II Ubungsaufgaben

1. Berechnen Sie die Termwerte und vereinfachen Sie so weit wie möglich.

1. a)
$$T(x) := \frac{x^2 - 6x}{x - 4}$$

 $T(-2) = \frac{(-2)^2 - 6 \cdot (-2)}{(-2) - 4} = \frac{4 + 12}{-6} = \frac{16}{-6} = \frac{2 \cdot 8}{2 \cdot 3} = \frac{8}{3}$

1.b)
$$T(x) = \frac{7x - 4}{x^2 - 25}$$

 $\frac{7}{2}(-5) - a - 35 - a - 35 - a$

$$T(-5) = \frac{7 \cdot (-5) - a}{(-5)^2 - 25} = \frac{-35 - a}{25 - 25} = \frac{-35 - a}{(wir dür fen in R)}$$

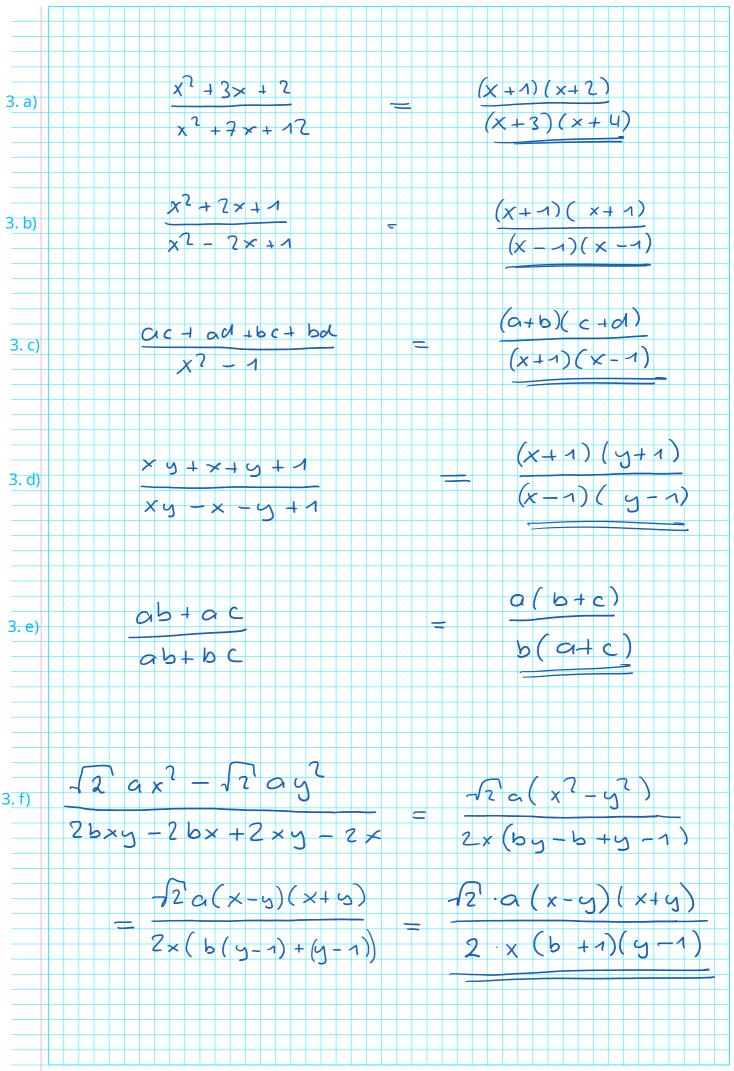
1.c)
$$T(x) := \frac{5 \times (a - x)(x + 3)(x - 4)}{25 (a - x)(x + 3)(x + 6)}$$

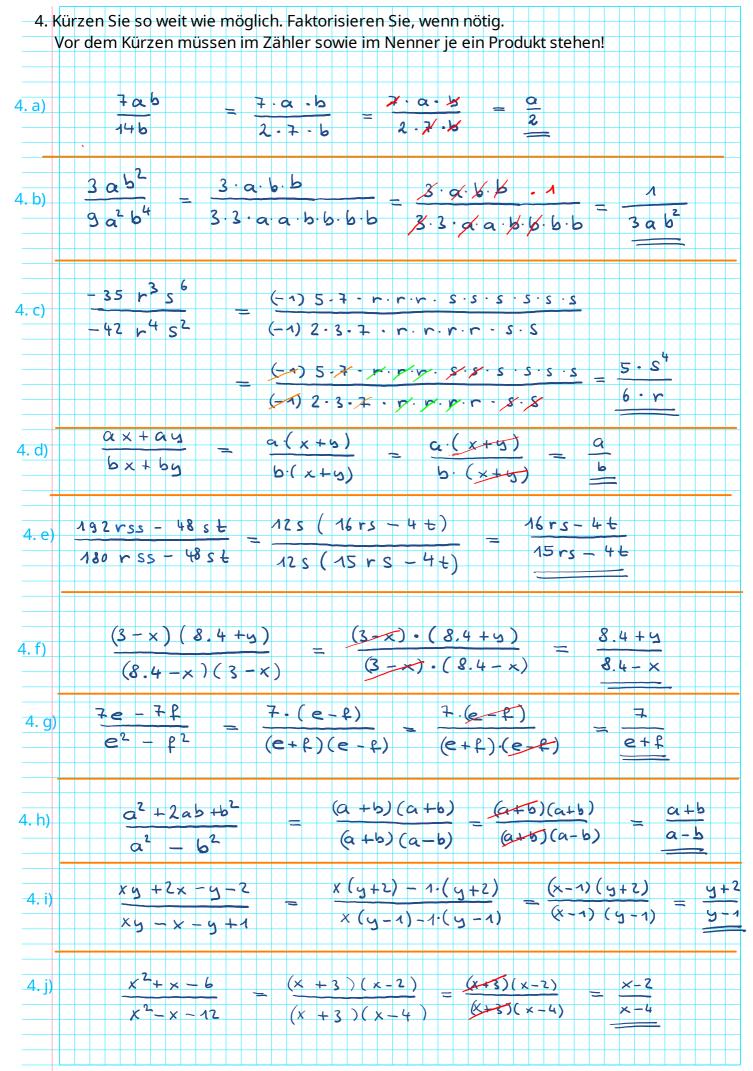
$$T(3) = \frac{5 \times (a \times)(x+3)(x+4)}{5 \cdot (x+3)(x+6)} = \frac{x(x-4)}{5(x+6)} = \frac{3((3)-4)}{5((3)+6)}$$

