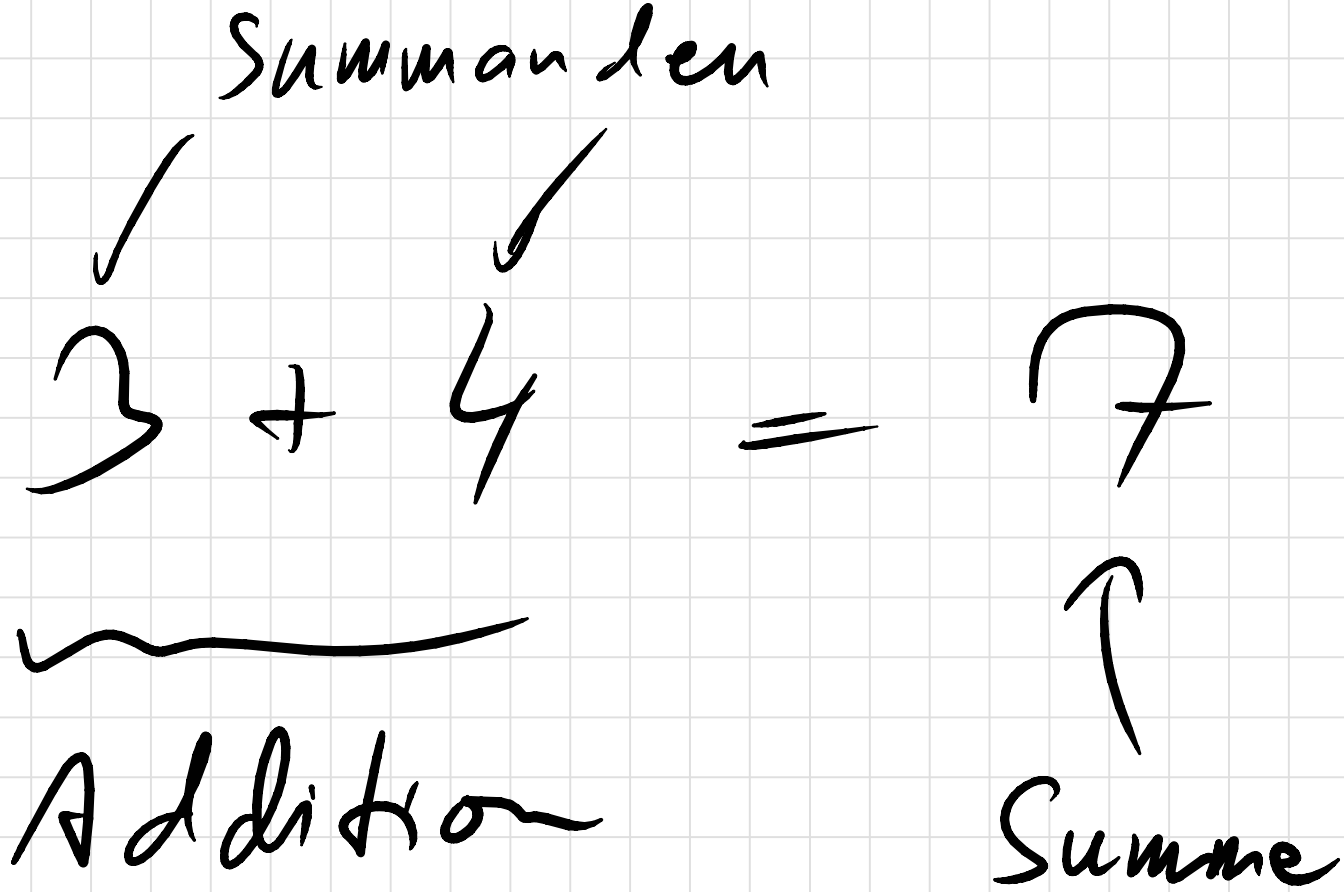
