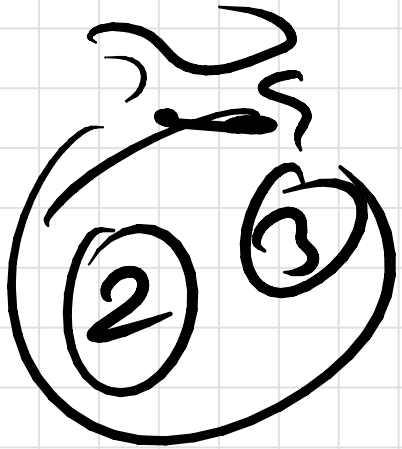
$$(x-2)\cdot(x-3)=0$$

$$\Longleftrightarrow \quad x=2 \;\vee\; x=3$$

$$\mathbb{L}=\{2;3\}$$



$$(x-2)(x-3)(x-4) = 0$$

$$\mathbb{L} = \{2; 3; 4\}$$

$$\underbrace{7x^2 + 5x}_{x(7x+5)} = 0$$

$$\Rightarrow \quad \mathbb{L} = \left\{ 0 ; -\frac{5}{7} \right\}$$

$$x^3 + 6x^2 + 12x + 8 = 0$$

$$(x+2)^3$$

$$\mathbb{L} = \{-2\}$$

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

$$x^3 + 6x^2 + 12x + 8 = 0$$

$\Leftrightarrow \quad \underbrace{(x+2)^3} = 0$

$(x+2)(x+2)(x+2)$

Definitionsmenge

$$\frac{x-3}{x+5} = 7 \qquad D = \mathbb{R} \setminus \{-5\}$$

$$\Leftrightarrow x-3 = 7 \cdot (x+5) = 7x+35$$

$$\Leftrightarrow x \ldots$$

$$\frac{5}{x^2-16} = 11$$

$$D = \mathbb{R} \setminus \{-4; 4\}$$

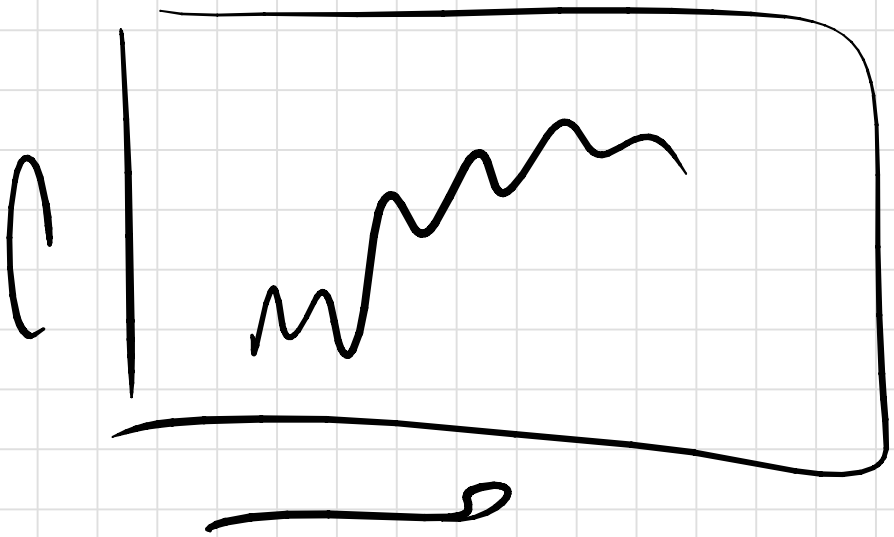
$$x \neq 4 \text{ und } x \neq -4$$

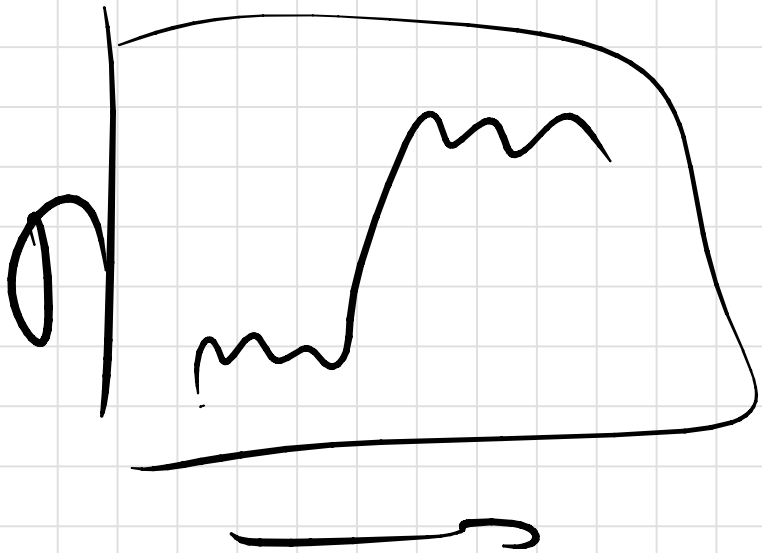
$$\Leftrightarrow \quad 5 = n(x^2-16) = n x^2 - 176$$

