

LÖSUNGEN

$$1a) A = 5^2 = 25 \text{ cm}^2$$

$$U = 4 \cdot 5 = 20 \text{ cm}$$

$$b) a^2 = 49 \quad | \sqrt{\quad}$$

$$a = 7 \text{ cm}$$

$$U = 4 \cdot 7 = 28 \text{ cm}$$

$$c) 4a = 24 \quad | :4$$

$$a = 6 \text{ cm}$$

$$A = 6^2 = 36 \text{ cm}^2$$

$$2a) A = a \cdot h_a = 5 \cdot 3 = 15 \text{ cm}^2$$

$$U = 2a + 2b$$

$$17,2 = 2 \cdot 5 + 2b$$

$$17,2 = 10 + 2b \quad | -10$$

$$7,2 = 2b \quad | :2$$

$$3,6 \text{ cm} = b$$

$$A = b \cdot h_b$$

$$15 = 3,6 \cdot h_b \quad | :3,6$$

$$4,17 \text{ cm} \approx h_b$$

$$b) A = a \cdot h_a$$

$$8 = 4 \cdot h_a \quad | :4$$

$$2 \text{ cm} = h_a$$

$$U = 2a + 2b$$

$$U = 2 \cdot 4 + 2 \cdot 7,83$$

$$U = 13,66 \text{ cm}$$

$$A = b \cdot h_b$$

$$8 = 2,83 \cdot h_b \quad | :2,83$$

$$2,83 \text{ cm} \approx h_b$$

$$3a) A = \frac{1}{2} \cdot (a+c) \cdot h = \frac{1}{2} \cdot (6,8+5) \cdot 2$$

$$= 11,8 \text{ cm}^2$$

$$b) A = \frac{1}{2} \cdot (5+3) \cdot 6 = 24 \text{ cm}^2$$

$$c) A = \frac{1}{2} \cdot (a+c) \cdot h$$

$$288,6 = \frac{1}{2} \cdot (28+16,4) \cdot h$$

$$288,6 = 22,2 \cdot h \quad | :22,2$$

$$13 \text{ cm} = h$$

$$d) A = \frac{1}{2} \cdot (a+c) \cdot h$$

$$51 = \frac{1}{2} \cdot (8+c) \cdot 6$$

$$51 = \frac{1}{2} \cdot 6 \cdot (8+c)$$

$$51 = 3 \cdot (8+c) \quad | :3$$

$$17 = 8+c \quad | -8$$

$$9 \text{ cm} = c$$

$$4a) V = 2a + 2b = 2 \cdot 2,83 + 2 \cdot 4,47 = 14,6 \text{ cm}$$

$$A = \frac{1}{2} \cdot 6 \cdot 4 = 12 \text{ cm}^2$$

$$b) V = 2a + 2b$$

$$19,74 = 2 \cdot 3,16 + 2b$$

$$19,74 = 6,32 + 2b$$

$$13,42 = 2b$$

$$6,71 \text{ cm} = b$$

$$A = \frac{1}{2} \cdot e \cdot f$$

$$21 = \frac{1}{2} \cdot 7 \cdot f$$

$$21 = 3,5 \cdot f$$

$$6 \text{ cm} = f$$

$$5a) d = 2 \cdot r = 8 \text{ cm}$$

$$V = 2\pi r = 2\pi \cdot 4 = 8\pi \approx 25,13 \text{ cm}$$

$$A = \pi r^2 = \pi \cdot 4^2 = 16\pi \approx 50,27 \text{ cm}^2$$

$$b) r = \frac{1}{2}d = 5 \text{ cm}$$

$$V = \pi d = 10\pi \approx 31,42 \text{ cm}$$

$$A = \pi r^2 = \pi \cdot 5^2 = 25\pi \approx 78,54 \text{ cm}^2$$

$$c) V = 2\pi r$$
$$20 = 2\pi r \quad | :2$$
$$10 = \pi r \quad | :\pi$$
$$3,18 \text{ cm} \approx r$$

$$A = \pi r^2$$
$$A = \pi \cdot 3,18^2$$
$$A = 31,77 \text{ cm}^2$$
$$d = 2 \cdot 3,18 = 6,36 \text{ cm}$$