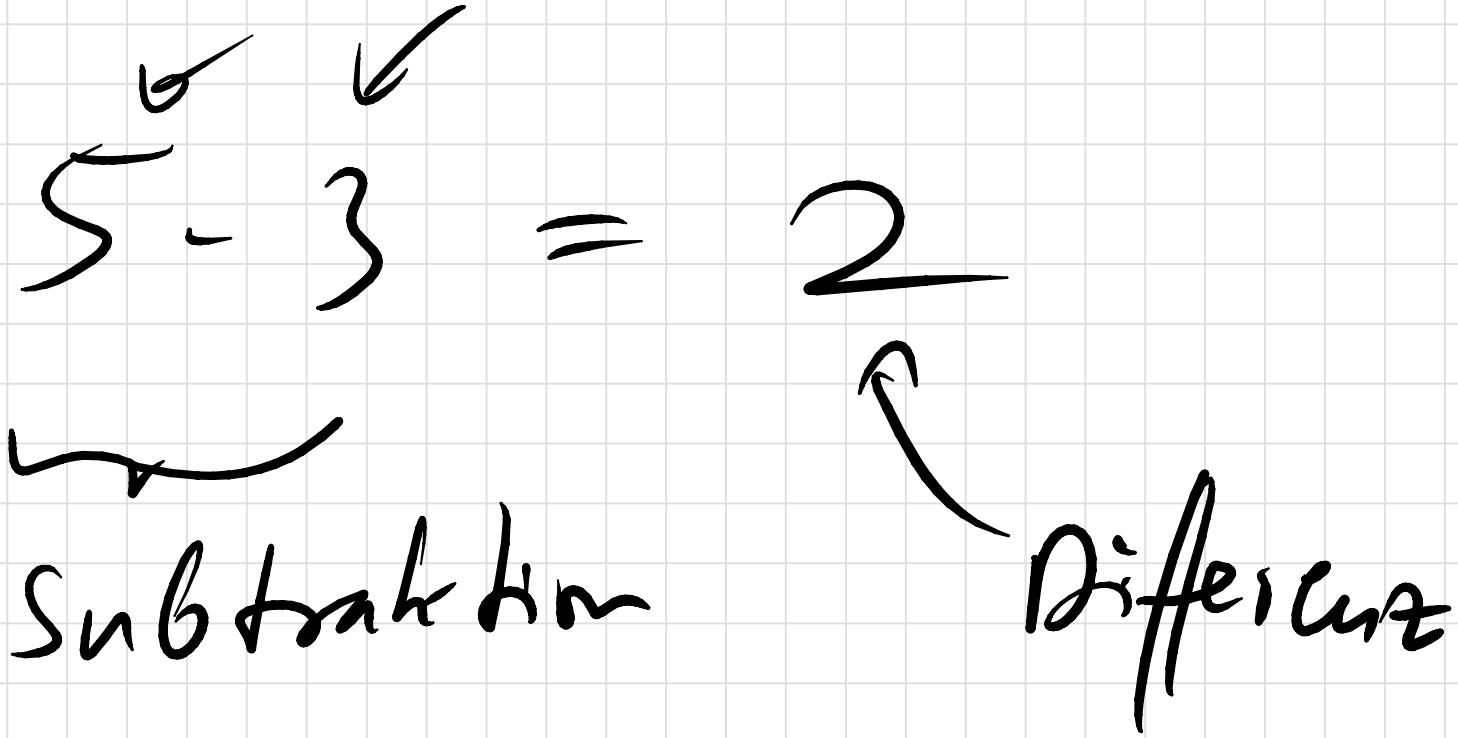
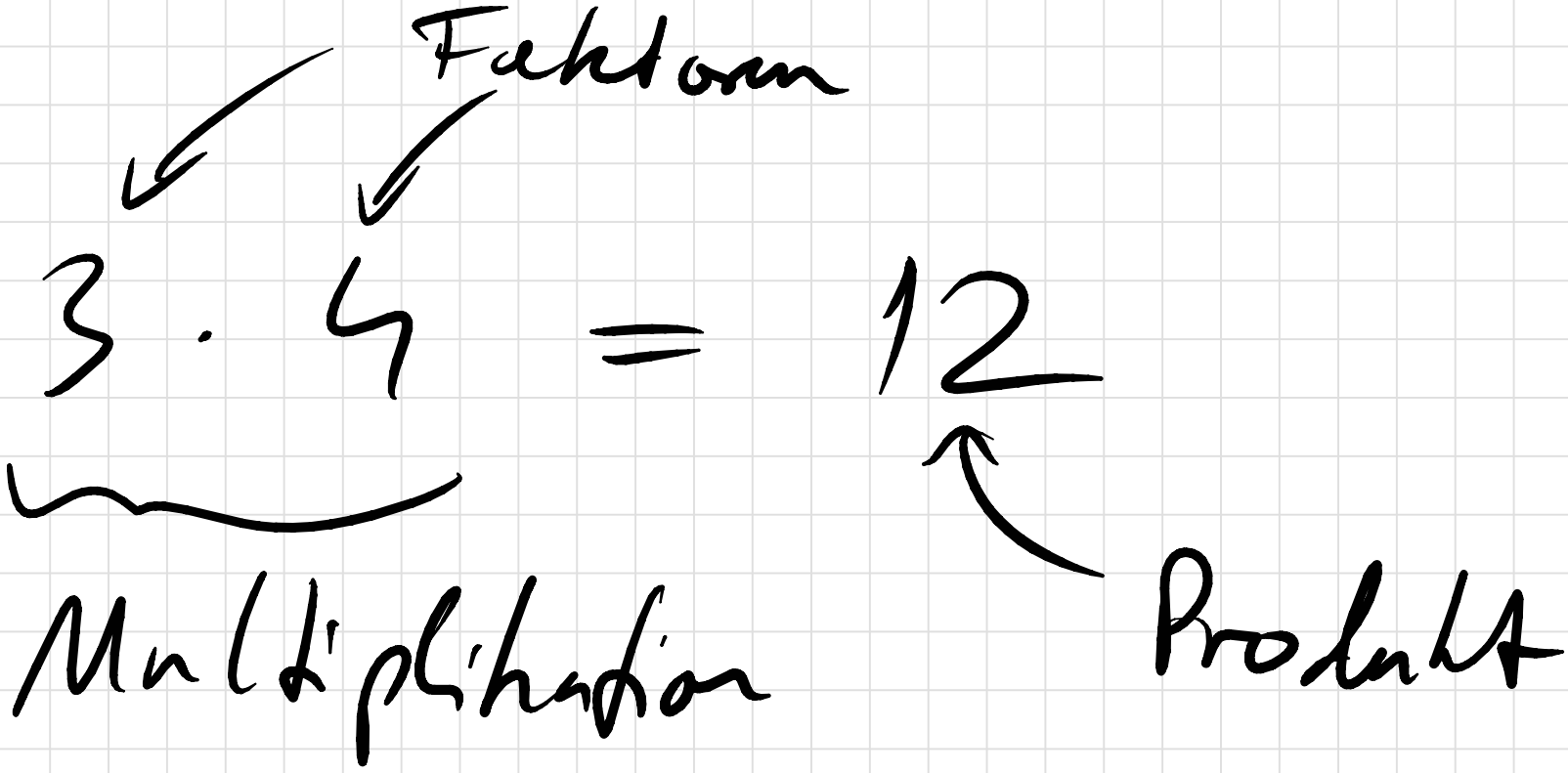