$$\frac{3}{x^2+7} = 13 \quad , \quad D = \mathbb{R}$$

$$\frac{3}{x-b} = 7 \quad , \quad x \neq b$$

$$2 + \underbrace{3 \cdot 4}_{12} = 14$$





$$\sum_{j=3}^{7} j^2$$

$$\prod_{j=3}^{7} j^2$$

$$= 3^2 + 4^2 + 5^2 + 6^2 + 7^2$$

$$3^2 \cdot 4^2 \cdot 5^2 \cdot 6^2 \cdot 7^2$$

Proportionalität

1 m^3	Wasser	:	Masse	1000 kg
2 m^3	"	=	"	2000 kg
$\frac{1}{2}$ m^3	"	:	"	500 kg

DE: Volumen $\sim$ Masse

US: Volume $\propto$ Mass

$$\frac{\text{Masse}}{\text{Volumen}} = \text{const.}$$

gesucht

gegeben

Proportionalitäts-
konstante

$$= \frac{1000\,kg}{1\,m^3} = \frac{3000\,kg}{3\,m^3}$$

$$= 1000\ kg/m^3$$

Dichte

$$\left(\frac{\text{Volumen}}{\text{Masse}} = \frac{3\,m^3}{3000\,kg} = \frac{1}{1000}\,\frac{m^3}{kg} \right)$$

$$\frac{\text{Masse}}{\text{Volumen}} = 1000\ \frac{kg}{m^3} \quad \Big\| \cdot \text{Volumen}$$

$$\Longleftrightarrow \frac{\text{Masse}}{\text{Volumen}} \cdot \text{Volumen} = 1000\ \frac{kg}{m^3} \cdot \text{Volumen}$$

$$\Longleftrightarrow \text{Masse} = 1000\ \frac{kg}{m^3} \cdot \text{Volumen}$$

z.B. Masse = ?