$$d) A = \pi r^2$$
$$40 = \pi r^2 \quad | :\pi$$
$$\frac{40}{\pi} = r^2 \quad | \sqrt{\quad}$$
$$r = \sqrt{\frac{40}{\pi}} \approx 3,57 \text{ cm}$$

$$V = 2\pi r$$
$$V = 2\pi \cdot 3,57 \approx 22,43 \text{ cm}$$
$$d = 2 \cdot 3,57 = 7,14 \text{ cm}$$

$$6a) A = \pi r_2^2 - \pi r_1^2 = \pi \cdot 11^2 - \pi \cdot 4^2 = 121\pi - 16\pi$$
$$= 105\pi$$
$$\approx 329,87 \text{ cm}^2$$

$$V = 2\pi r_1 + 2\pi r_2 = 2\pi \cdot 6 + 2\pi \cdot 11 = 12\pi + 22\pi$$
$$= 34\pi$$
$$\approx 106,81 \text{ cm}$$

$$b) \quad 2\pi r_1 + 2\pi r_2 = 132$$

$$2\pi \cdot 6 + 2\pi r_2 = 132$$

$$12\pi + 2\pi r_2 = 132$$

$$2\pi r_2 = 132 - 12\pi$$

$$r_2 = \frac{132 - 12\pi}{2\pi} \approx 15 \text{ cm}$$

$$A = \pi r_2^2 - \pi r_1^2 = 15^2 \cdot \pi - 6^2 \cdot \pi$$

$$= 225\pi - 36\pi$$

$$= 189\pi \approx 593,76 \text{ cm}^2$$

$$c) \quad A = \pi r_2^2 - \pi r_1^2$$

$$50,24 = \pi \cdot 5^2 - \pi r_1^2$$

$$50,24 = 25\pi - \pi r_1^2$$

$$50,24 - 25\pi = -\pi r_1^2$$

$$\frac{50,24 - 25\pi}{-\pi} = r_1^2$$

$$\sqrt{\frac{50,24 - 25\pi}{-\pi}} = r_1$$

$$\sqrt{9} = r_1$$

$$3 \text{ cm} = r_1$$

$$U = 2\pi r_1 + 2\pi r_2$$

$$U = 2\pi \cdot 3 + 2\pi \cdot 5$$

$$U = 6\pi + 10\pi$$

$$U = 16\pi$$

$$U \approx 50,27 \text{ cm}$$

$$7a) \quad l = \frac{\alpha}{360} \cdot 2\pi r = \frac{60}{360} \cdot 2\pi \cdot 5 = 5,24 \text{ cm}$$

$$A = \frac{60}{360} \cdot \pi \cdot 5^2 = 13,09 \text{ cm}^2$$

$$U = 2 \cdot r + l = 10 + 5,24 = 15,24 \text{ cm}$$

$$b) \quad l = \frac{\alpha}{180} \cdot \pi r$$

$$A = \frac{28,65}{360} \cdot \pi \cdot 10^2$$

$$5 = \frac{\alpha}{180} \pi \cdot 10 \quad | :10$$

$$A \approx 25 \text{ cm}^2$$

$$0,5 = \frac{\alpha}{180} \pi \quad | \cdot 180$$

$$90 = \alpha \cdot \pi \quad | : \pi$$

$$\frac{90}{\pi} = \alpha$$

$$28,65^\circ \approx \alpha$$

$$U = 2r + l$$

$$U = 20 + 5$$

$$U = 25 \text{ cm}$$

$$c) \quad A = \frac{\alpha}{360} \pi r^2$$

$$l = \frac{60}{180} \cdot \pi \cdot 6$$

$$18,84 = \frac{60}{360} \pi r^2 \quad | \text{ kürzen}$$

$$l = 2\pi \approx 6,28 \text{ cm}$$

$$18,84 = \frac{1}{6} \pi r^2 \quad | \cdot 6$$

$$113,04 = \pi r^2 \quad | : \pi$$

$$U = 2r + l$$

$$U = 12 + 6,28$$

$$U = 18,28 \text{ cm}$$

$$\frac{113,04}{\pi} = r^2 \quad | \sqrt{\quad}$$

$$\sqrt{\frac{113,04}{\pi}} = r$$

$$6 \text{ cm} \approx r$$

$$\begin{aligned} \text{8a)} \quad a^2 + c^2 &= b^2 \\ 4^2 + 3^2 &= b^2 \\ 16 + 9 &= b^2 \\ 25 &= b^2 \\ 5 \text{ cm} &= b \end{aligned}$$