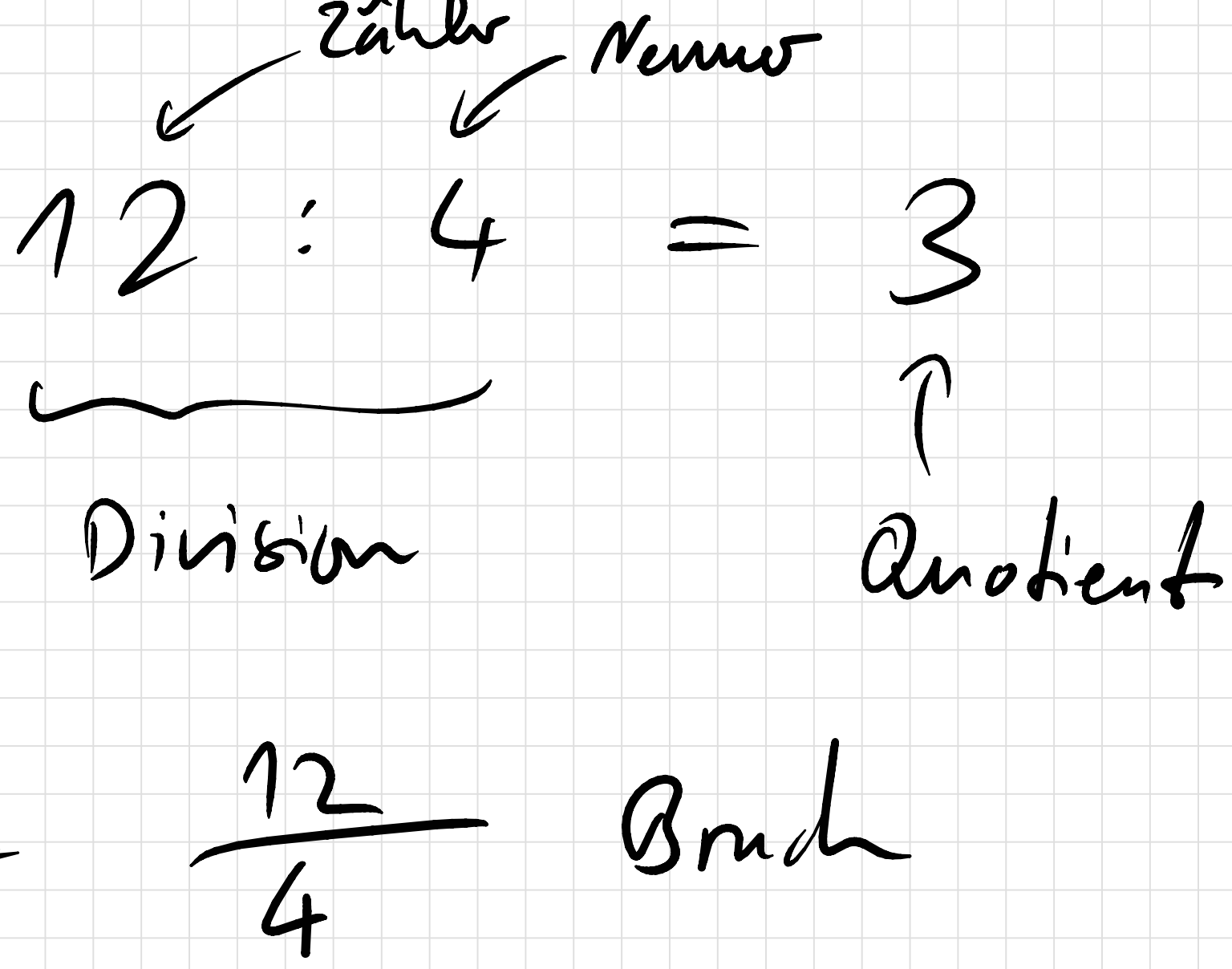

