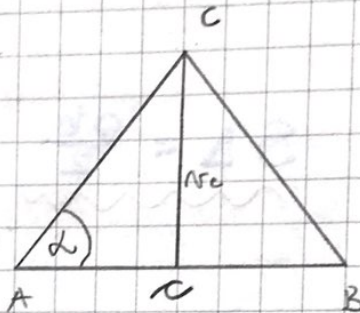
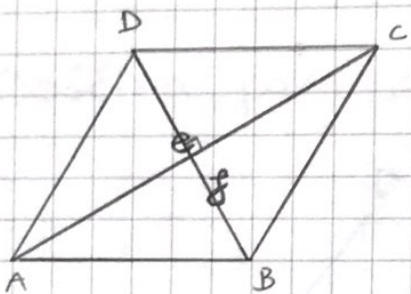


Romb z diagonalama $e = 7 \text{ cm}$ in $f = 5.7 \text{ cm}$ je plosčinsko enak enakokrakemu Δ z osnovnico $c = 9 \text{ cm}$. Kolikšen je kot ob osnovnici Δ ?



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

$$f = 5.7 \text{ cm}$$

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

$$\alpha = ?$$

$$S_{\text{romba}} = \frac{e \cdot f}{2}$$

$$S_1 = S_2$$

$$S_{\square} = S_{\Delta}$$

$$S_1 = \frac{e \cdot f}{2} = 19.95 \text{ cm}^2$$

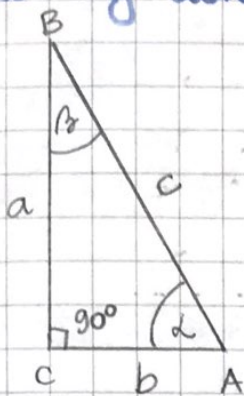
$$S_2 = \frac{c \cdot n_c}{2} \Rightarrow n_c = \frac{2S_2}{c} = \frac{2 \cdot 19.95 \text{ cm}^2}{9 \text{ cm}}$$

$$n_c = \frac{39.9}{9} \text{ cm} = 4.43 \text{ cm}$$

$$\text{tg } \alpha = \frac{n_c}{\frac{c}{2}} = \frac{4.43 \text{ cm}}{4.5 \text{ cm}}$$

$$\alpha = 44^{\circ} 34'$$

- ⑧
④ V pravokotnem Δ je $a+c=30$ cm, kot $\alpha=30^\circ$.
Izračunaj dolžine stranic Δ .



$$a = (30 - c) \text{ cm}$$

$$\sin \alpha = \frac{a}{c}$$

$$\sin 30^\circ = \frac{30 - c}{c}$$

$$\frac{1}{2} = \frac{30 - c}{c} \quad | \cdot 2c$$

$$a = (30 - c) \text{ cm}$$

$$a = (30 - 20) \text{ cm}$$

$$a = \underline{10 \text{ cm}}$$

$$c = 60 - 2c$$

$$3c = 60$$

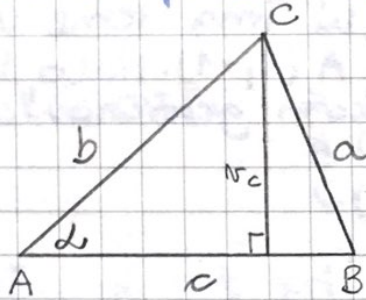
$$c = \underline{20 \text{ cm}}$$

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

$$b^2 = 400 \text{ cm}^2 - 100 \text{ cm}^2$$

$$b = \sqrt{300 \text{ cm}^2} = \underline{5\sqrt{10} \text{ cm}}$$

- ✓ 30. Stranice $\triangle ABC$ so v razmerju 2:4:5, obseg \triangle pa je 55cm. Izračunajte dolžine stranic $\triangle ABC$.
Koliko meri ploščina $\triangle ABC$?



$$a:b:c = 2:4:5$$

$$O = a+b+c = 55 \text{ cm}$$

$$a, b, c, S_{\triangle} = ?$$

$$a = 2x$$

$$b = 4x$$

$$c = 5x$$

$$2x + 4x + 5x = 55$$

$$11x = 55$$

$$x = \underline{\underline{5}}$$

$$a = 2x = 10 \text{ cm}$$

$$b = 4x = 20 \text{ cm}$$

$$c = 5x = 25 \text{ cm}$$

$$\cos \alpha = \frac{b^2 + c^2 - a^2}{2bc} = \frac{400 \text{ cm}^2 + 625 \text{ cm}^2 - 100 \text{ cm}^2}{2 \cdot 20 \text{ cm} \cdot 25 \text{ cm}}$$

$$\cos \alpha = \frac{925 \text{ cm}^2}{1000 \text{ cm}^2} = 0,925$$

$$\alpha = \underline{\underline{22^\circ 20'}}$$

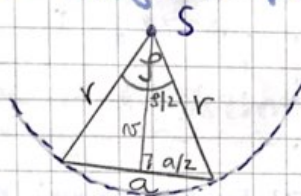
$$S_{\Delta} = \frac{1}{2} b \cdot c \cdot \sin \alpha$$

$$S_{\Delta} = \frac{1}{2} \cdot 20 \text{ cm} \cdot 25 \text{ cm} \cdot \sin 22^{\circ} 20'$$

$$S_{\Delta} = \underline{\underline{95 \text{ cm}^2}}$$

31. Izračunajte stranico in ploščino pravilnega 9-kotnika, ki ga vrtamo krogu s polmerom 15 cm.

$$\begin{aligned} n &= 9 \\ r &= 15 \text{ cm} \\ a, S_9 &= ? \end{aligned}$$



$$\varphi = \frac{360^{\circ}}{9} = \underline{\underline{40^{\circ}}}$$

$$\sin \frac{\varphi}{2} = \frac{a/2}{r}$$

$$a/2 = \sin \frac{\varphi}{2} \cdot r = \sin 20^{\circ} \cdot 15 \text{ cm} = 5,13 \text{ cm}$$