$$G = \frac{1}{2} \cdot 4 \cdot 3$$

$$G = 6 \text{ cm}^2$$

$$U_G = a + b + c = 4 + 5 + 3 = 12 \text{ cm}$$

$$V = G \cdot h = 6 \cdot 10 = 60 \text{ cm}^3$$

$$\begin{aligned} O &= 2G + U_G \cdot h = 12 + 12 \cdot 10 = 12 + 120 \\ &= 132 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{2)} \quad V &= G \cdot h \\ 24 &= G \cdot 8 \quad | :8 \\ 3 \text{ cm}^2 &= G \end{aligned}$$

$$G = \frac{1}{2} a \cdot c$$

$$3 = \frac{1}{2} \cdot 2 \cdot c$$

$$3 \text{ cm} = c$$

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

$$2^2 + 3^2 = b^2$$

$$4 + 9 = b^2$$

$$13 = b^2 \quad | \sqrt{\quad}$$

$$3,61 \text{ cm} \approx b$$

$$U_G = a + b + c$$

$$U_G = 2 + 3,61 + 3$$

$$U_G = 8,61 \text{ cm}$$

$$\begin{aligned} O &= 2G + U_G \cdot h \\ O &= 6 + 8,61 \cdot 8 \\ O &= 74,88 \text{ cm}^2 \end{aligned}$$

$$g) \quad G = a^2 = 6^2 = 36 \text{ cm}^2$$

$$U_G = 4a = 4 \cdot 6 = 24 \text{ cm}$$

$$V = G \cdot h = 36 \cdot 10 = 360 \text{ cm}^3$$

$$O = 2G + U_G \cdot h = 72 + 24 \cdot 10 = 312 \text{ cm}^2$$

$$h) \quad G = a^2 = 2^2 = 4 \text{ cm}^2$$

$$U_G = 4a = 4 \cdot 2 = 8 \text{ cm}$$

$$V = G \cdot h$$

$$20 = 4 \cdot h \quad | :4$$

$$5 \text{ cm} = h$$

$$O = 2G + U_G \cdot h$$

$$O = 8 + 8 \cdot 5 = 48 \text{ cm}^2$$

$$i) \quad O = 2G + U_G \cdot h$$

$$O = 2a^2 + 4a \cdot h$$

$$200 = 2a^2 + 4a \cdot 10$$

$$200 = 2a^2 + 40a \quad | :2$$

$$100 = a^2 + 20a$$

$$0 = a^2 + 20a - 100$$

$$a = -10 \pm \sqrt{100 + 100}$$

$$a = -10 \pm \sqrt{200}$$

$$a_1 = 4,14 \text{ cm}$$

$$(a_2 = -24,14)$$

$$G = 4,14^2$$

$$G = 17,1396 \text{ cm}^2$$

$$V = G \cdot h$$

$$V = 17,1396 \cdot 10$$

$$V = 171,396 \text{ cm}^3$$

$$10a) V = \pi r^2 h = \pi \cdot 4^2 \cdot 8 = 128\pi \\ \approx 402,12 \text{ cm}^3$$

$$O = 2\pi r^2 + 2\pi r h \\ = 2\pi \cdot 4^2 + 2\pi \cdot 4 \cdot 8 \\ = 32\pi + 64\pi = 96\pi \approx 301,59 \text{ cm}^2$$

$$b) V = \pi r^2 h \\ 200 = \pi r^2 \cdot 10 \quad | :10 \\ 20 = \pi r^2 \quad | :\pi \\ \frac{20}{\pi} = r^2 \quad | \sqrt{\quad}$$

$$\sqrt{\frac{20}{\pi}} = r$$

$$2,52 \text{ cm} = r$$

$$O = 2\pi r^2 + 2\pi r h \\ O = 2\pi \cdot 2,52^2 + 2\pi \cdot 2,52 \cdot 10 \\ O \approx 39,9 + 158,34 \\ = 198,24 \text{ cm}^2$$

