12.  $\frac{15ax}{-3bc}$
13.  $(-24xy) : (-8n)$

*Summe  $\geq 14$*

**Das kleinste gemeinsame Vielfache von Zahlen und Termen mit Variablen (kgV)**

Berechnen Sie das kgV:

- |      |      |      |       |      |
|------|------|------|-------|------|
| 1. 2 | 2. 4 | 3. 6 | 4. 24 | 5. 3 |
| 5    | 7    | 9    | 36    | 4    |
| 9    | 28   | 24   | 40    | 12   |
|      |      |      |       | 15   |
|      |      |      |       | 20   |
- 
- |      |       |       |       |        |
|------|-------|-------|-------|--------|
| 6. 3 | 7. 16 | 8. 66 | 9. 44 | 10. 5x |
| 17   | 24    | 396   | 45    | 35cx   |
| 51   | 49    | 714   | 484   | 15c    |
| 102  | 56    | 924   | 594   |        |
- 
- |           |           |          |          |
|-----------|-----------|----------|----------|
| 11. $abx$ | 12. $12a$ | 13. $6x$ | 14. $3a$ |
| $acx$     | $15b$     | $8x$     | $16b$    |
| $bcy$     | $16ac$    | $5xz$    | $14ab$   |
|           |           | $108xy$  |          |
- 
- |           |              |          |               |
|-----------|--------------|----------|---------------|
| 15. $4mn$ | 16. $4(a+1)$ | 17. $cd$ | 18. $5a(a+b)$ |
| $6mp$     | $2(a+1)$     | $a+b$    | $20b(a+b)$    |
| $8np$     | $15(a+1)$    | $d$      | $15ab(a+b)$   |
| $10m$     |              |          |               |
| $24p$     |              |          |               |
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- |          |            |             |              |
|----------|------------|-------------|--------------|
| 19. $cy$ | 20. $4x-2$ | 21. $4x+2y$ | 22. $x(x-c)$ |
| $2cy$    | $6x-3$     | $6x+3y$     | $x(x-d)$     |
| $n+x$    |            | $8x+4y$     | $(x-c)(x-d)$ |
- 
- |            |            |           |             |
|------------|------------|-----------|-------------|
| 23. $6x+9$ | 24. $2x-5$ | 25. $24a$ | 26. $4a-2b$ |
| $2x+2$     | $4x-10$    | $4a-2b$   | $15a$       |
|            | $27x+21$   | $-8b+16a$ | $6a-3b$     |
|            |            | $12a-6b$  | $-4b+8a$    |
- 
- |                     |                    |                      |                |
|---------------------|--------------------|----------------------|----------------|
| 27. $(4x-8y)(b-3a)$ | 28. $(6a-2)(2x-8)$ | 29. $(4x-2b)(3y-6a)$ | 30. $ab-a+b-1$ |
| $(6a-2b)(2y-x)$     | $(12a-4)(2x-8)$    | $(6x-3b)(2y-4a)$     | $ab-2a+b-2$    |
|                     | $(2-6a)(4-x)$      | $(8x-4b)(3y-6a)$     |                |

31.  $ax-2x+2a-4$
  32.  $ay+by+2a+2b$
  33.  $bc+c+b+1$
  34.  $xy-x-y+1$
  - $3x+6$
  - $ay-by+2a-2b$
  - $bc+c-b-1$
  - $xy+2y-x-2$
  - $(c+1)(c-1)$
  - $xy+y-x-1$
- 
35.  $mn+m-2n-2$
  36.  $9a+6b$
  37.  $8x-20y$
  - $mn-m-2n+2$
  - $3ax+3ay+2bx+2by$
  - $2ax+2cy-5ay-5cy$
  - $mt+2m-2n-4$
  - $3x+3y$
  - $2a+2c$
  - $3a+2b$
  - $16x-40y$

