

$$381416,4187 = 3,81... \cdot 10^5$$

$$0,000000047 \text{ g} = 4,7 \cdot 10^{-8}$$

$$4,7 \in 18 \quad (\text{TR})$$

$$4,7 \cdot 10^{18}$$

$$x^{3/2} = \sqrt{x^3} \quad (x^3)^{1/2} = \sqrt{x^3}$$

$$\sqrt{x^3} = (\sqrt{x})^3$$

$$\sqrt{x^3} = (x^3)^{1/2} = x^{3/2}$$

$$x^{1/n} = \sqrt[n]{x}$$

$$(\sqrt{x})^3 = (x^{1/2})^3 = x^{3/2}$$

$$\frac{x}{y^2 z^1} = x \cdot y^{-2} z^{-1}$$

$$x^{-n} = \frac{1}{x^n}$$

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

$$\frac{1}{y^2} = y^{-2}$$

$$= x \cdot (y^2)^{-1} \cdot (z^1)^{-1}$$

$$= x \cdot y^{-2} \cdot z^{-1}$$

$$3x = 12$$

$$x = 4$$

$$x = x + 1$$

$$3x = 3x$$

Übungen:

$$3. \quad f) \quad \frac{x - \frac{12-5x}{3}}{2} = \frac{1-x + \frac{x+4}{2}}{3} \quad | \cdot 2$$

$$x - \frac{12-5x}{3} = \frac{2 \cdot (1-x + \frac{x+4}{2})}{3} \quad | \cdot 3$$

$$3 \cdot (x - \frac{12-5x}{3}) = 2 \cdot (1-x + \frac{x+4}{2})$$

$$3x - (12-5x) = 2 - 2x + (x+4)$$

$$3x - 12 + 5x = 2 - 2x + x + 4$$

$$8x - 12 = 6 - x$$

$$| +x \quad | +12$$

$$9x = 18$$

$$x = 2$$

$$| :9$$

$$\frac{\frac{x}{2}}{\frac{3}{x}} = \frac{x}{2} : \frac{3}{x} = \frac{x}{2} \cdot \frac{x}{3} = \frac{x^2}{6}$$

$$\frac{\frac{x}{2}}{\frac{3}{x}} = \frac{\frac{x}{2}}{x} : 3$$

$$= \frac{x}{2} : x \cdot \frac{1}{3}$$

$$= \frac{x}{2} \cdot \frac{1}{x} \cdot \frac{1}{3} = \frac{x}{6x} = \frac{1}{6}$$

$$\frac{x(x+3)}{3x+9} = \frac{x(x+3)}{3(x+3)}$$

$$g) \quad x + \frac{2x-7}{2} - \frac{3x+1}{5} = 5 - \frac{x+6}{2} \quad | \cdot 2$$

$$2x + 2x - 7 - \frac{2(3x+1)}{5} = 10 - (x+6) \quad | \cdot 5$$

$$10x + 10x - 35 - 2(3x+1) = 50 - (5x+30)$$

$$20x - 35 - 6x - 2 = 50 - 5x - 30$$

$$14x - 37 = 20 - 5x \quad | +5x \quad | +37$$

$$19x = 57 \quad | :19$$

$$\underline{x = 3}$$

$$5. n) \quad \frac{x+1}{x+5} - 2 = - \frac{x+3}{x-1} \quad | \cdot (x+5) \quad D = \mathbb{R} \setminus \{-5, 1\}$$

$$(x+1) - 2 \cdot (x+5) = - \frac{(x+3)(x+5)}{x-1} \quad | \cdot (x-1) \quad G = \mathbb{R}$$