Summanden
3 + 4 = 7
Addition
Summe

$$\begin{array}{r} 23,4 \\ +\ 8,2 \\ \hline 31,6 \end{array}$$


5 - 3 = 2
Subtraktion
Differenz


Faktoren
3 · 4 = 12
Multiplikation
Produkt

$$
\begin{array}{r}
1{,}2 \cdot 3{,}4 \\
\hline
360 \\
48 \\
\hline
408 \\
1{,}
\end{array}
$$



$= \frac{12}{4}$ Bruch

$$0 : 3 = 0$$

$$3 : 0 = \lightning$$

Angenommen, es gäbe x mit:

$$\frac{3}{0} \stackrel{?}{=} x$$

$$\Rightarrow 0 \cdot \frac{3}{0} = 0 \cdot x$$

$$\Rightarrow 3 = \boxed{0 \cdot x} = 0 \quad \lightning$$

$2 \cdot 3 + 4$

6

10

nicht:

$2 \cdot 3 + 4$

7

14

$2 \cdot (3 + 4)$

7

14

$$\Big(\underbrace{(a \cdot 4 + b) \cdot x}_{\text{ausmultiplizieren}} + 7\Big) \cdot 3$$

$$\underbrace{(11 \cdot 4}_{44} + 13) \cdot 7 = 44 \cdot 7 + 13 \cdot 7$$

$$(a \cdot 4 + b) \cdot x = a \cdot 4 \cdot x + bx$$

$$= (a \cdot 4 \cdot x + bx + 7) \cdot 3$$

$$= \underbrace{a \cdot 4 \cdot x \cdot 3}_{12ax} + bx \cdot 3 + \underbrace{7 \cdot 3}_{21}$$

$$5 \cdot 4 \cdot 7 \cdot 3 = \underbrace{4 \cdot 3}_{12} \cdot 5 \cdot 7$$

Binomische Formeln

$$(a+b)^2 = (a+b)(a+b)$$

$$= a(a+b) + b(a+b)$$

$$= \underbrace{a \cdot a}_{a^2} + \underbrace{a \cdot b + b \cdot a}_{2ab} + \underbrace{b \cdot b}_{b^2}$$

$$= a^2 + 2ab + b^2$$

$$(a \pm b)^2 = a^2 \pm 2ab + b^2$$

$$(a-b)^2 = (a-b)(a-b)$$

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

$$= \underbrace{a \cdot a}_{a^2} \underbrace{- ab - ba}_{-2ab} + \underbrace{(-b) \cdot (-b)}_{b^2}$$