*Summe  $\geq 50$*

**Kürzen von Brüchtermen**

1.  $\frac{axby}{ax-by}$
2.  $\frac{49ax}{7bx}$
3.  $\frac{48n}{12bn}$
4.  $\frac{54acd}{9x}$
5.  $\frac{3abcd}{bc}$
6.  $\frac{0,01ab}{0,1a}$
7.  $\frac{18adx}{6bdx}$
8.  $\frac{144cb}{12cd}$
9.  $\frac{20 \cdot 18 \cdot 4 \cdot x}{30 \cdot 6 \cdot a}$
10.  $\frac{24 \cdot 6 \cdot 4 \cdot ab}{12 \cdot 8}$
11.  $\frac{6a+6b}{6}$
12.  $\frac{8x-8y}{8}$
13.  $\frac{ax+bx}{x}$
14.  $\frac{36a-12b+18c}{6}$
15.  $\frac{amx+bm+cnx}{nx}$
16.  $\frac{26a+65b-39x}{13}$
17.  $\frac{8ac-4adx-2a}{2a}$
18.  $\frac{24ad-48bd+96cd}{12d}$
19.  $\frac{59abd-12acd}{3a}$
20.  $\frac{20a+8b-12c}{-4}$
21.  $\frac{-4ax}{-6a+2a-8x}$
22.  $\frac{5ab}{15ac-20ab}$
23.  $\frac{6n+3x}{12n+15x}$
24.  $\frac{(a+n)3x}{15ax(a+n)}$
25.  $\frac{15a-6ab}{20c-8bc}$
26.  $\frac{14ab+7ac+42ab}{70ab+14ac+7ab}$
27.  $\frac{b-2}{2-b}$
28.  $\frac{-a+x}{a-x}$
29.  $\frac{(3a+n) \cdot (b-c)}{c-b}$
30.  $\frac{(5x-b) \cdot (2a+c)}{-c-2a}$
31.  $\frac{3(a+b)}{5(a+b)}$
32.  $\frac{3ab-6ac}{3bx-6cx}$
33.  $\frac{ax+ay}{bx+by}$
34.  $\frac{15x-6bx}{20c-8bc}$
35.  $\frac{-4xz}{2bx-2ax}$
36.  $\frac{5x(a+n)}{(a+n)15bx}$
37.  $\frac{x-a}{a-x}$
38.  $\frac{25ab-5ac}{15bx-3xz-5ab+az}$
39.  $\frac{2ax+2cy-5ay-5cy}{3a+3c}$
40.  $\frac{2ab+3ay-2bx-3cy}{2bc+3cy-2bx-3xy}$
41.  $\frac{15AN+10AP-3BN-2BP}{15AN+3BN+10AP+2BP}$

*Summe*

*7*

**Erweitern von Brüchtermen**

1.  $\frac{15ax}{7bx}$  mit  $(2c)$
2.  $\frac{3b}{7a}$  mit  $(-2x)$
3.  $\frac{3c}{3x+7a}$  mit  $(-1)$
4.  $\frac{8c+4b}{x}$  mit  $(3a)$
5.  $\frac{2ab+3ad-7ac}{5ab+7ac}$  mit  $(-2x)$
6.  $\frac{1,3x+3,2a-1,8b}{-1,4a-3,6x}$  mit  $(-0,2a)$

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Bringen Sie alle nachfolgenden Bruchterme auf den neben dem Bruchterm stehenden Nenner.

- 7.  $\frac{6x}{2y} (14yz); \frac{6x-7-42x}{2y-7-14y}$
- 8.  $\frac{4x}{3a} (21ab)$
- 9.  $\frac{7a}{-3b} (-21bc)$
- 10.  $\frac{-3x}{5y} (-25yz); \frac{-9a}{7b} (28bc)$
- 11.  $\frac{5x}{9y} (-36yz)$
- 12.  $\frac{5x}{9y} (-36yz)$
- 13.  $\frac{x-y}{-3y} (-12ay); \frac{2x+3y}{-4a} (32ab); \frac{5x-6y}{7z} (-42abz)$
- 14.  $\frac{x-y}{-3y} (-12ay); \frac{2x+3y}{-4a} (32ab); \frac{5x-6y}{7z} (-42abz)$
- 15.  $\frac{5x-6y}{7z} (-42abz)$
- 16.  $\frac{9a-7b}{5c} (-35cx); \frac{3a-2b}{4x+2y} (8cx+4cy)$
- 17.  $\frac{3a-2b}{4x+2y} (8cx+4cy)$
- 18.  $\frac{a+3b}{3x-1} (6x-2)$

Erweitern Sie folgende Bruchterme auf den neuen Nenner:

- 19.  $\frac{4y}{3a} \frac{21a}{21a}$  Erweiterungsfaktor? Lösung:  $\frac{21a}{3a} \cdot \frac{7 \cdot d}{3 \cdot d}$ ; Erweiterungsfaktor:  $\frac{4 \cdot 7 \cdot 28x}{3a \cdot 7 \cdot 21a}$

Erweiterungsfaktor?

Summe ≥ 60

Erweiterungsfaktor?