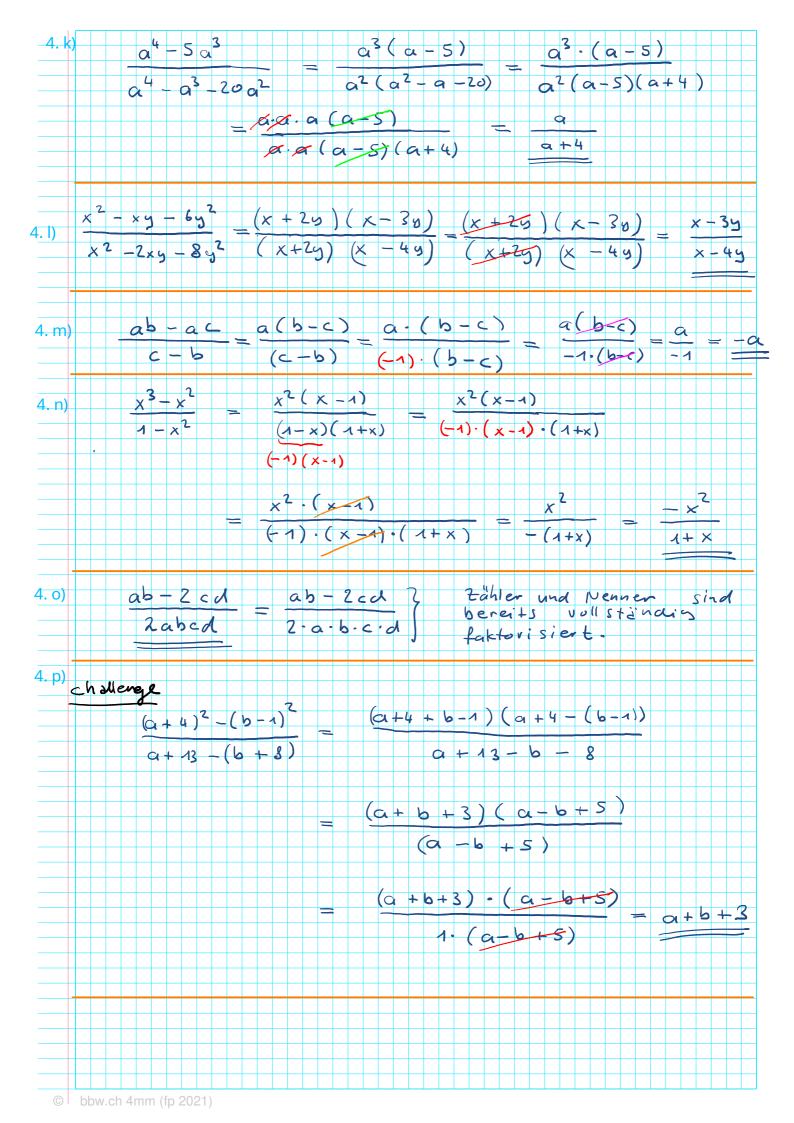
$$\frac{3 \cdot (-1)}{5 \cdot 9} = \frac{-3 \cdot 1}{5 \cdot 3} = \frac{1}{15}$$