Volumen = 100 l

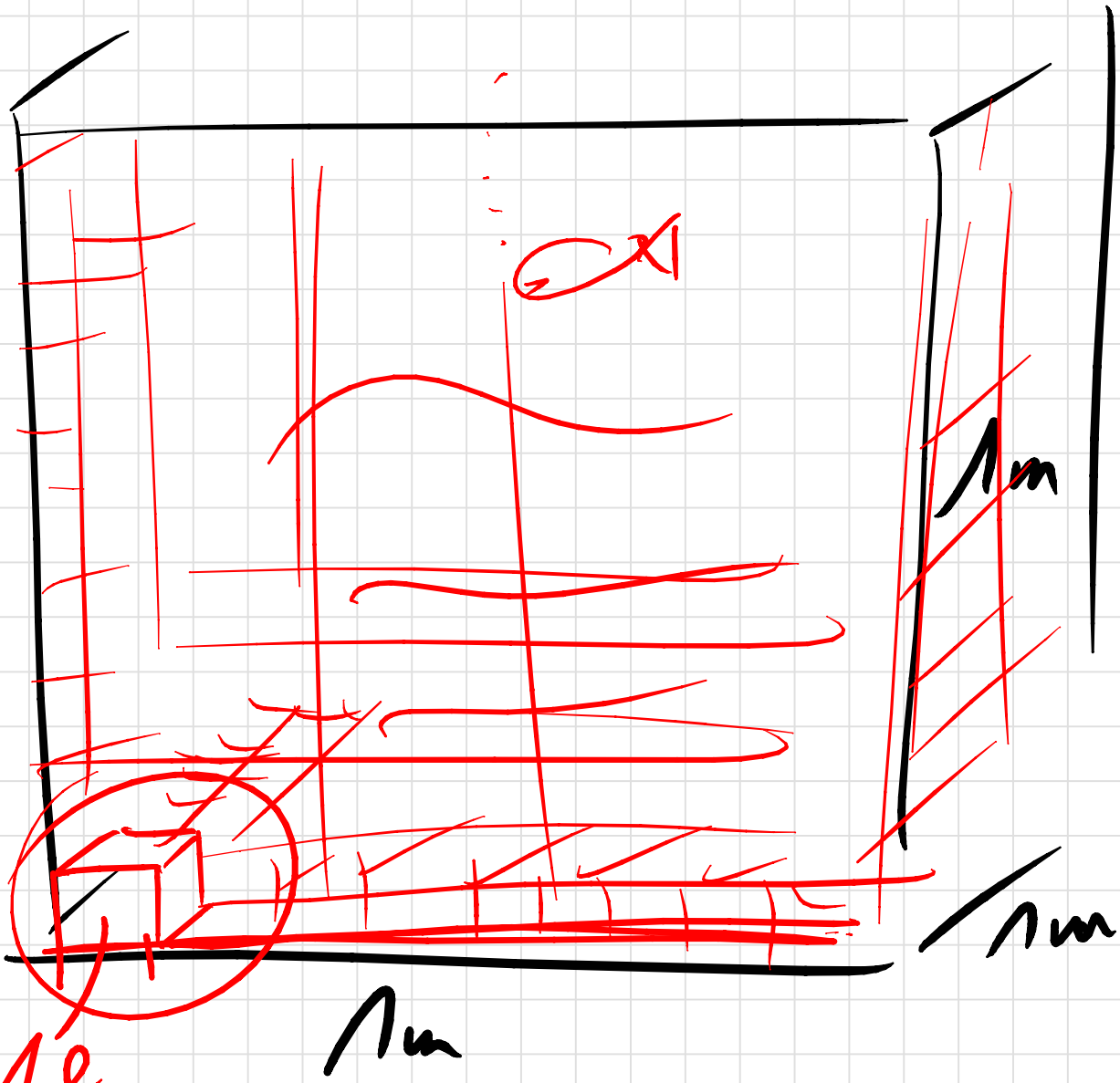
$1\,dm^3 = \frac{1}{1000}\,m^3$

$$\text{Masse} = 1000\,\frac{kg}{m^3} \cdot 100\,l = 100000\,\frac{kg \cdot l}{m^3}$$

$$= 100000\,\frac{kg \cdot \frac{1}{1000}\,m^3}{m^3}$$

$$= 100000\,kg \cdot \frac{1}{1000} = \frac{100000}{1000}\,kg$$

$$= 100\,kg$$

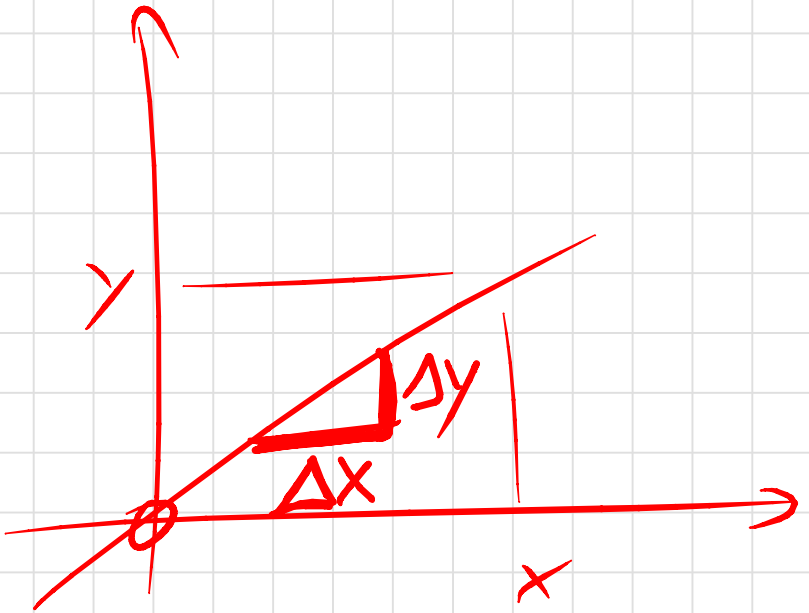


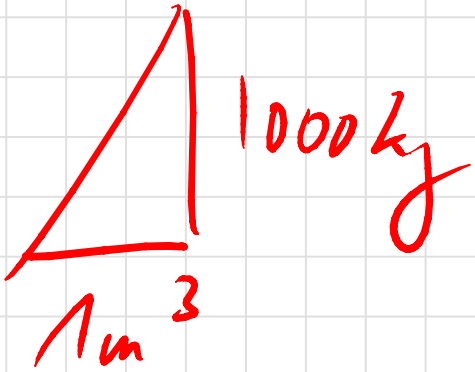
$1\,dm^3 = 1\,\ell$

$$y = m\,x$$

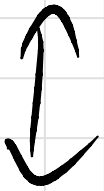
$m = \frac{\Delta y}{\Delta x}$

Steigung





Proportionalität



Dreisatz

$3\,m^3$ einer Flüssigkeit haben eine Masse von $6000\,kg$.