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Übungen zu 1.7

Addieren und Subtrahieren von gleichnamigen Bruchtermen

- 1.  $\frac{6}{a} + \frac{5}{a} = \frac{11}{a}$
- 2.  $\frac{4}{x} - \frac{2}{x} = \frac{2}{x}$
- 3.  $\frac{5b}{11} - \frac{3b}{11} = \frac{2b}{11}$
- 4.  $\frac{5a}{11} - \frac{2a}{11} = \frac{3a}{11}$
- 5.  $\frac{16ab}{3a} - \frac{14ac}{3a} = \frac{2ab-14ac}{3a}$
- 6.  $\frac{3a}{3} - \frac{3a}{3} = 0$
- 7.  $\frac{n+x}{3} - \frac{n-x}{3} = \frac{2x}{3}$
- 8.  $\frac{6ab+x}{5c} - \frac{ab-x}{5c} = \frac{5ab+2x}{5c}$
- 9.  $\frac{3a+5b}{a} - \frac{5b+8a}{a} = \frac{-5a-3b}{a}$
- 10.  $\frac{2+a}{x} - \frac{2-2a}{x} = \frac{4a}{x}$
- 11.  $\frac{x+y}{2} - \frac{x-y}{2} = \frac{2y}{2} = y$
- 12.  $\frac{x+y}{2} - \frac{x-y}{2} = y$
- 13.  $\frac{xy+y}{2a} - \frac{xy-y}{2a} = \frac{2y}{2a} = \frac{y}{a}$
- 14.  $\frac{5a+b}{-5} - \frac{a+b}{-5} = \frac{4a}{-5} = -\frac{4a}{5}$
- 15.  $\frac{x+7}{-2} + \frac{3x-6}{-2} = \frac{4x-6}{-2} = -2x+3$
- 16.  $\frac{5a+b}{-5} - \frac{a+b}{-5} = \frac{4a}{-5} = -\frac{4a}{5}$
- 17.  $\frac{11b+ab}{5b} - \frac{2b-4ab}{5b} = \frac{9b+5ab}{5b} = \frac{9+5a}{5}$
- 18.  $\frac{3+a}{7a} - \frac{6-a}{7a} = \frac{3+a-6+a}{7a} = \frac{2a-3}{7a}$
- 19.  $\frac{4x+5y+6z}{3a} - \frac{3x-6y-6z}{3a} = \frac{x+9y+12z}{3a}$
- 20.  $\frac{1+a}{b} - \frac{1-2a+5b}{b} = \frac{2a-5b}{b}$
- 21.  $\frac{mx+my}{m+n} + \frac{nx+ny}{m+n} = \frac{(m+n)x+(m+n)y}{m+n} = x+y$
- 22.  $\frac{mx+my}{m+n} + \frac{nx+ny}{m+n} = x+y$
- 23.  $\frac{ax+y}{a+n} + \frac{nx-y}{a+n} = \frac{ax+y+nx-y}{a+n} = \frac{ax+nx}{a+n} = \frac{x(a+n)}{a+n} = x$
- 24.  $\frac{ax+y}{a+n} + \frac{nx-y}{a+n} = x$
- 25.  $\frac{3x-2y}{a+b} - \frac{3x+2y}{a+b} = \frac{-4y}{a+b}$
- 26.  $\frac{ax-y}{a+n} + \frac{nx-ny}{a+n} = \frac{ax-y+nx-ny}{a+n} = \frac{ax+nx-y(1+n)}{a+n}$
- 27.  $\frac{17ax-5ab}{5x+2b} - \frac{2ax-11ab}{5x+2b} = \frac{15ax+9ab}{5x+2b}$
- 28.  $\frac{11by+18ax}{x-y} + \frac{7ax-2by}{x-y} = \frac{18ax+7ax+11by-2by}{x-y} = \frac{25ax+9by}{x-y}$
- 29.  $\frac{5c+4d}{c+d} - \frac{8c-13d}{c+d} = \frac{-3c+17d}{c+d}$
- 30.  $\frac{9a}{a+b} + \frac{9b}{a+b} = \frac{9(a+b)}{a+b} = 9$
- 31.  $\frac{7x}{x+1} + \frac{7}{x+1} = \frac{7(x+1)}{x+1} = 7$
- 32.  $\frac{7x-5y}{x-y} + \frac{8x+3y}{x-y} = \frac{15x-2y}{x-y}$
- 33.  $\frac{17ax-5ab}{5x+2b} - \frac{2ax-11ab}{5x+2b} = \frac{15ax+9ab}{5x+2b}$
- 34.  $\frac{5x+2b}{c+d} - \frac{5x+2b}{c+d} = 0$
- 35.  $\frac{7x-5y}{x-y} - \frac{8x+3y}{x-y} = \frac{-x-8y}{x-y}$