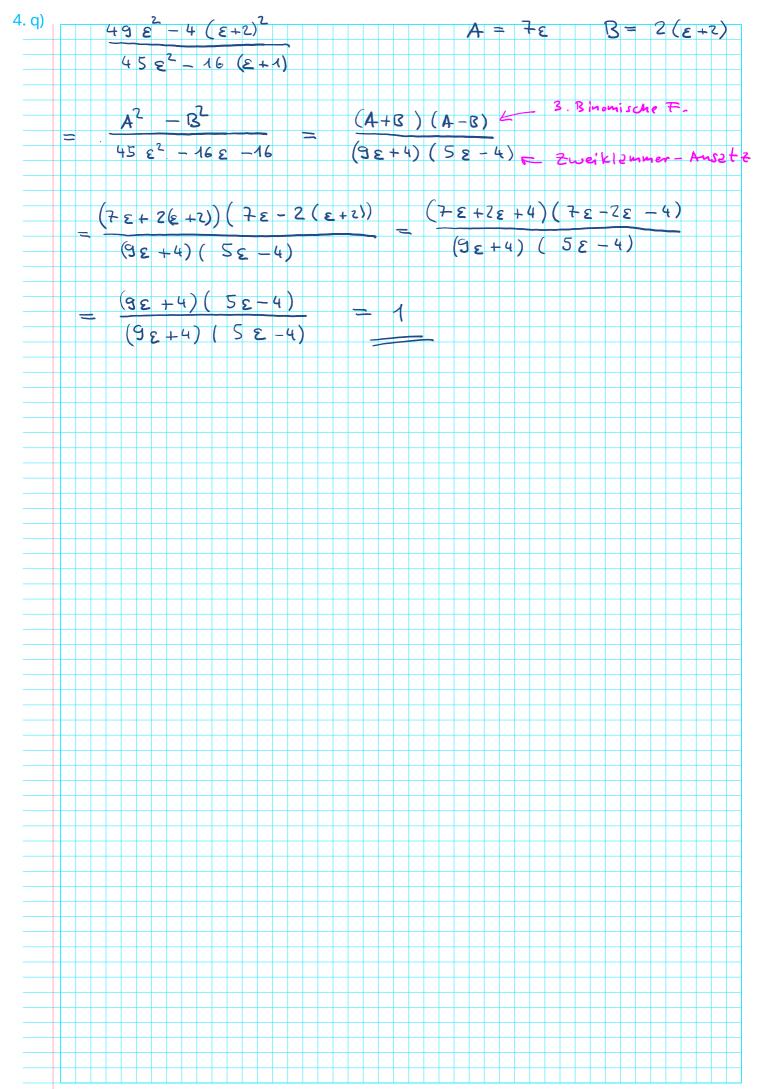
| (| Alle folgenden Brüche sind | nicht kurzbar.) | | \blacksquare |
|----------|----------------------------|------------------------|----------------------|----------------|
| a) | 7 + × | - L | Summe | |
| | 8+× 24(7+×) | | Produkt | |
|) | (8+x) A3 | × J | Produkt | |
| <u> </u> | 7× | ρ | Produkt | |
| | 7+X | | Summe | |
| | $a(-1)\sqrt{x+3}$ | | Produk+ | |
| d) | x + 3 · 4b | + | Summe | |
| | × ² + 1 | ρ | Summe | |
|) | x - 1 | | Summe Differenz | |
| | 2 × -36 | | Different | |
| f) | 2 x - 3 b 3 b · (2x) | | Different Produkt | |
| 3) | 6 (4-x) | \bowtie \checkmark | Produkt | |
| 37 | $7(x+5)^2$ | | Produkt | |
| 1) | x2 (a-c) | n L | Produkt | |
| | $x^2 \cdot a - c$ | - \ | Differenz | |
| i) | 6-a (a ² -3) | $\bowtie \sqrt{}$ | Produkt Produkt | |
| | a^{2} - b $(a-4)^{2}$ | | Product | |
| j) | 8 (×-4) | ρ | Produkt | |
| | - x - 4 | | Differenz | \Box |
| <) | 8 (x - 4) | Ø.J | Produkt Produkt | \Box |
| 1 | (-1) (x+4) | | | |