$$(x+1)(x-1) - 2 \cdot (x+5)(x-1) = - (x+3)(x+5) \quad (a+b)(a-b) = a^2 - b^2$$

$$x^2 - 1 - 2 \cdot (x^2 - x + 5x - 5) = - (x^2 + 5x + 3x + 15)$$

$$\underline{x^2 - 1 - 2x^2 + 2x - 10x + 10} = -x^2 - 5x - 3x - 15$$

$$\underline{-x^2 + 9 - 8x} = \underline{-x^2 - 8x - 15} \quad | +x^2$$

$$9 - 8x = -8x - 15 \quad | +8x$$

$$\underline{9 = -15}$$

falsche Aussage

→ keine Lösung, $L = \emptyset$

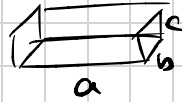
9. i) $0 = 2 \cdot (a \cdot b + a \cdot c + b \cdot c)$ $|\cdot 2$ $c = ?$

$$\frac{0}{2} = ab + ac + bc \quad | -ab$$

$$\frac{0}{2} - ab = ac + bc$$

$$\frac{0}{2} - ab = c \cdot (a + b) \quad | : (a + b)$$

$$\frac{\frac{0}{2} - ab}{a + b} = c$$



v) $\frac{1}{g} + \frac{1}{f} = \frac{1}{b}$ $|\cdot b$ $b = ?$

$$\frac{b}{g} + \frac{b}{f} = 1 \quad | \cdot g \quad | \cdot f$$

$$b \cdot f + b \cdot g = g \cdot f$$

$$b(f + g) = g \cdot f \quad | : (f + g)$$

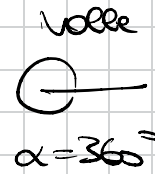
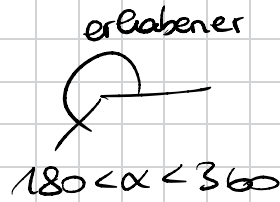
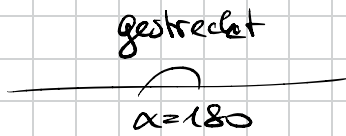
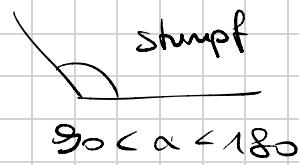
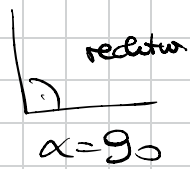
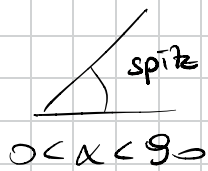
$$b = \frac{g \cdot f}{f + g}$$

$$b \cdot f + b \cdot g = g \cdot f \quad | -bf$$

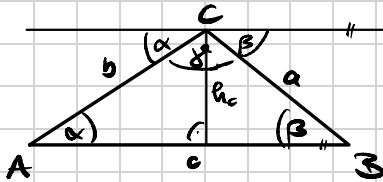
$$b \cdot g = g \cdot f - b \cdot f$$

$$b \cdot g = f \cdot (g - b) \quad | : (g - b)$$

$$f = \frac{b \cdot g}{g - b}$$



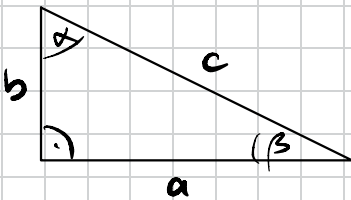
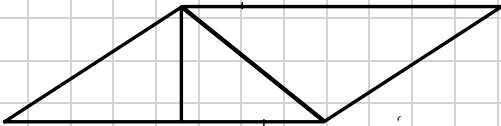
Dreiecke



$$U = a + b + c$$

$$A = \frac{c \cdot h_c}{2} = \frac{a \cdot h_a}{2} = \frac{b \cdot h_b}{2}$$

$$\alpha + \beta + \gamma = 180^\circ$$

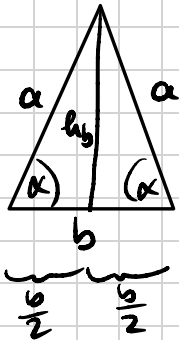


$$A = \frac{a \cdot b}{2}$$

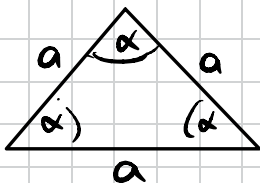
$$a^2 + b^2 = c^2$$

a, b Katheten

c Hypotenuse

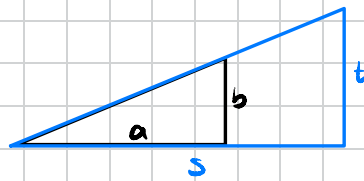


h_b halbiert b



$$\alpha = 60^\circ$$

Strahlensatz:

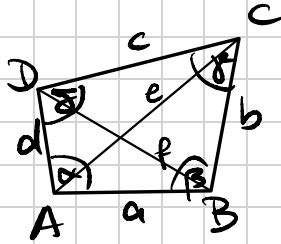


Ähnliche Dreiecke: Winkel gleich

$$a:b = s:t$$

$$a:s = b:t$$

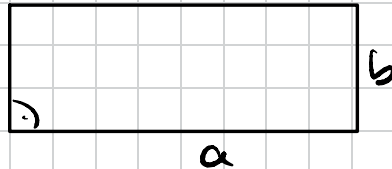
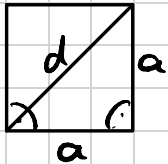
Vierecke



$$U = a + b + c + d$$

A = in 2 Dreiecke zerlegen

$$\alpha + \beta + \gamma + \delta = 360^\circ$$



$$A = a^2$$

$$U = 4a$$

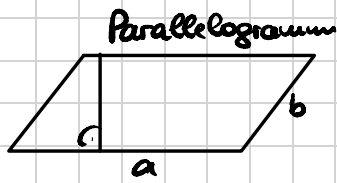
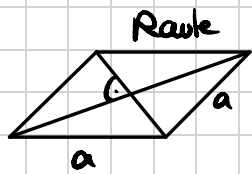
$$A = a \cdot b$$

$$U = 2a + 2b$$

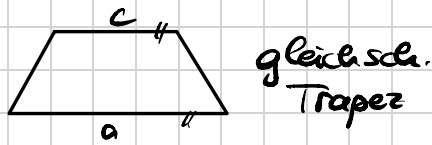
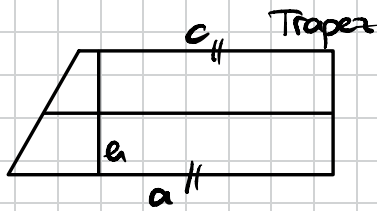
$$d^2 = a^2 + a^2$$

$$d = \sqrt{2a^2} = \sqrt{2} \cdot \sqrt{a^2}$$

$$\underline{d = \sqrt{2} \cdot a}$$

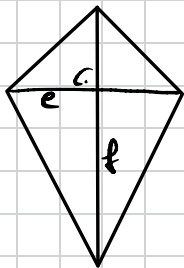


$$A = a \cdot h_a$$



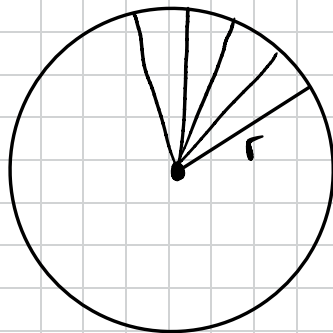
$$A = \frac{a+c}{2} \cdot h$$

Deltoid.



$$A = \frac{e \cdot f}{2}$$

Kreis



$$U = 2r \cdot \pi$$

$$2r = d$$

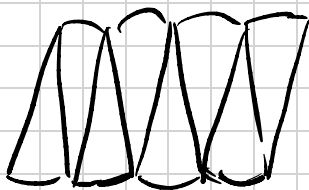
$$U = d \cdot \pi$$

$$A = r^2 \cdot \pi$$

$$r = \frac{d}{2}$$

$$A = \left(\frac{d}{2}\right)^2 \cdot \pi$$

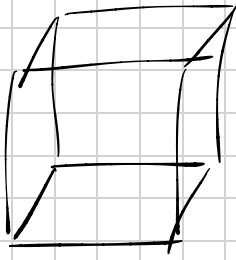
$$A = \frac{d^2}{4} \cdot \pi$$



$$A = r \cdot \frac{2r\pi}{2}$$

$$= r^2 \pi$$

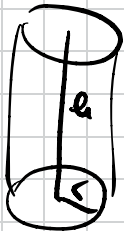
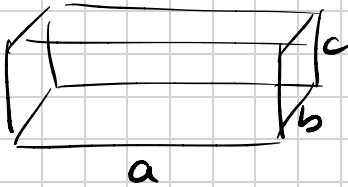
Prisma