Summe = 50

Addieren und Subtrahieren von ungleichnamigen Bruchtermen

- 1.  $\frac{a}{6} + \frac{a}{12} = \frac{2a}{12} + \frac{a}{12} = \frac{3a}{12} = \frac{a}{4}$
- 2.  $\frac{3x}{6} + \frac{5x}{9} = \frac{x}{2} + \frac{5x}{9} = \frac{9x+10x}{18} = \frac{19x}{18}$
- 3.  $\frac{4a}{9} - \frac{8b}{27} = \frac{4a}{9} - \frac{8b}{27} = \frac{12a-8b}{27}$
- 4.  $\frac{7b}{10} - \frac{9a}{20} = \frac{7b}{10} - \frac{9a}{20} = \frac{14b-9a}{20}$
- 5.  $\frac{3a-4b}{4} - \frac{a+6b}{3} = \frac{3(3a-4b)-4(a+6b)}{12} = \frac{9a-12b-4a-24b}{12} = \frac{5a-36b}{12}$

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Dividieren von Bruchtermen

- $\frac{9x}{5b} : \frac{3a}{5b} = \frac{9x}{5b} \cdot \frac{5b}{3a} = \frac{3x}{a}$
- $\frac{144abx}{3c} : 12ax = \frac{144abx}{3c} \cdot \frac{1}{12ax} = \frac{4b}{c}$
- $\frac{3a}{4b} : \frac{6ad}{2b} = \frac{3a}{4b} \cdot \frac{2b}{6ad} = \frac{1}{2a}$
- $\frac{34a}{3x} : \frac{85x}{63b} = \frac{34a}{3x} \cdot \frac{63b}{85x} = \frac{136ab}{85x}$
- $\frac{9y}{(-18xy)} : \left(\frac{9y}{-3a}\right) = \frac{9y}{(-18xy)} \cdot \left(\frac{-3a}{9y}\right) = \frac{a}{2x}$
- $\frac{ax+bx}{a-b} : (a+b) = \frac{ax+bx}{a-b} \cdot \frac{1}{a+b} = \frac{ax+bx}{(a-b)(a+b)}$
- $\frac{6(x+y)}{15(x-y)} : \frac{3(x+y)}{5(x-y)} = \frac{6(x+y)}{15(x-y)} \cdot \frac{5(x-y)}{3(x+y)} = \frac{2}{3}$
- $\frac{3ax}{4bc} : \frac{6ad}{8c} = \frac{3ax}{4bc} \cdot \frac{8c}{6ad} = \frac{2cx}{2ad} = \frac{cx}{ad}$
- $\frac{8a^2(a+b)}{5n} : \frac{2a(a+b)}{25n(c-n)} = \frac{8a^2(a+b)}{5n} \cdot \frac{25n(c-n)}{2a(a+b)} = \frac{4a^2(c-n)}{n}$
- $\frac{3cax-3bcx}{5ab} : \frac{9ax-9bx}{20bx+20by} = \frac{3cax-3bcx}{5ab} \cdot \frac{20bx+20by}{9ax-9bx} = \frac{20c(b+y)}{3a(b-x)}$
- $\frac{3ab(a+b)}{5xy(c-d)} : \frac{3a+3b}{5c} = \frac{3ab(a+b)}{5xy(c-d)} \cdot \frac{5c}{3a+3b} = \frac{abc}{xy(c-d)}$

**ALLE AUFGABEN**

$$\frac{\frac{m}{a} \cdot \frac{x}{b}}{\frac{n}{a} \cdot \frac{y}{b}} = \frac{\frac{mx}{ab}}{\frac{ny}{ab}} = \frac{mx}{ny}$$

$$\frac{\frac{a}{n} \cdot \frac{x}{b}}{\frac{a}{n} \cdot \frac{y}{b}} = \frac{\frac{ax}{nb}}{\frac{ay}{nb}} = \frac{ax}{ay} = \frac{x}{y}$$

$$\frac{\frac{a}{n} \cdot \frac{x}{b}}{\frac{a}{n} \cdot \frac{y}{b}} = \frac{\frac{ax}{nb}}{\frac{ay}{nb}} = \frac{ax}{ay} = \frac{x}{y}$$