$5\,m^3$ haben welche Masse?

$$\frac{6000\,kg}{3\,m^3} \cdot 5\,m^3 = \frac{5}{\cancel{3}_{1}} \cdot \overset{2000}{\cancel{6000}}\,kg$$

$$= 10000\,kg$$

Prozent

7 % von 30 €

↑

$\frac{7}{100}$

$= \frac{7}{100} \cdot 30$ €

$= 2{,}1$ €

drei Jahre 1% Zinsen auf

200 Euro:

Endkapital nach 1 Jahr: $200\,€ \cdot \frac{1}{100} + 200\,€$

$= 200\,€ \cdot \left(1 + \frac{1}{100}\right)$

$= 200\,€ \cdot \frac{101}{100}$

nach 3 Jahren $= 200\,€ \cdot \frac{101}{100} \cdot \frac{101}{100} \cdot \frac{101}{100}$

Zinszins!

$$= 200\,€ \cdot \left(\frac{101}{100}\right)^3$$

50 €, darin 19% MwSt.

enthaltene MwSt $= x$

$$50\,€ = \text{Nettopreis} \cdot \frac{119}{100}$$

$$x = 50\,€ - \text{Nettopreis} = \text{Nettopreis} \cdot \frac{119}{100} - \text{Nettopreis}$$

$$= \text{Nettopreis} \left(\frac{119}{100} - 1 \right) = \text{Nettopreis} \cdot \frac{19}{100}$$

Nettopreis $= 50\,€ \cdot \frac{100}{119}$

$$x = 50\,€ \cdot \frac{100}{119} \cdot \frac{19}{100} = 50\,€ \cdot \frac{19}{119}$$