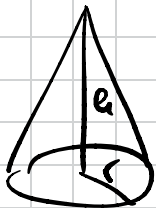
$$V = G \cdot h$$

$$\text{Würfel: } V = a^2 \cdot a = a^3$$

$$\text{Quader: } V = a \cdot b \cdot c$$

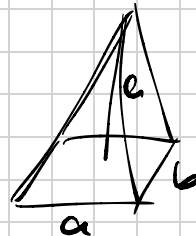


$$V = r^2 \pi \cdot h$$

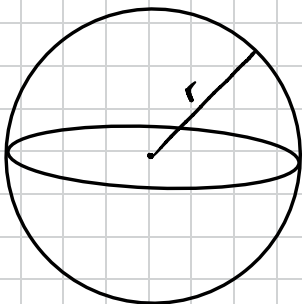


$$V = \frac{G \cdot h}{3}$$

$$V = \frac{r^2 \pi \cdot h}{3}$$



$$V = \frac{a \cdot b \cdot h}{3}$$



$$V = \frac{4}{3} \pi \cdot r^3$$

$$O = 4 \pi r^2$$

24. a) $d = 27 \mu$ $U = d \cdot \pi = 27 \cdot \pi = 84,82$ $A = \frac{d^2}{4} \pi = 572,56 \mu^2$
 b) $r = 2,5 \mu$ $U = 15,71 \mu$ $A = 19,63 \mu^2$
 $= 196.300 \text{ cm}^2$

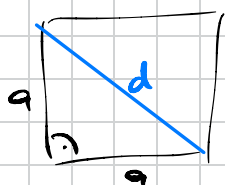
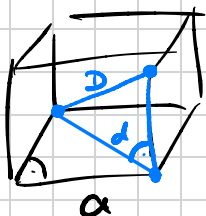
$$\mu \xrightarrow{10} \text{dm} \xrightarrow{10} \text{cm}$$

$$\mu \xrightarrow{100} \text{cm}$$

$$1 \mu^2 = 100^2 \text{ cm}^2$$

$$1 \mu^2 = 10000 \text{ cm}^2$$

1. a)



$$a = 5,75 \text{ cm}$$

$$d^2 = a^2 + a^2$$

$$d = \sqrt{2a^2} = \sqrt{2} \cdot a$$

$$d = \sqrt{2} \cdot 5,75$$

$$d = 8,13 \text{ cm}$$

$$D^2 = d^2 + a^2 = a^2 + a^2 + a^2$$

$$= 3a^2$$

$$D = \sqrt{3a^2} = \sqrt{3} \cdot \sqrt{a^2}$$

$$D = \sqrt{3} \cdot a$$

$$D = \sqrt{3} \cdot 5,75 = 9,96 \text{ cm}$$

$$O = 6 \cdot a^2 = 6 \cdot 5,75^2 = 198,375 \text{ cm}^2$$

$$V = a^3 = 5,75^3 = 190,1 \text{ cm}^3 = 0,1901 \text{ dm}^3 = 0,1901 \text{ l}$$

$$1 \text{ dm}^3 = 1 \text{ l}$$

$$1^3 \text{ dm}^3 = 10^3 \text{ cm}^3$$

$$1 \text{ dm}^3 = 1000 \text{ cm}^3$$

12. $r = 6.371 \text{ km}$

$$O = 4 \pi r^2 = 510.064.471,9 \text{ km}^2$$

$$V = \frac{4}{3} \pi \cdot r^3 = 1,08 \cdot 10^{12} \text{ km}^3$$

keine Gleit- $\rightarrow \frac{10,8 \cdot 10^{11} \text{ km}^3}{10}$
kommaderst.