Dividieren eines Summenterms durch einen Produktterm:

- $(55abc+28abc-21abc) : 7bcd = \frac{50abc}{7bcd} = \frac{50a}{7d}$
- $(8ac-4ada-a) : 2a = \frac{8ac-4ada-a}{2a} = \frac{8c-4ad-1}{2}$
- $(39abd-12acd+45acd) : 3d = \frac{39abd-12acd+45acd}{3d} = 13ab-4ac+15ac = 13ab+11ac$
- $(25a+60b-125c) : (-5) = \frac{25a+60b-125c}{-5} = -5a-12b+25c$
- $(-42ab+28ax-56bx) : (-14abx) = \frac{-42ab+28ax-56bx}{-14abx} = \frac{3b}{x} - 2 + \frac{4}{a}$
- $\frac{22pq}{39n} : \frac{9ps}{25v} = \frac{22pq}{39n} \cdot \frac{25v}{9ps} = \frac{22q}{117n} \cdot \frac{25v}{9s}$
- $\frac{15ab}{8xy} : \frac{25ac}{12x} = \frac{15ab}{8xy} \cdot \frac{12x}{25ac} = \frac{3ab}{10cy}$
- $(24ab+36ac-60bc) : 23x = \frac{24ab+36ac-60bc}{23x}$
- $\frac{35ab}{12cx} : \frac{45a}{8c} = \frac{35ab}{12cx} \cdot \frac{8c}{45a} = \frac{7b}{9x}$

Dividieren eines Produktterms durch einen Summenterm:

- $bn : (abn-bnx) = \frac{bn}{abn-bnx} = \frac{1}{a-x}$
- $48ax : (9ac-36ad+18ax) = \frac{48ax}{9ac-36ad+18ax} = \frac{16x}{3a-12d+6x}$
- $bn : (abn-bnx) = \frac{bn}{abn-bnx} = \frac{1}{a-x}$
- $2ab : (abx-cbx+b) = \frac{2ab}{abx-cbx+b} = \frac{2}{x-1+\frac{b}{a}}$
- $48abc : (12acx-36acy+48ac) = \frac{48abc}{12acx-36acy+48ac} = \frac{4b}{x-3y+4c}$