$(-3€) \cdot 3 = -9€$

$\underbrace{(-3)\cdot(-3)}_{???} + \underbrace{(-3)\cdot 3}_{-9} = -3\cdot\underbrace{(-3+3)}_{0}$

$= 0$

$\Rightarrow \quad ??? - 9 = 0$

$\Rightarrow \quad ??? = 9$

$$(a+b)^3 = (a+b)(a+b)(a+b)$$

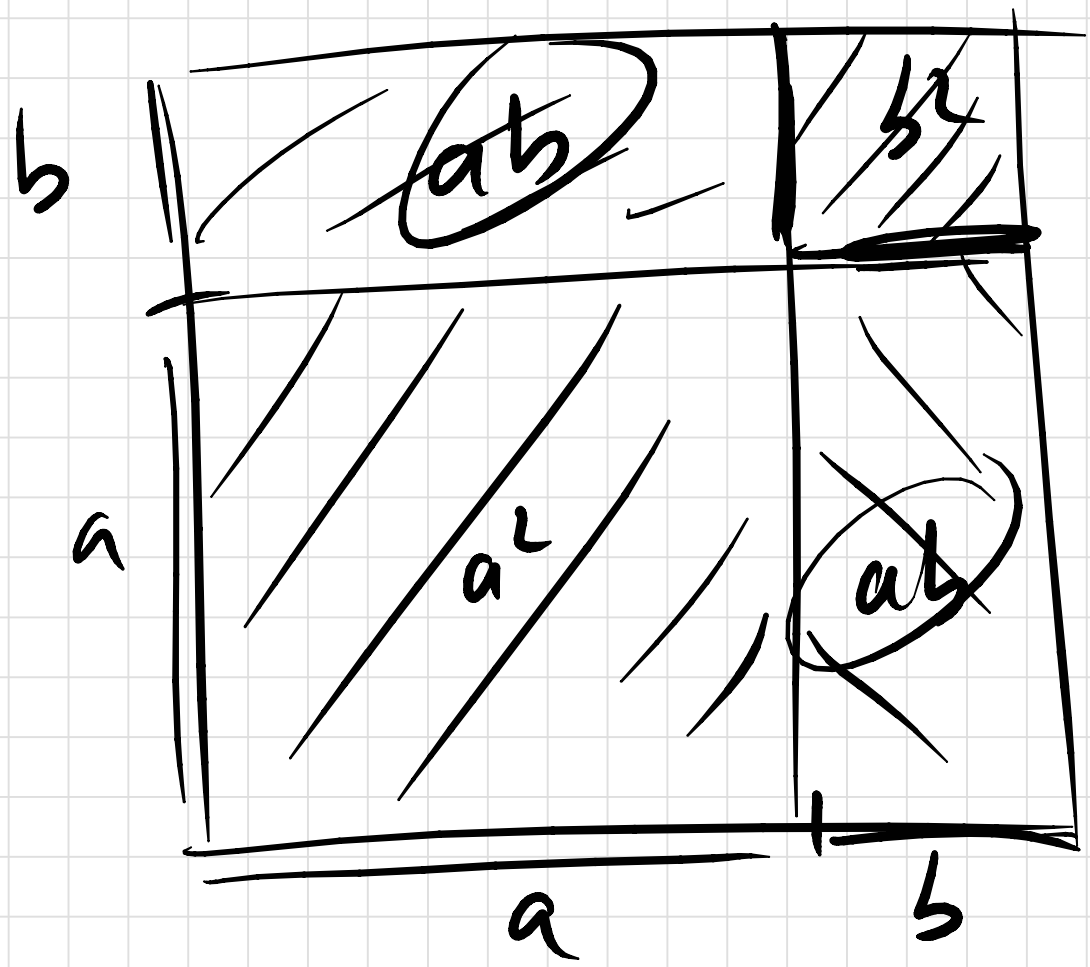
$$= a^3 + 3a^2b + 3ab^2 + b^3$$

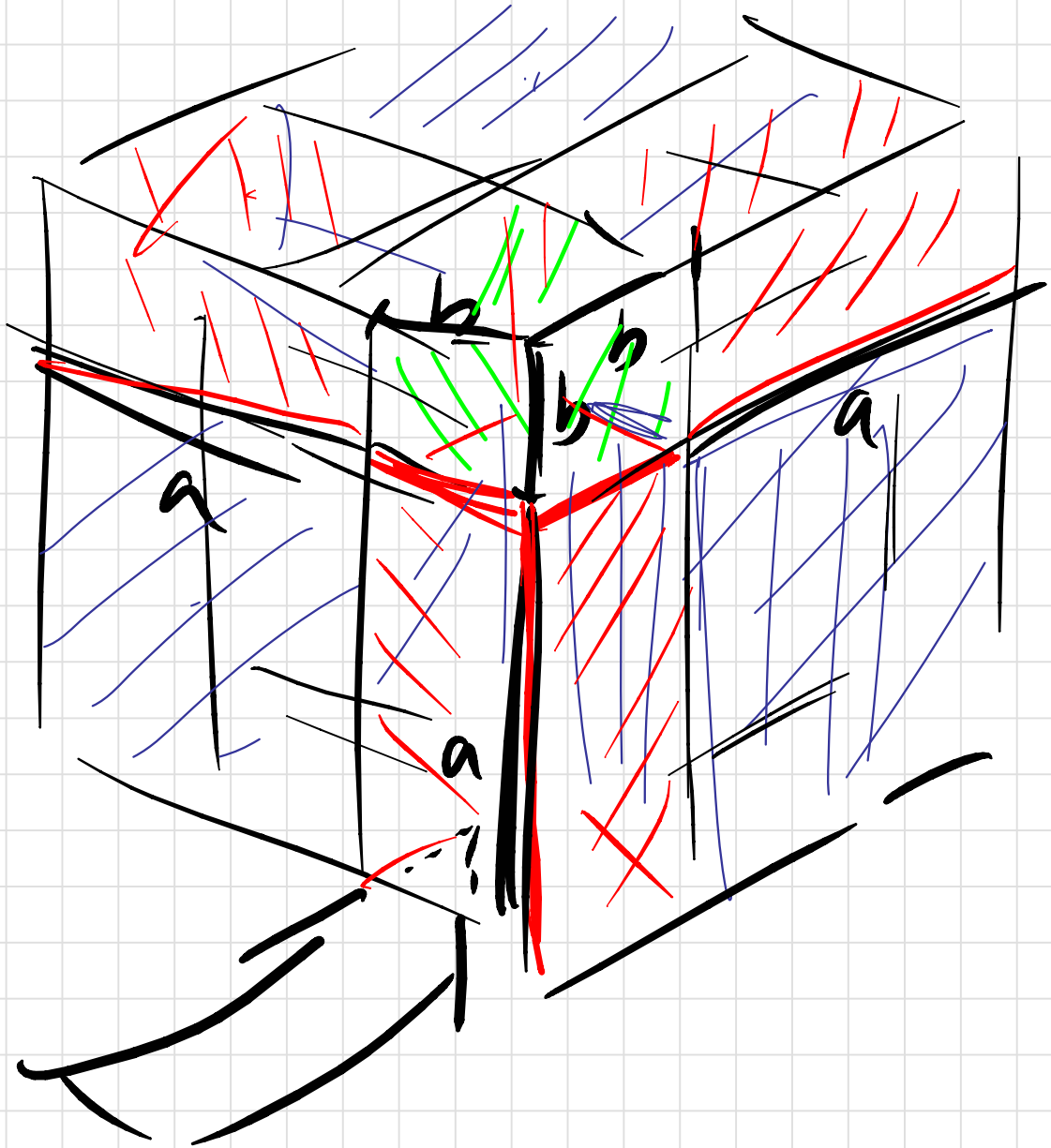
$$(a+b)^2$$

$$\parallel$$

Gesamtfläche

$$= a^2 + 2ab + b^2$$





Volumen.