Promille

$10‰ = 1\%$

$5‰$ von $300\,€ = \frac{5}{1000} \cdot 300\,€$

$= \frac{15}{10}\,€ = 1{,}5\,€$

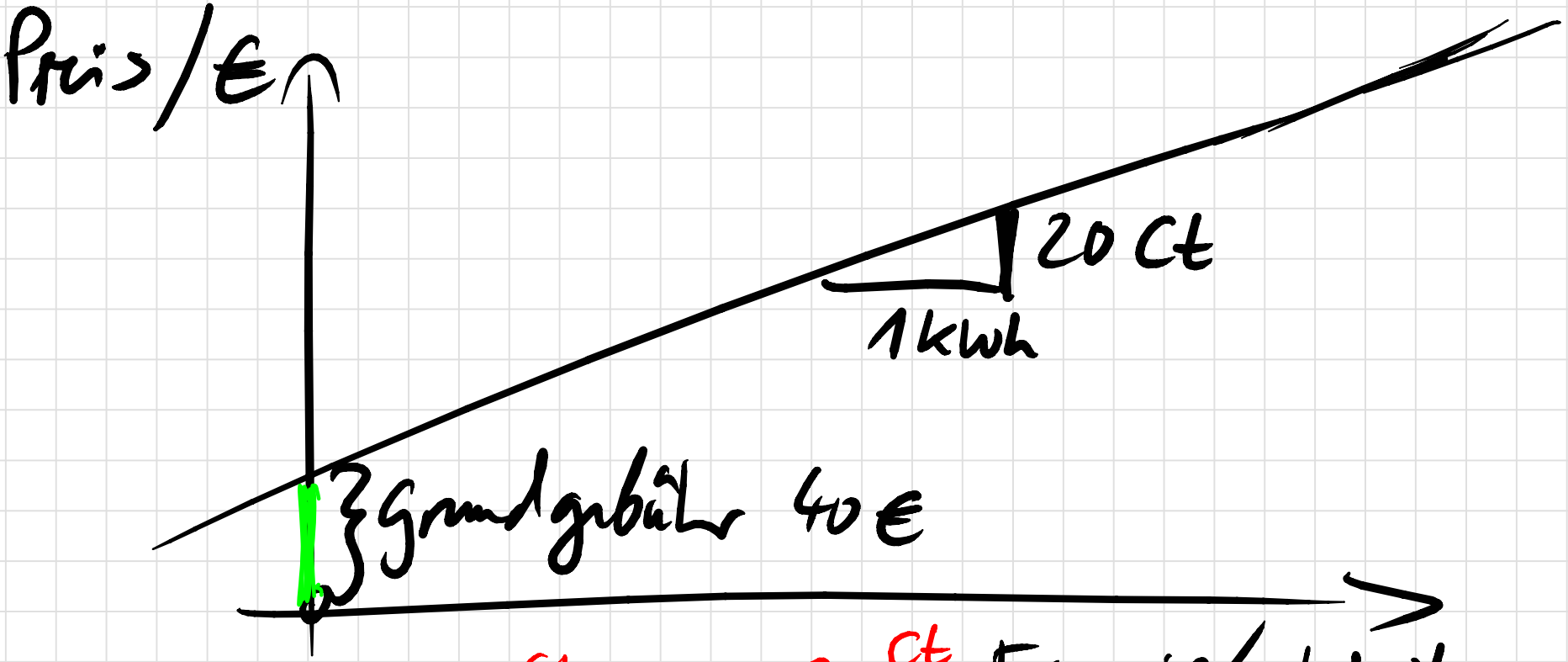
ppm

parts per million

5 ppm von 7 kg