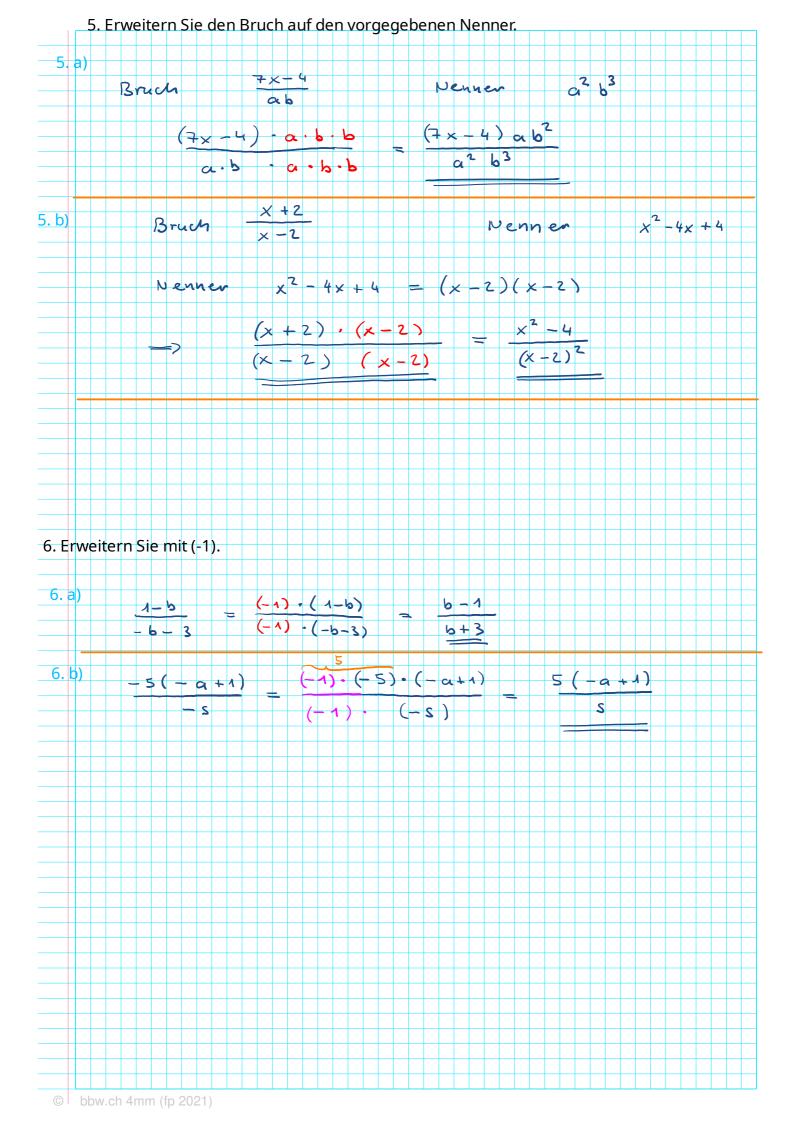
3. Faktorisieren Sie jeweils Zähler und Nenner