$$(a+b)^3 =$$

$$a^3$$

$$+ 3a^2b$$

$$+ 3ab^2$$

$$+ b^3$$

$$(a+b)(a-b)$$

$$= (a+b)a - (a+b)b$$

$$= \underbrace{a \cdot a}_{a^2} + \underbrace{ba - ab}_{0} - \underbrace{bb}_{b^2}$$

$$= a^2 - b^2$$

Brüche

$$\frac{3}{4} = 3 : 4$$

$$\frac{15}{4} = 15 : 4 = 3 + \frac{3}{4} = 3\frac{3}{4}$$

$$= 3{,}75$$

$$15 : 4 = \boxed{3} \text{ Rest } \boxed{3}$$
$$\underline{12}$$
$$3$$

$$120 : 11 = 10 \text{ Rest } 10$$
$$\underline{-\ 11}$$
$$10$$

$$119 : 11 = (10) \text{ Rest } 9$$
$$\underline{-\ 11}$$
$$09$$

$$\frac{\ln 9}{\ln} = \log_{10} \frac{9}{\ln}$$

$$\frac{7}{11} \xrightarrow{\cdot 3} \frac{21}{33}$$

Erweitern

$$\frac{140}{210} \xrightarrow{:10} \frac{14}{21} \xrightarrow{:7} \frac{2}{3}$$

Kürzen

$$\frac{7a}{21} = \frac{a}{3}$$

$$\frac{21 \pm 7a}{14} = \frac{\cancel{7}(3 \pm a)}{\cancel{14}\,2}$$

$$\frac{5}{3} \cdot 11 = \frac{5 \cdot 11}{3} = \frac{55}{3}$$

$$\frac{5}{3} \cdot \frac{7}{8} = \frac{5 \cdot 7}{3 \cdot 8}$$

$$(5:3) \cdot (7:8) = \left(5 \cdot \frac{1}{3}\right) \cdot \left(7 \cdot \frac{1}{8}\right)$$

$$= 5 \cdot 7 \cdot \frac{1}{3} \cdot \frac{1}{8} = 5 \cdot 7 \cdot \frac{1}{3 \cdot 8}$$