$$c) O = 2\pi r^2 + 2\pi r h \\ 500 = 2\pi \cdot 5^2 + 2\pi \cdot 5 \cdot h \\ 500 = 50\pi + 10\pi \cdot h$$

$$500 - 50\pi = 10\pi h$$

$$\frac{500 - 50\pi}{10\pi} = h$$

$$10,92 \text{ cm} = h$$

$$V = \pi r^2 h \\ V = \pi \cdot 5^2 \cdot 10,92 \\ V \approx 857,65 \text{ cm}^3$$

$$11a) V = \frac{4}{3} \pi r^3 = \frac{4}{3} \pi \cdot 5^3 = \frac{500}{3} \pi \approx 523,6 \text{ cm}^3$$

$$O = 4 \pi r^2 = 4 \pi \cdot 5^2 = 100 \pi \approx 314,16 \text{ cm}^2$$

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

$$500 = \frac{4}{3} \pi r^3 \quad | \cdot \frac{3}{4}$$

$$375 = \pi r^3 \quad | : \pi$$

$$\frac{375}{\pi} = r^3 \quad | \sqrt[3]{\quad}$$

$$\sqrt[3]{\frac{375}{\pi}} = r$$

$$4,92 \text{ cm} = r$$

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

$$O = 4 \pi \cdot 4,92^2$$

$$O = 304,19 \text{ cm}^2$$

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

$$500 = 4 \pi r^2 \quad | : 4$$

$$125 = \pi r^2 \quad | : \pi$$

$$\frac{125}{\pi} = r^2 \quad | \sqrt{\quad}$$

$$\sqrt{\frac{125}{\pi}} = r$$

$$6,31 \text{ cm} = r$$

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

$$V = \frac{4}{3} \pi \cdot 6,31^3$$

$$V \approx 1052,39 \text{ cm}^3$$

$$12a) \quad V = \frac{4}{3} \pi r^3$$

$$V = \frac{4}{3} \pi \cdot 10^3$$

$$V \approx 4188,79 \text{ cm}^3$$

$$4188,79 = a^3 \quad | \sqrt[3]{}$$

$$16,12 \text{ cm} = a$$

$$b) \quad O = 4\pi r^2$$

$$O = 4\pi \cdot 10^2$$

$$O = 400\pi$$

$$O \approx 1256,64 \text{ cm}^2$$

$$1256,64 = 6a^2$$

$$209,44 = a^2 \quad | \sqrt{}$$

$$14,47 \text{ cm} = a$$

$$c) \quad V = \frac{4}{3} \pi r^3$$

$$2000 = \frac{4}{3} \pi r^3 \quad | \cdot \frac{3}{4}$$

$$1500 = \pi r^3 \quad | : \pi$$

$$\frac{1500}{\pi} = r^3 \quad | \sqrt[3]{}$$

$$\sqrt[3]{\frac{1500}{\pi}} = r$$

$$7,82 \text{ cm} \approx r$$

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

$$O = 4\pi \cdot 7,82^2$$

$$O = 768,46 \text{ cm}^2$$

$$768,46 = 6 \cdot a^2 \quad | : 6$$

$$128,08 = a^2 \quad | \sqrt{}$$

$$11,32 \text{ cm} = a$$

$$b) 100 \text{ m} = 10000 \text{ cm}$$

$$10.000 = a \cdot 2\pi \cdot 35$$

$$10.000 = a \cdot 70\pi \quad | : 70\pi$$

$$45,47 = a$$

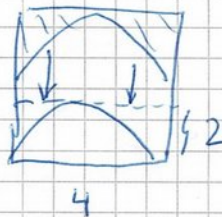
⇒ Es muss sich 45,47-mal drehen

$$15a) A_{\square} = 6^2 = 36 \text{ cm}^2$$

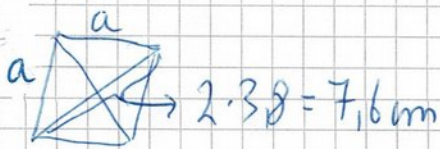
$$A_{\triangle} = \frac{1}{2} \cdot \pi r^2 = \frac{1}{2} \pi \cdot 3^2 = 4,5\pi \text{ cm}^2$$