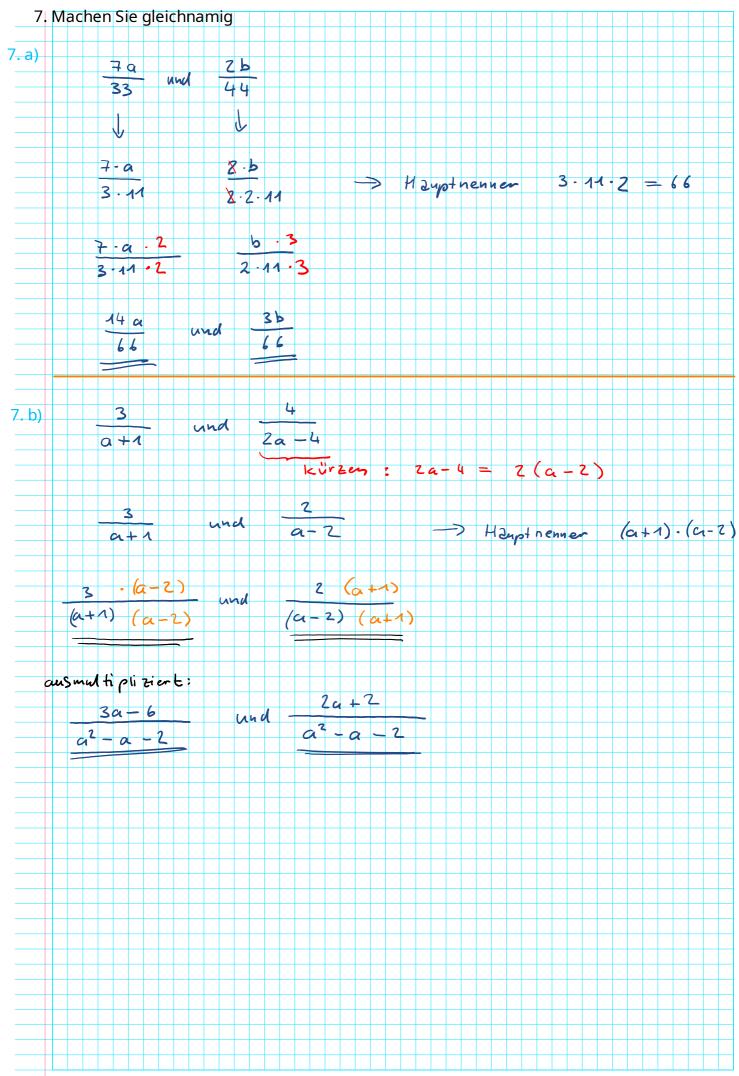




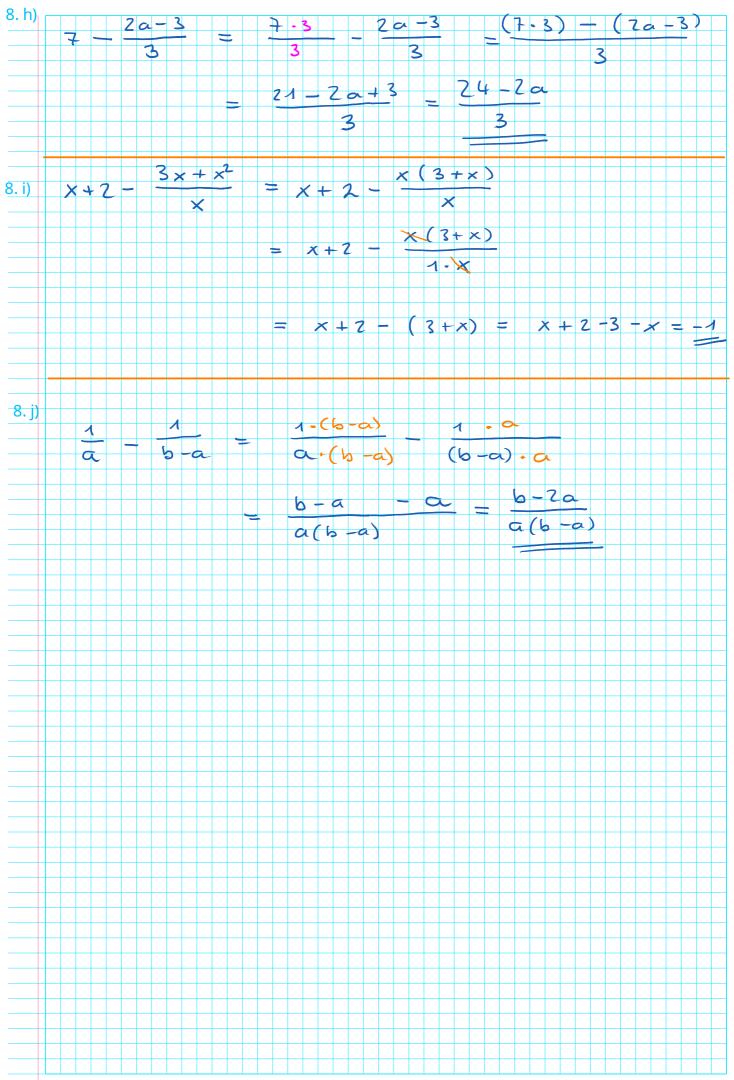


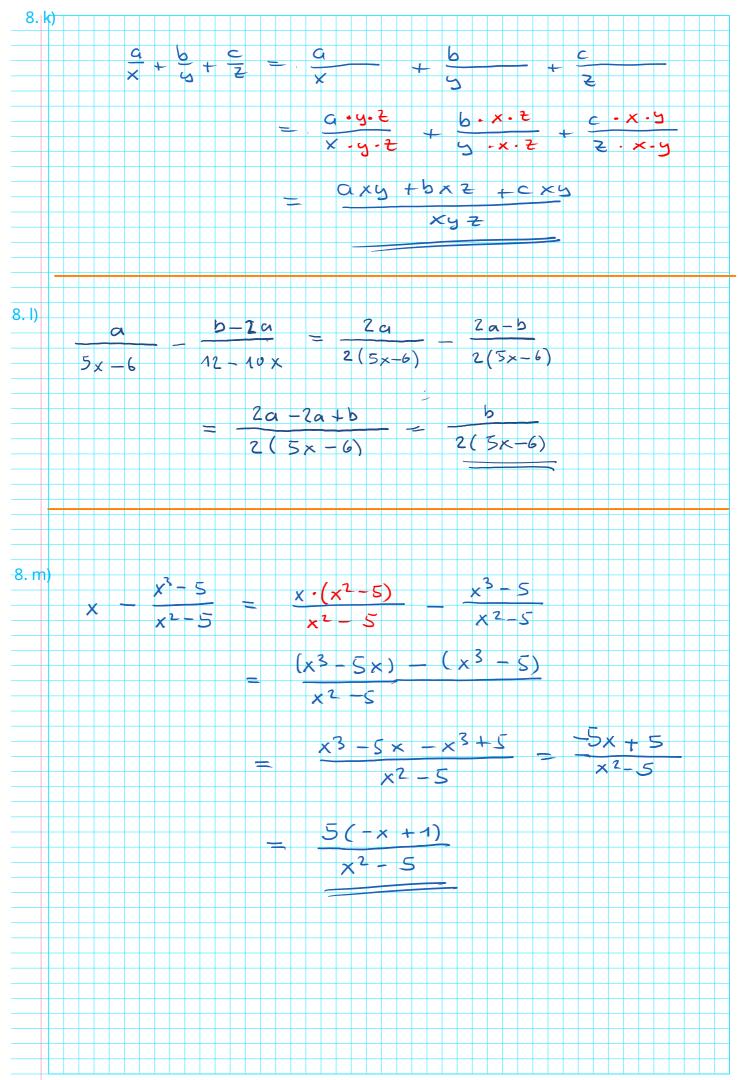




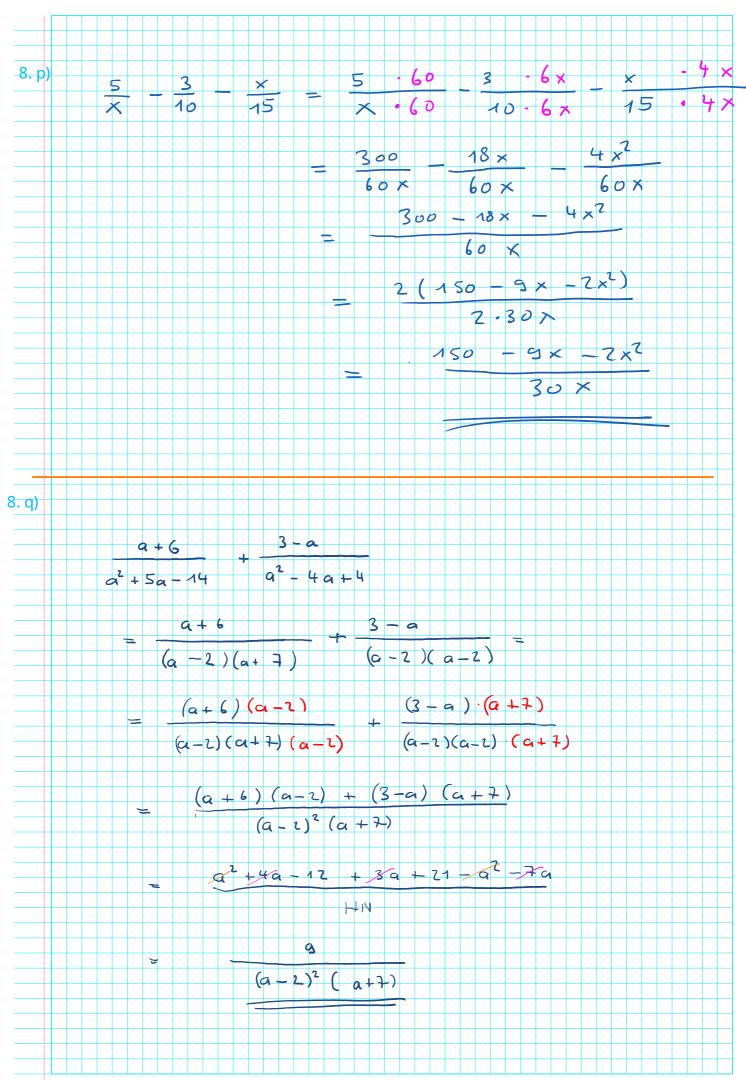


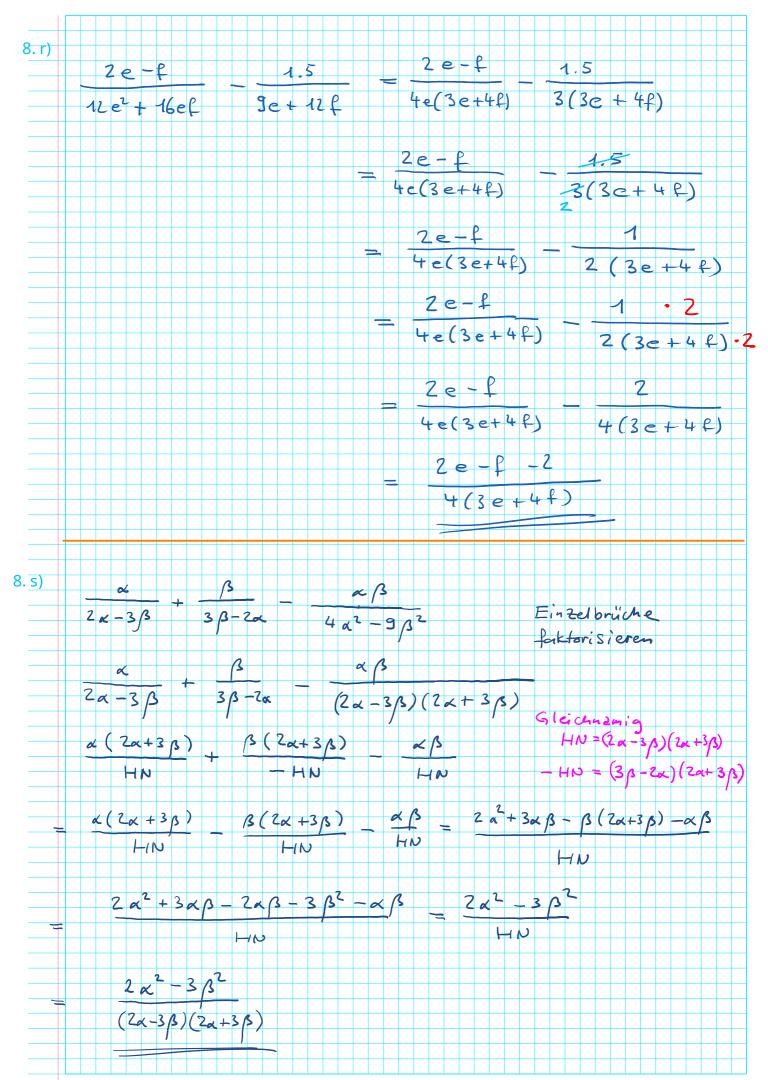
Addition/Subtraktion 8. Addieren bzw. subtrahieren Sie die folgenden Bruchterme 7.4-3.3 28-9 8. a 12 3 +4a 8. b) 12 8. c) Hauptnenner = 60 20 -5 + 12 x 5.12 8. d) $(7\times 5) - (6\cdot 3\cdot 5) + (2\cdot 3)$ 35x - 90 + 6 3.5.11 165 8. e) (a+26) - (a-26) a+26-a+26 $\frac{97}{65} \left(+ R \right)$ $\left(\frac{4}{5} + \frac{9}{13} \right) \cdot \times =$ 8. f) 8. g 7b . b 26 © bbw.ch 4mm (fp 2021)