$$= \frac{5 \cdot 7}{3 \cdot 8}$$

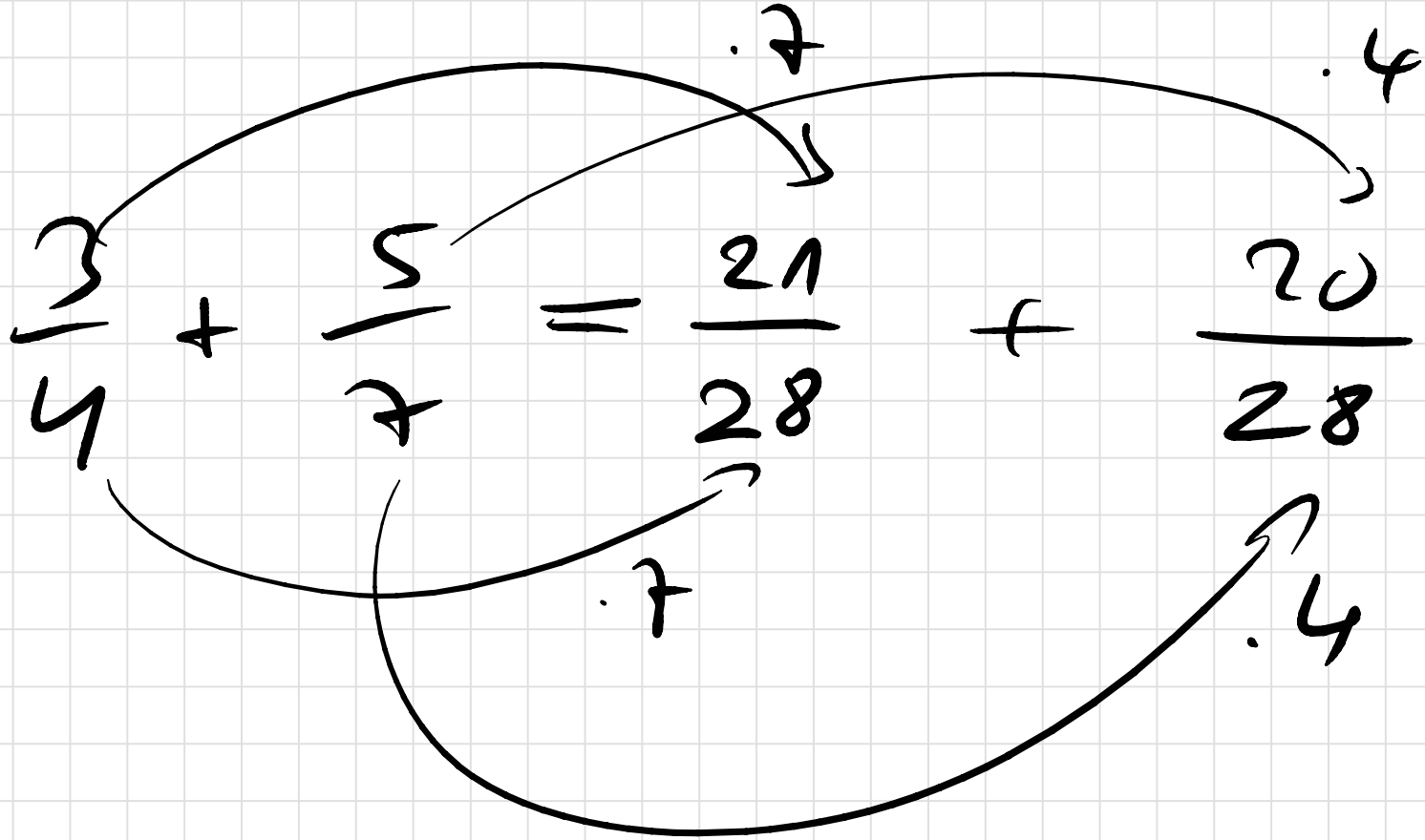
$$3 : \frac{4}{1000} = 3000$$

$$= \frac{3}{\frac{4}{1000}} = \frac{3 \cdot 1000}{4}$$

$$(4 : 7) : (9 : 13)$$

$$= \frac{\frac{4}{7}}{\frac{9}{13}} = \frac{4}{7} \cdot \frac{13}{9}$$

$$= \frac{4 \cdot 13}{7 \cdot 9}$$



Haupt-
nenner

$$= \frac{21+20}{28} = \frac{41}{28}$$

$$\frac{3}{4} \pm \frac{5}{1+a} = \frac{3+3a}{4+4a} \pm \frac{20}{4+4a}$$

$\cdot(1+a)$ $\cdot 4$

$$= \frac{3+3a \pm 20}{4+4a}$$

$$= \frac{23+3a}{4+4a} \quad (-17)$$

Dezimalbrüche

$$23{,}456 = 23\frac{456}{1000}$$

$$23{,}4 = 23\frac{4}{10}$$

$$23{,}45 = 23\frac{45}{100}$$

$\frac{10}{7} = 1,428571428572\ldots$

$= 1,\overline{428571}$

$10 : 7 = 1,428\ldots$

-7

30

-28

20

-14

60

-56

$4\ldots$

$\frac{123}{10} = 12,3$

$$3 + x = 7 \quad \| \; -3$$

$$\Leftrightarrow$$

$$3 + x - 3 = 7 - 3$$

$$\Leftrightarrow$$

$$x = 7 - 3 = 4$$

$$ab^2 + 98x - 5 = ab^2 + 3 \quad /\!/ +5$$

$x = ?$

$$ab^2 + 98x - 5 + 5 = ab^2 + 3 + 5$$

$$= ab^2 + 8$$

$$/\!/ -ab^2$$

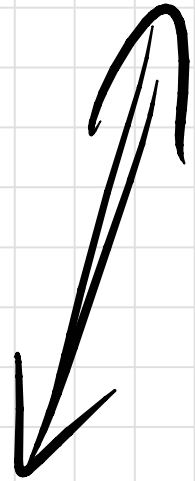
$$ab^2 + 98x - ab^2 = ab^2 + 8 - ab^2$$

$$\Longleftrightarrow \quad 98x = 8 \quad /\!/ \quad :98$$

$$\Longleftrightarrow \quad \frac{98x}{98} = \frac{8}{98} \quad \begin{matrix} \\ \cdot 4 \end{matrix}$$

$$\Longleftrightarrow \quad x = \frac{4}{49}$$

$$\frac{3}{x-2} = 7 \qquad D = \mathbb{R} \setminus \{2\}$$



x darf alles sein, aber nicht 2 !

$$\frac{3}{x-2}(x-2) = 7(x-2)$$

$\Longleftrightarrow \quad 3 = 7x - 14 \qquad \| +14$

$\Longleftrightarrow \quad \underbrace{3+14}_{17} = 7x - \cancel{14+14}$

$\Longleftrightarrow \quad 17 = 7x \qquad \| \ :7$

$\Longleftrightarrow \quad 17 : 7 = \cancel{7}x : \cancel{7}$

$\Longleftrightarrow \quad x = \frac{17}{7}$

$\mathbb{L} = \left\{ \frac{17}{7} \right\}$