$$= \frac{5}{1000000} \cdot 7\,kg = \frac{35}{1000000}\,kg$$

Lineare Funktionen

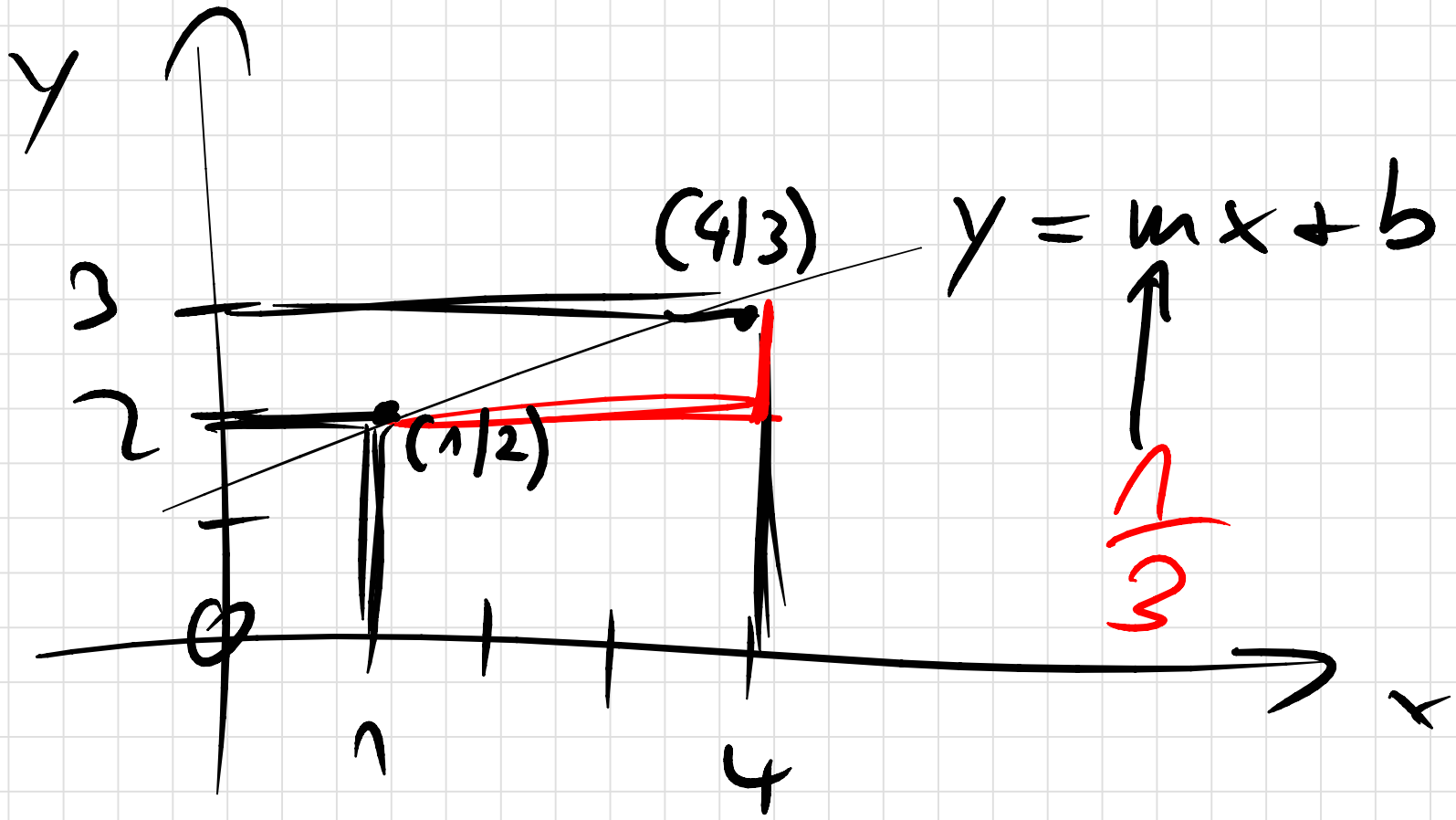


$y = m x + b$

m: Steigung

b: y-Achsenabschnitt

lineare Funktion

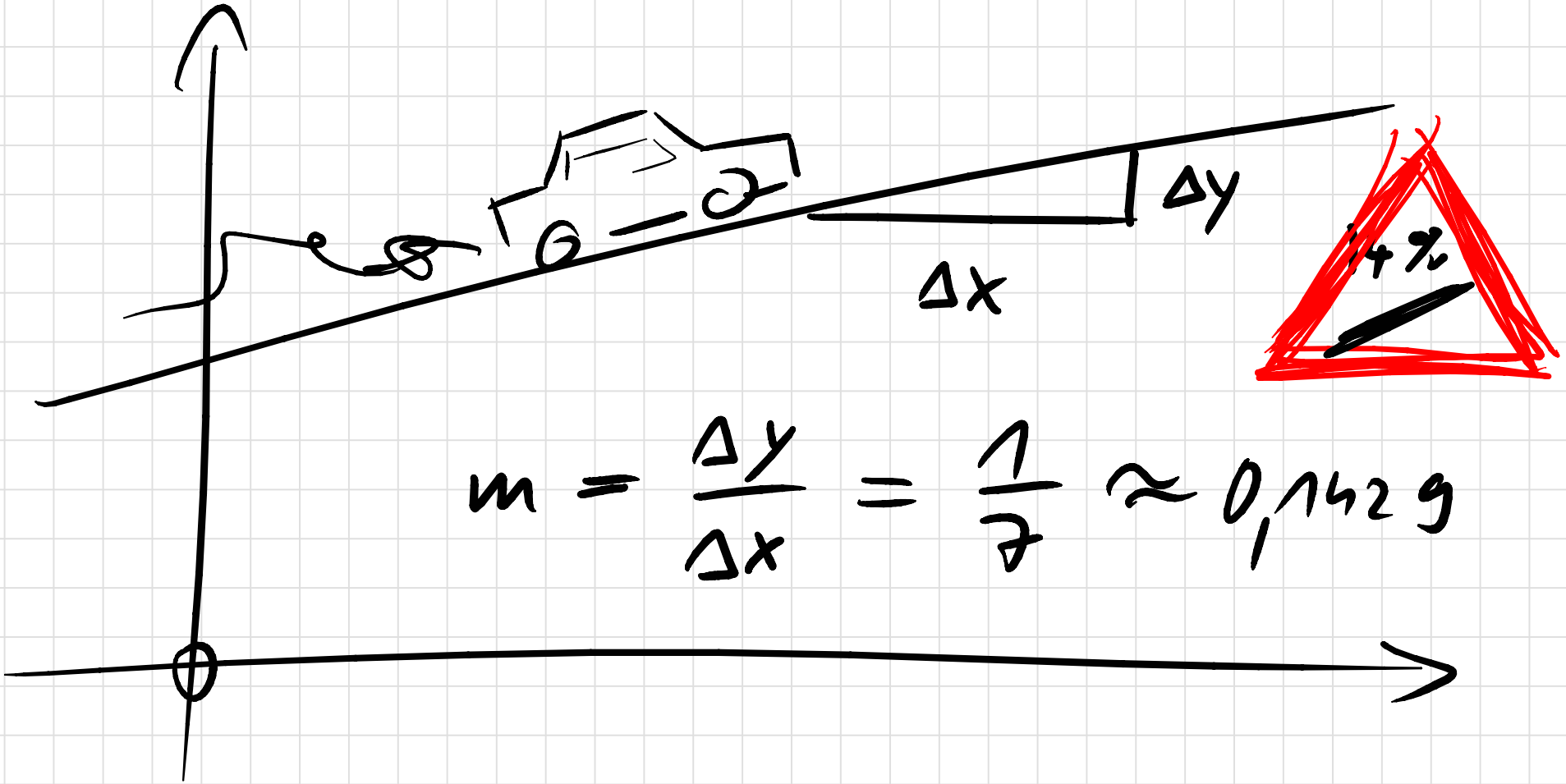