$$A_{\text{III}} = 36 - 4,5\pi = 21,86 \text{ cm}^2$$

$$b) A_{\text{III}} = 2 \cdot 4 = 8 \text{ cm}^2$$



$$c) A_{\circ} = \pi r^2 = \pi \cdot 3,8^2 = 45,36 \text{ cm}^2$$



$$a^2 + a^2 = 7,6^2$$

$$2a^2 = 7,6^2$$

$$2a^2 = 57,76$$

$$a^2 = 28,88$$

$$a \approx 5,37 \text{ cm}$$

$$A_{\square} = 5,37^2 = 28,88 \text{ cm}^2$$

$$A_{\text{III}} = 45,36 - 28,88 = 16,48 \text{ cm}^2$$

$$16a) \quad 1 \text{ l} = 1 \text{ dm}^3 \\ = 1000 \text{ cm}^3$$

$$1 \text{ m} = 100 \text{ cm}$$

$$V_{\text{Tonne}} = \pi r^2 h \\ = \pi \cdot 40^2 \cdot 100 \\ = 502654,82 \text{ cm}^3 \\ = 502,65 \text{ dm}^3 \\ = 502,65 \text{ l}$$

\Rightarrow Es sind 502,65 l

$$b) \quad 200 \text{ l} = 200 \text{ dm}^3 \\ 40 \text{ cm} = 4 \text{ dm} \\ 100 \text{ cm} = 10 \text{ dm}$$

$$200 = \pi r^2 h$$

$$200 = \pi \cdot 4^2 h$$

$$200 = 16\pi h$$

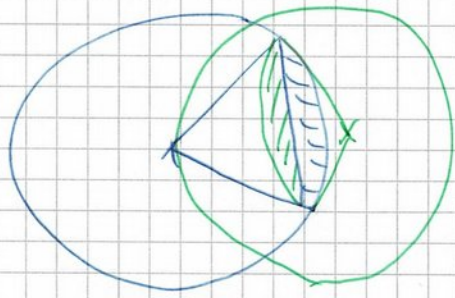
$$\frac{200}{16\pi} = h$$

$$3,98 \text{ dm} = h$$

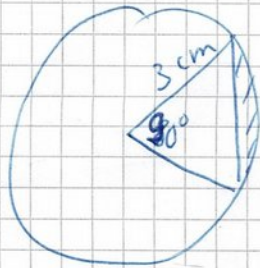
$$39,8 \text{ cm} = h$$

\Rightarrow Es steht 39,8 cm hoch.

17)



Die beiden schraffierten Bereiche sind gleich groß. Es genügt daher, nur einen davon zu bestimmen.



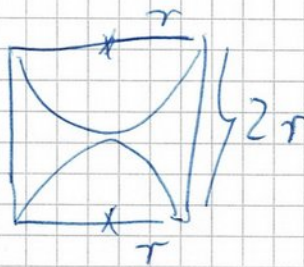
$$A_{\triangle} = \frac{90}{360} \cdot \pi \cdot 3^2 = 7,07 \text{ cm}^2$$

$$A_{\triangle} = \frac{1}{2} \cdot 3 \cdot 3 = 4,5 \text{ cm}^2$$

$$\Rightarrow A_{\text{Bogen}} = 7,07 - 4,5 = 2,57 \text{ cm}^2$$

$$\Rightarrow A_{\text{gesamt}} = 2 \cdot 2,57 = \underline{\underline{5,14 \text{ cm}^2}}$$

18a)



$$A_{\square} = 2r \cdot 2r = 4r^2$$

$$A_{\nabla} = \frac{1}{2} \cdot \pi r^2 \quad \left\{ \begin{array}{l} \text{zusammen ein} \\ \text{ganzer Kreis} \end{array} \right.$$

$$A_{\triangle} = \frac{1}{2} \cdot \pi r^2 \quad \left\{ \begin{array}{l} \text{zusammen ein} \\ \text{ganzer Kreis} \end{array} \right.$$

$$A = 4r^2 - \pi r^2 = (4 - \pi) \cdot r^2$$

b)

$$A = 4r^2$$