Dividieren von Summentermen

- $\frac{8a}{a+b} : \frac{4}{2a+b} = \frac{8a}{a+b} \cdot \frac{2a+b}{4} = \frac{2a(2a+b)}{a+b}$
- $(36x-54z) : (4x-6z) = \frac{36x-54z}{4x-6z} = \frac{9(4x-6z)}{4x-6z} = 9$
- $(39n+26x-91z) : (3n+2x-7z) = \frac{39n+26x-91z}{3n+2x-7z} = \frac{13(3n+2x-7z)}{3n+2x-7z} = 13$
- $(24ax+32bx-30ay-40by) : (6a+8b) = \frac{24ax+32bx-30ay-40by}{6a+8b} = \frac{6(4ax+8bx-5ay-10by)}{6a+8b} = \frac{4ax+8bx-5ay-10by}{a+\frac{4}{3}b}$
- $(16xy+32xz+24by+48bz) : (4y+8z) = \frac{16xy+32xz+24by+48bz}{4y+8z} = \frac{4(4xy+8xz+6by+12bz)}{4y+8z} = \frac{4xy+8xz+6by+12bz}{y+2z}$
- $(30ax-12ay-40bx+16by) : (10x-4y) = \frac{30ax-12ay-40bx+16by}{10x-4y} = \frac{2(15ax-6ay-20bx+8by)}{10x-4y} = \frac{15ax-6ay-20bx+8by}{5x-2y}$
- $(45ax-36bx+30ay-24by) : (15a-12b) = \frac{45ax-36bx+30ay-24by}{15a-12b} = \frac{3(15ax-12bx+10ay-8by)}{15a-12b} = \frac{15ax-12bx+10ay-8by}{5a-4b}$
- $(60ac+80bc+72ad+96bd) : (12a+16b) = \frac{60ac+80bc+72ad+96bd}{12a+16b} = \frac{4(15ac+20bc+18ad+24bd)}{12a+16b} = \frac{15ac+20bc+18ad+24bd}{3a+4b}$
- $\left(\frac{1}{8}bx+\frac{1}{12}by-\frac{1}{10}cx-\frac{1}{15}cy\right) : \left(\frac{1}{2}x+\frac{1}{3}y\right) = \frac{\frac{1}{8}bx+\frac{1}{12}by-\frac{1}{10}cx-\frac{1}{15}cy}{\frac{1}{2}x+\frac{1}{3}y} = \frac{3bx+2by-4cx-2cy}{6x+4y}$
- $(0,1bx-0,2cx-0,5by+cy) : (0,1b-0,2c) = \frac{0,1bx-0,2cx-0,5by+cy}{0,1b-0,2c} = \frac{bx-2cx-5by+10cy}{b-2c}$
- $\frac{14ax+10bx-6cx-21ap-15bp+9cp}{7a+5b-3c} = \frac{7(2ax+2bx-2cx-3ap-3bp+3cp)}{7a+5b-3c} = \frac{2ax+2bx-2cx-3ap-3bp+3cp}{a+\frac{5}{7}b-\frac{3}{7}c}$
- $\frac{10b}{6} : \frac{175mny}{36acd} + \frac{24abcd}{10xy} - 7mn = \frac{10b}{6} \cdot \frac{36acd}{175mny} + \frac{24abcd}{10xy} - 7mn = \frac{2b}{7} \cdot \frac{6acd}{175mny} + \frac{24abcd}{10xy} - 7mn$
- $\frac{0,5ax}{3c} + \frac{4,5abx}{3c} + 0,5 = \frac{0,5ax+4,5abx}{3c} + 0,5 = \frac{0,5x(1+9ab)}{3c} + 0,5$
- $(15ax-10ac+5ad-6bx+4bc-2bd) : (5a-2b) = \frac{15ax-10ac+5ad-6bx+4bc-2bd}{5a-2b} = \frac{5(3ax-2ac+d-1,2bx+0,8bc-0,4bd)}{5a-2b} = \frac{3ax-2ac+d-1,2bx+0,8bc-0,4bd}{a-\frac{2}{5}b}$
- $(8ay+12by-2cy+10az+15z-2,5cz) : (4y+5z) = \frac{8ay+12by-2cy+10az+15z-2,5cz}{4y+5z} = \frac{2(4ay+6by-cy+5az+7,5z-1,25cz)}{4y+5z} = \frac{4ay+6by-cy+5az+7,5z-1,25cz}{2y+\frac{5}{2}z}$
- $\frac{12ac+20ax+8ay-18bc-30bx-12by}{4a-6b} = \frac{12ac+20ax+8ay-18bc-30bx-12by}{4a-6b}$
- $\frac{28ax+20bx-12cx-42ap-30bp+18cp}{14a+10b-6c} = \frac{28ax+20bx-12cx-42ap-30bp+18cp}{14a+10b-6c}$
- $\frac{45ax-36bx+30ay-27by}{15a-12b} = \frac{45ax-36bx+30ay-27by}{15a-12b}$

Vermischte Aufgaben zur Wiederholung von 1.6 und 1.7

Berechnen Sie den Wert folgender Bruchterme:

- $\frac{32bc}{8x} = 4bc$
- $\frac{60PN}{12B} = 5PN$
- $\frac{42xz}{7ab} = \frac{6xz}{ab}$
- $\frac{25ab}{-5x} = -5ab$
- $\frac{45ax}{-9bc} = -5\frac{ax}{bc}$
- $\frac{36ab}{9c} = 4ab$
- $\frac{-16}{-4} = 4$
- $\frac{-12ab}{-4xy} = 3\frac{ab}{xy}$

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Zerlegen Sie die Koeffizienten folgender Produktterme in Primfaktoren:

- 9.  $396xy^2$
- 10.  $462ab$
- 11.  $204bcx$
- 12.  $420ady$
- 13.  $180abc$
- 14.  $168axy$
- 15.  $24bx$
- 16.  $108ax$
- 17.  $252ac$
- 18.  $210ay$
- 19.  $74cx$
- 20.  $120bcx$
- 21.  $72abx$
- 22.  $300acx$
- 23.  $441xy$
- 24.  $120bcx$
- 25.  $72abx$
- 26.  $588acd$
- 27.  $735axy$

Berechnen Sie das kleinste gemeinsame Vielfache:

- 17.  $315aby$
- 18.  $330xy^2$
- 19.  $48ax - 72ay$
- 20.  $12ax - 30bx$
- 21.  $2ax + 3bx - 2ay - 3by$
- 22.  $3am + 5mx + 3an + 5nx$
- 23.  $140axy$
- 24.  $24m^2 - 16ms$
- 25.  $4x + 12y$
- 26.  $210by$
- 27.  $132yz$
- 28.  $14c - 28$
- 29.  $700ab$
- 29.  $792xy$
- 30.  $20xy - bm + 2ay - bn$
- 31.  $2ax + 3bx - 2ay - 3by$
- 32.  $4ax + 6bx + 2ay + 3by$
- 33.  $(x-y)(2x+y)$
- 34.  $2ax - 3bx - 2ay - 3by$
- 35.  $-10bc + 4ac$
- 36.  $6ac - 9b$

Kürzen Sie folgende Bruchterme:

- 23.  $\frac{ac+ad}{cx+dx} \cdot \frac{a(c+d)}{x(c+d)}$
- 24.  $\frac{24m^2 - 16ms}{4m}$
- 25.  $\frac{4x + 12y}{8x + 2y}$
- 26.  $\frac{2x - 8y}{3x - 12y}$
- 27.  $\frac{ax - bx}{am - bm}$
- 28.  $\frac{14c - 28}{21c - 42}$
- 29.  $\frac{18a - 30b}{12a - 20b}$
- 30.  $\frac{5b + 15c}{14b + 42c}$
- 31.  $\frac{55ax - 66by}{45ax - 54bx}$
- 32.  $\frac{35xy - 49yz}{25xz - 35xt}$
- 33.  $\frac{3abm - 4cdm - 3abn + 4cdn}{6abx - 8cdx}$
- 34.  $\frac{2acx - 2acy - 3bx + 3by}{6ac - 9b}$
- 35.  $\frac{2ab - 3ay - 2bx + 3xy}{am - bm - an + bn}$
- 36.  $\frac{mx - m - nx + n}{am - bm - an + bn}$

Bringen Sie folgende Bruchterme auf einen anderen Nennernorm:

- 37.  $\frac{1}{3} \cdot \frac{1-x+y}{12x+12y} = \frac{1-x+y}{3 \cdot 4(3x+3y)} = \frac{1-x+y}{12x+12y}$
- 38.  $\frac{3a-13b}{5} = \frac{15x-15y}{5} = \frac{3x-3y}{1}$
- 39.  $\frac{7x+8y}{4} = \frac{7x+8y}{4}$
- 40.  $\frac{3x-5y}{2y} = \frac{3x-5y}{2y}$
- 41.  $\frac{a-b}{a-b} = \frac{b-a}{ac-bc} = \frac{1}{c}$
- 42.  $\frac{a-b}{ac-bc} = \frac{1}{c}$
- 43.  $\frac{1}{a-b} = \frac{8ay+8by}{5(b-a)}$
- 44.  $\frac{9x-3y}{2a-3b} = \frac{10acd-2am-15bcd+3bm}{10acd-2am-15bcd+3bm}$
- 45.  $\frac{3a-4d}{a+b} = \frac{5acy-7az+5bcy-7bz}{5acy-7az+5bcy-7bz}$

Suchen Sie den Hauptnenner und erweitern Sie die Bruchterme:

- 46.  $\frac{2x}{3y} + \frac{5x}{6y} = \frac{2x \cdot 2}{3y \cdot 2} + \frac{5x}{6y} = \frac{4x}{6y} + \frac{5x}{6y} = \frac{4x+5x}{6y} = \frac{9x}{6y} = \frac{3x}{2y}$
- 47.  $\frac{12a-12b}{2 \cdot 2 \cdot 3 \cdot (a-b)}$
- Hauptnenner:  $2 \cdot 2 \cdot 3 \cdot y \cdot (a+b)$
- 48.  $\frac{2x}{3y} = \frac{2x \cdot 2y}{3y \cdot 2y} = \frac{4x}{6y}$
- 49.  $\frac{5x}{6y} = \frac{5x \cdot 2a}{6y \cdot 2a} = \frac{10ax}{12ay}$
- 50.  $\frac{3x}{6y} = \frac{3x \cdot 2a}{6y \cdot 2a} = \frac{6ax}{12ay}$
- 51.  $\frac{12a-12b}{2 \cdot 2 \cdot 3 \cdot y \cdot (a+b)}$
- 52.  $\frac{3x}{2y} = \frac{3x \cdot 2a}{2y \cdot 2a} = \frac{6ax}{4ay}$
- 53.  $\frac{5x}{6y} = \frac{5x \cdot 2a}{6y \cdot 2a} = \frac{10ax}{12ay}$