$$2 = \frac{1}{3} \cdot 1 + b$$

$$\Longrightarrow 2 = \frac{1}{3} + b \quad \| -\frac{1}{3}$$

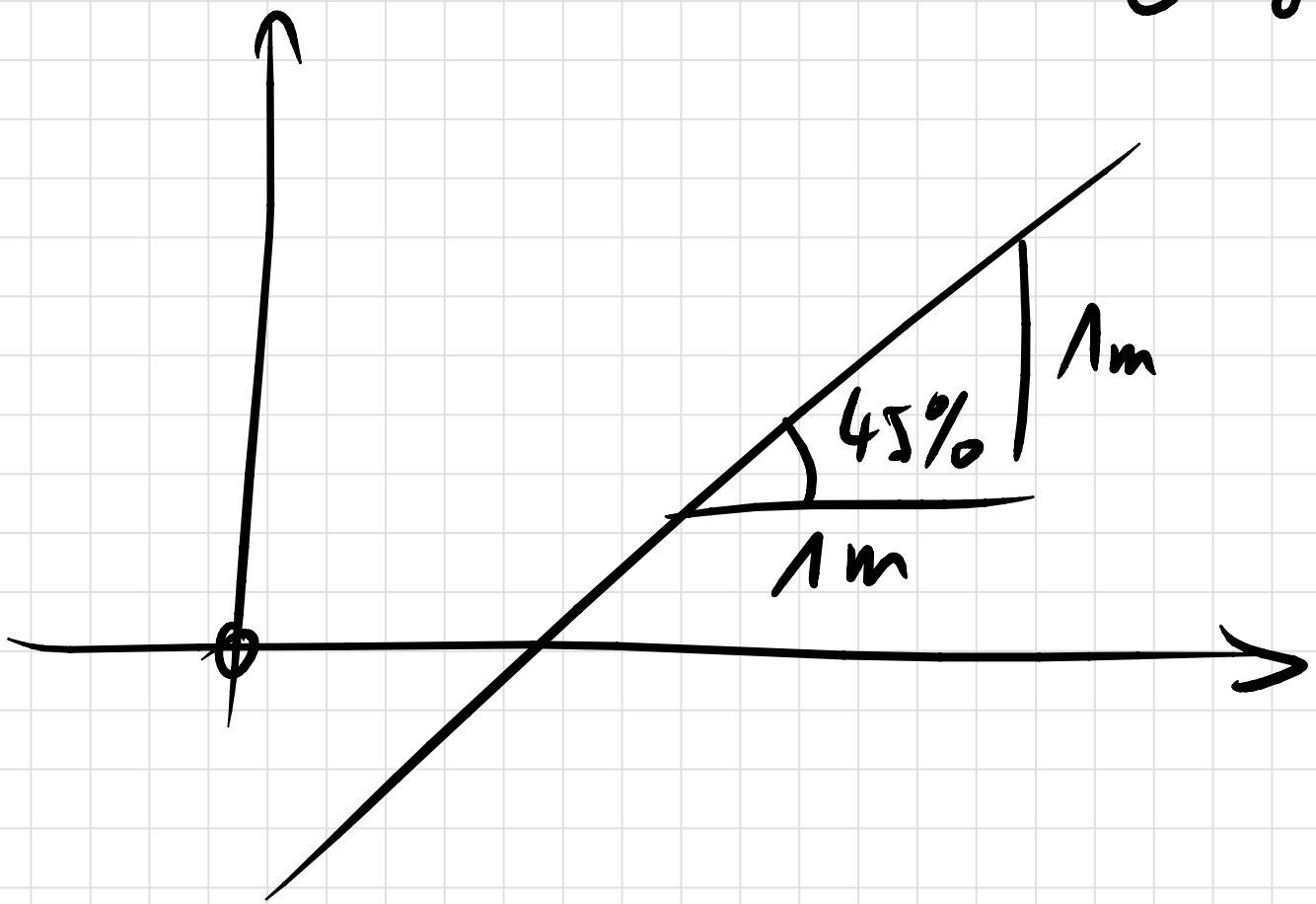
$$\Rightarrow 2-\frac{1}{3}=\frac{1}{b}+b-\frac{1}{3}$$