| 8. n) | | , | |
|-------|---------------------------------|---|---|
| | a + 3 b | 5a + 15b | |
| | a2 + 6ab+9b2 | 50 + 156 | |
| | G + 626+ 36 | | = MTA S. 51 |
| | | | |
| | a + 3b | a-b | Anfg. 24.a) |
| | (a+3b)(a+3b) | 5(a+3b) | 2 4 2 |
| | | | -1.a) |
| | = (a+3b) = (a+3b)(a+3b) | a-b | |
| | | 5(a+36) | |
| | (a+3b)(a+3b) | 5(a+sb) | |
| | 1.5 | a-b | |
| | = (a+3b)5 | | |
| | (U+So)55 | S (a+3b) | +++++ |
| | | (a-b) | |
| | 5 ^ | | 5-a+b 5(a+3b) |
| | = 5(a+ | 39) | 5(a+3b) |
| | | | |
| | | | |
| | | | |
| 9 0) | | | |
| 8. 0) | m ² 6 m ² | m² 6. m.m | |
| | | m² 6 · m · m 2 · 6 · m | |
| | m-1 12m | | |
| | | m² 6· m·m | |
| | | m-1 2-6-m | |
| | | . 2 . 2 m· | (n-1) |
| | | $\frac{m^2 \cdot 2}{(m-1) \cdot 2} + \frac{m}{2}$ | (m-1) |
| | | $(m-1)$ $\stackrel{\checkmark}{\sim}$ | |
| | | 2m² + m(m-1) | 2 m² + m² - m |
| | 7 | Z(m-1) | $=$ $\frac{1}{2(m-1)}$ |
| | | | |
| | | 3 m² - m _ m | (3m-1) |
| | | $\frac{3m^2-m}{2(m-1)}$ | 2 (m-1) |
| | | +++++++++++++++++++++++++++++++++++++++ | +++++ |
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Multiplikation

9. Multiplizieren Sie die Bruchterme

9. b)
$$m \cdot m = m \cdot n = m \cdot n$$

9. c)
$$\frac{x-3}{6x^3-48x^2} \cdot (-3x^2) = \frac{(x-3)}{6x^2(x-3)} \cdot 4$$

$$= \frac{(x-3) \cdot (-1) \cdot 3 \cdot x^2}{2 \cdot 3 \cdot x^2 (x-3) \cdot 1}$$

9. d)
$$(a-b) \cdot (b-a) = (a-b) \cdot 2 \cdot a = (-1) \cdot (b-a) \cdot 2 \cdot a$$

 $(b-a) = (b-a) \cdot 1$

$$= (-1) \cdot 2 \cdot a = -2 a$$

9. e)
$$\frac{-xy}{4x-4y}$$
 · $(16y-16x)$ = $\frac{-x\cdot y\cdot (16y-16x)}{4x-4y}$

$$= -x \cdot y \cdot 16 \cdot (y - x)$$

$$= (x - y)$$

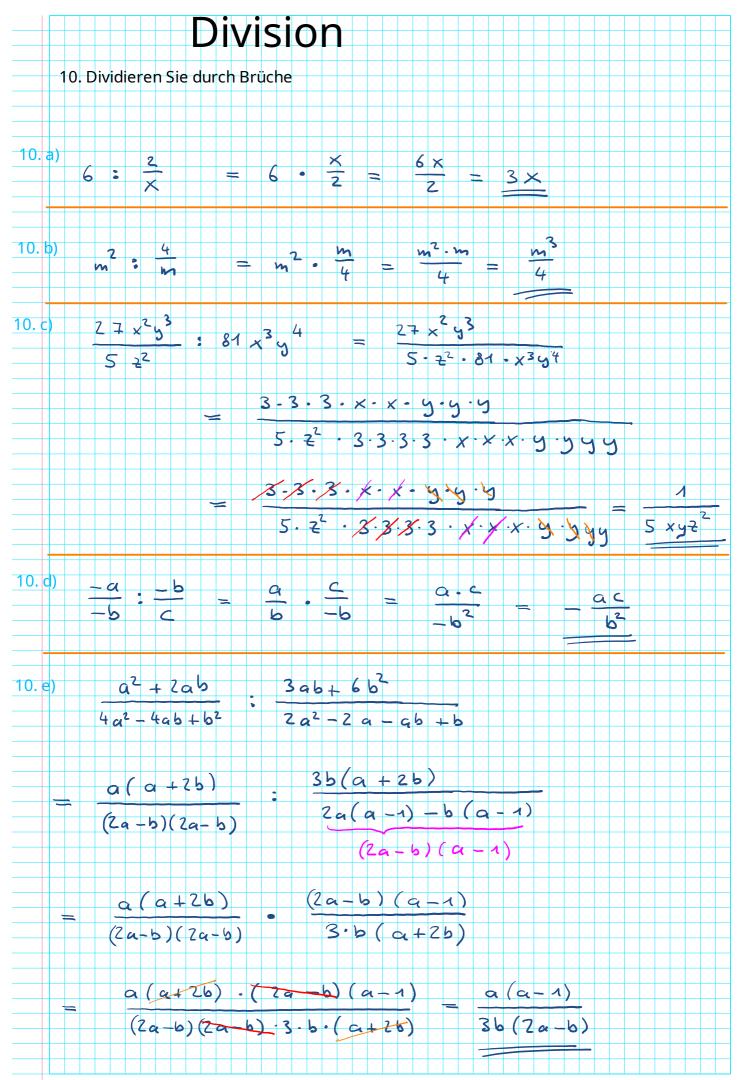
$$= -x \cdot y \cdot 16 \cdot (-1)(x - 9)$$