- 47.  $\frac{3a}{4b} + \frac{5x}{6y}$
- 48.  $\frac{5x}{12y} + \frac{7x}{8y}$
- 49.  $\frac{6a}{7b} - \frac{4x}{5y}$
- 50.  $\frac{2a}{5x} + \frac{3a}{7x} + \frac{7a}{10x}$
- 51.  $\frac{2}{4x+4y} + \frac{1}{2a}$
- 52.  $\frac{5a-b}{21a-28b} + \frac{a-3b}{9a+12b}$
- 53.  $\frac{7x-11a}{30x+21a} + \frac{12x-35a}{70x+49a}$

Addieren und subtrahieren Sie folgende Bruchterme:

- 54.  $\frac{16ab}{5x} + \frac{13ab}{5x} - \frac{4ab}{5x} + \frac{13ab-4ab}{5x}$
- 55.  $\frac{3a+5b}{2c} - \frac{2-2b+8a}{2c} + \frac{7a-3b+6}{2c}$
- 56.  $\frac{34x}{3ab} + \frac{16x}{3ab} + \frac{14x}{3ab} - \frac{20x}{3ab}$
- 57.  $\frac{4x+5y+6z}{3a} - \frac{3x-6y-6z}{3a} + \frac{2x+y}{3a}$
- 58.  $\frac{5c+4d}{c+d} - \frac{13d-8c}{c+d} + \frac{9c-11d}{c+d}$
- 59.  $\frac{23x-20y}{x-y} + \frac{7x-3y}{y-x} - \frac{8x-9y}{x-y}$
- 60.  $\frac{15x+a}{3} + \frac{7x-3a}{4} + \frac{3x+4a}{12} + \frac{5x-10a}{15}$
- 61.  $\frac{3a-4b}{2} - \frac{7a-10b}{10} + \frac{10a-9b}{15} - \frac{3a-8b}{12}$
- 62.  $\frac{5a+4b}{3y} + \frac{6a-7b}{9y} - \frac{8b-3a}{36y}$
- 63.  $\frac{2x+5n}{2x} - \frac{2x-3n}{6x} + \frac{3n}{6x} + \frac{n}{12x}$
- 64.  $\frac{3a}{2y-6} - \frac{10a}{3x-9} + \frac{a}{6x-30}$
- 65.  $\frac{3a-3(x-5)}{2 \cdot 3(x-3)(x-5)} + \frac{10a-2(x-5)}{6(x-3)(x-5)} + \frac{a(x-3)}{3(x-3)(x-5)}$
- 66.  $\frac{9ax-45a-20ax+100a+ax-3a}{2 \cdot 3(x-3)(x-5)} - \frac{52a-10ax}{3(x-3)(x-5)} + \frac{26a \cdot 5ax}{3(x-3)(x-5)}$
- 67.  $\frac{2(b+y)}{27by} + \frac{3(a-x)}{9ay}$
- 68.  $\frac{4x^2}{x+1} + \frac{y^2-y}{3x+3} + \frac{x+y}{9x+9}$
- 69.  $\frac{6x-8}{20y+12} + \frac{6x+5}{15y-6}$
- 70.  $\frac{4x-4y}{3x-3y} + \frac{3x-3y}{7x-7y}$
- 71.  $\frac{2x+5}{4x-4} + \frac{5x-3}{6x-6} + \frac{2x+1.5}{2x-2}$
- 72.  $\frac{3a-b}{4a-2b} + \frac{2a+3b}{6a-3b} + \frac{5a+2b}{8a-4b} - 1$
- 73.  $\frac{3+4a}{2a-3} - \frac{3x-5}{5x-1} + \frac{18-44ax-6a}{104x-2a-15x+3}$
- 74.  $\frac{8+5n}{n+1} + \frac{7a+3}{5a-3} - \frac{18n+27}{5an-3n+5a-3}$
- 75.  $\frac{3x-2y}{14x+21y} + \frac{3a+2b}{8a+18b} + \frac{35ay+8ax+24by}{24(2ax+2bx+3ay+3by)}$
- 76.  $\frac{5c-7d}{2c+18d} + \frac{12a+15b}{3a+5b} + \frac{2.5bd-12.5bc+5.5ad+74.5ac}{15(2ac+2bc+3ad+3bd)}$

2 Aufgaben beliebig

H: Hauptnenner

- 2x-6 = 2 \cdot (x-3)
- 3x-9 = 3 \cdot (x-3)
- 6x-30 = 2 \cdot 3 \cdot (x-5)
- H: 2 \cdot 3 \cdot (x-3) \cdot (x-5)

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