$$\Rightarrow b = 2-\frac{1}{3}=1\frac{2}{3}$$

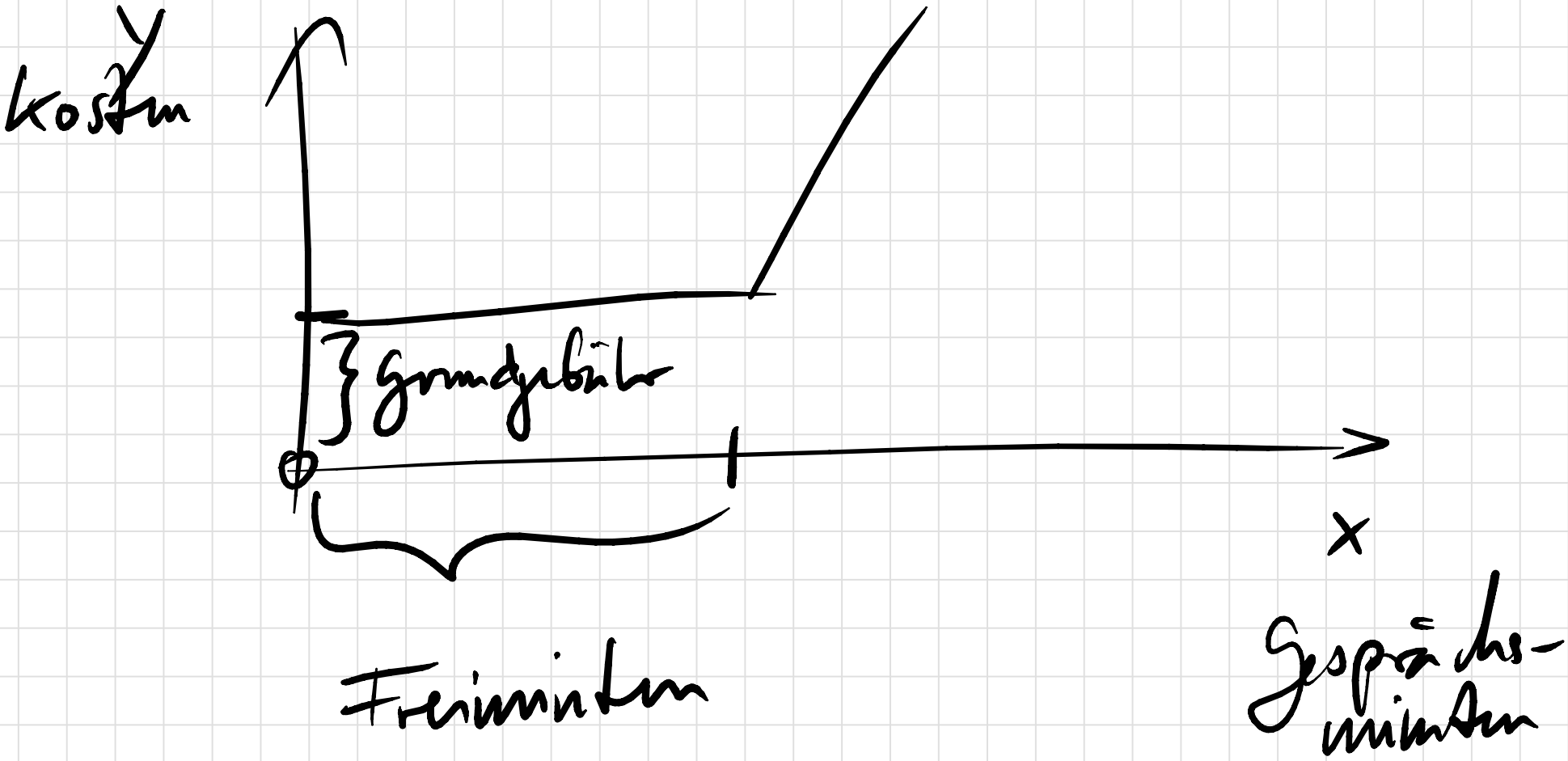


$$m = \frac{\Delta y}{\Delta x} = \frac{1}{7} \approx 0{,}142$$

100% Steigung



Stückweise definierte Funktion



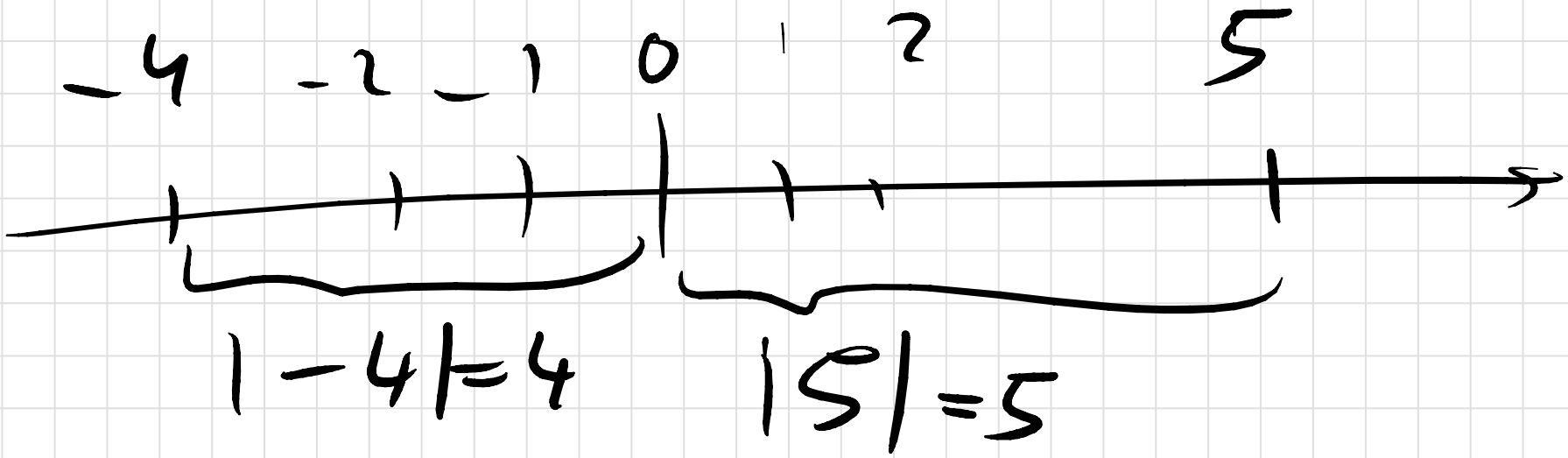
$$\text{Kosten} = \begin{cases} \text{Grundgeb.}; \text{ wenn Zeit} \leq \text{Freiminuten} \\ \text{Grundgeb} + \text{Minutenpreis} \cdot \text{zusätzl. Minuten}, \\ \text{wenn Zeit} > \text{Freiminuten} \end{cases}$$

$$y = \begin{cases} 25, & \text{wenn } x \leq 60 \\ 25 + 0{,}3\,(x-60), & \text{wenn } x > 60 \end{cases}$$

Absolutbetrag $|x|$

$$|x| = \begin{cases} x & , \text{wenn } x \geq 0 \\ -x & , \text{wenn } x < 0 \end{cases}$$

$|42| = 42$; $|-42| = -(-42) = 42$



$$|x| = \sqrt{x^2}$$