$$= -x \cdot y \cdot 4 \cdot (x - 9)$$

$$= -x \cdot y \cdot 4 \cdot (-1)(x - 9)$$

$$= -x \cdot y \cdot 4 \cdot (-1)(x - 9)$$

| 9. f) | $3x - 3y$ $4z^2 + 2z$ $3 \cdot (x - y)$ $2z(2z + 1)$ $2z$ $2x^2 - 2y^2$ $2 \cdot z$ $2(x^2 - y^2)$ |
|---------|---|
| | $\frac{3 \cdot (x-5) \cdot 2 \cdot 2 \cdot (22+1)}{2 \cdot 2 \cdot 2 \cdot (x^2-5^2)}$ |
| | $= \frac{3 \cdot (x-y) \cdot 2 \cdot 2 \cdot (2z+1)}{2 \cdot 2 \cdot 2 \cdot (x+y)(x-y)}$ |
| | $=\frac{3\cdot(x-5)\cdot 2\cdot \cancel{\cancel{4}}\left(2\cancel{\cancel{2}}+1\right)}{\cancel{\cancel{2}}\cdot\cancel{\cancel{2}}\cdot2\cdot(\cancel{\cancel{2}}+\cancel{\cancel{2}})}$ |
| | $= 3 \cdot (2z+1)$ $= 2 \cdot (x+4)$ |
| | |
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Doppelbrüche

11. Vereinfachen Sie so weit wie möglich.

11. a)
$$\frac{\alpha}{2b}$$
 $\frac{\alpha}{2b}$ $\frac{2\alpha}{3b}$ $\frac{\alpha}{2b}$ $\frac{3b}{2b}$ $\frac{3 \cdot \alpha \cdot b}{2a}$ $\frac{3}{4 \cdot \alpha \cdot b}$ $\frac{3}{4}$

11.b)
$$\frac{1}{1+\frac{1}{9}} = 1: \left(\frac{1}{1} + \frac{1}{9}\right) = 1: \left(\frac{9}{1} + \frac{1}{1}\right)$$

$$= 1 = \left(\frac{9+1}{1}\right) = 1 \cdot \frac{1}{9+1} = \frac{1}{9+1}$$

11. c)
$$\frac{1}{1-\frac{1}{a}} = 1 : \left(1-\frac{1}{a}\right) = 1 : \left(\frac{a}{a}-\frac{1}{a}\right)$$

$$= 1 = \left(\begin{array}{c} a - 1 \\ a \end{array}\right) = 1 \cdot \begin{array}{c} a \\ a - 1 \end{array} = \begin{array}{c} a \\ a - 1 \end{array}$$

11. d)
$$x + \frac{1}{2}$$
 = $(x + \frac{1}{2}) = (x - \frac{1}{2})$

$$= \left(\frac{2}{2} \times \frac{1}{2}\right) \cdot \left(\frac{2}{2} \times \frac{1}{2}\right)$$

$$\frac{2 \times +1}{2} = \frac{2 \times +1}{2} = \frac{2$$

alternativen

$$x + \frac{1}{2}$$
 $=$ $2 \cdot (x + \frac{1}{2})$

$$2 \cdot \left(x + \frac{1}{2}\right) = 2x + 1$$

$$\left(-\frac{1}{2}\right)$$
 $\left(\times-\frac{1}{2}\right)$

Gemischte Aufgaben

12. Vereinfachen Sie so weit wie möglich.

12. a)
$$2 \times y \left(\frac{x}{2y} - \frac{y}{2x}\right)$$

$$= 2 \times 9 \cdot \left(\frac{\times \times \times}{29 \cdot \times} - \frac{9 \cdot 9}{2 \times 4} \right)$$

$$= 2 \times 9 \cdot \left(\frac{x^2 - 9}{2 \times 9} \right) = 2 \times 9 \cdot \left(x^2 - 9^2 \right)$$

$$= x^2 - y^2 = (x + y)(x - y)$$

$$\begin{pmatrix} 1 & 1 & a \\ a & b \end{pmatrix}$$
, $\begin{pmatrix} ab & ab \\ ab & ab \end{pmatrix}$, $\begin{pmatrix} ab & ab \\ ab & ab \end{pmatrix}$, $\begin{pmatrix} 1 & ab \\ ab & ab \end{pmatrix}$

$$= \frac{(b+a^2) \cdot ab}{ab \cdot 7} = \frac{b+a^2}{7}$$