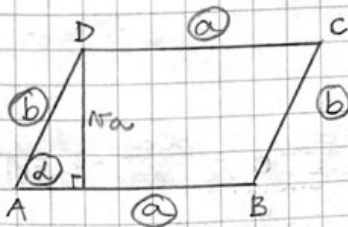
$$a = 5,13 \text{ cm} \cdot 2 = \underline{\underline{10,26 \text{ cm}}}$$

$$S_9 = 9 \cdot S_{\Delta}$$

$$S_{\Delta} = \frac{r^2}{2} \cdot \sin \varphi = \frac{(15 \text{ cm})^2}{2} \cdot \sin 40^{\circ} = 72,31 \text{ cm}^2$$

$$S_9 = 9 \cdot 72,31 \text{ cm}^2 = \underline{\underline{650,82 \text{ cm}^2}}$$

39. V paralelogramu ABCD je $a = 5 \text{ cm}$, $b = 4 \text{ cm}$, $\alpha = 45^{\circ}$.



$$\begin{aligned} a &= 5 \text{ cm} \\ b &= 4 \text{ cm} \\ \alpha &= 45^{\circ} \end{aligned}$$

a) Izračunaj višino na stranico a in ploščino paralelograma.

$$h_a = ? \quad S_{\square} = ?$$

$$\sin \alpha = \frac{h_a}{b} \Rightarrow h_a = \sin \alpha \cdot b = \frac{\sqrt{2}}{2} \cdot 4 \text{ cm} = \underline{\underline{2\sqrt{2} \text{ cm}}}$$

$$S_{\square} = a \cdot \sin a = 5 \text{ cm} \cdot 2\sqrt{2} \text{ cm} = 10\sqrt{2} \text{ cm}$$

b) Koliko meri dolžina diagonale f ?

$$f^2 = a^2 + b^2 - 2ab \cdot \cos \alpha$$

$$f^2 = 25 \text{ cm}^2 + 16 \text{ cm}^2 - 2 \cdot 5 \text{ cm} \cdot 4 \text{ cm} \cdot \cos 45^\circ$$

$$f^2 = 41 \text{ cm}^2 - 40 \text{ cm}^2 \cdot \frac{\sqrt{2}}{2}$$

$$f = \sqrt{(41 - 20\sqrt{2}) \text{ cm}^2}$$

$$f = 3,57 \text{ cm} \quad \checkmark$$

c) Za koliko odstotkov se spremeni ploščina paralelograma, če povečamo kot α za 10%, dolžini stranic a in b pa ostaneta nepromenjeni?

$$S_{\square} = 10\sqrt{2} \text{ cm}$$

$$10\% \text{ od } 45^\circ = x$$

$$x = \frac{10}{100} \cdot 45 = 4,5$$

$$S_{\square_1} = a \cdot b \cdot \sin \alpha = 5 \text{ cm} \cdot 4 \text{ cm} \cdot \sin 49,5^\circ = 15,208 \text{ cm}$$

$$\frac{10\sqrt{2} \text{ cm}}{15,208 \text{ cm}} \cdot 100\% = 92,99\%$$

$$100,00\%$$

$$- 92,99\%$$

$$\underline{7,01\%}$$

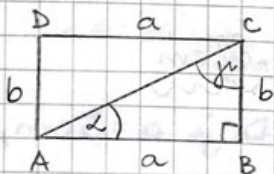
Poveča se za 7,01%.

② Obseg pravokotnika meri 30 cm, kot med diagonalo in osnovnico pa 42° . Izračunaj ploščino pravokotnika.

$$O = 30 \text{ cm}$$

$$\alpha = 42^\circ$$

$$S = ?$$



$$S = a \cdot b$$

$$O = 2a + 2b$$

$$2a = O - 2b$$

$$a = \frac{O - 2b}{2} = \frac{O}{2} - b = \frac{30 \text{ cm}}{2} - b = (15 - b) \text{ cm}$$

$$\gamma = 180^\circ - (90^\circ + 42^\circ) = 180^\circ - 132^\circ = 48^\circ$$

PO SINUSNI IZREKU:

$$\frac{b'}{\sin \alpha} = \frac{a}{\sin \gamma}$$

$$b = \frac{a \cdot \sin \alpha}{\sin \gamma} = \frac{(15 - b) \sin \alpha}{\sin \gamma}$$

$$b = \frac{(15-b) \sin \alpha}{\sin \beta} \quad / \cdot \sin \beta$$

$$b \cdot \sin \beta = (15-b) \sin \alpha$$

$$b \cdot \sin \beta - (15-b) \sin \alpha = 0$$

$$b \cdot \sin \beta - 15 \cdot \sin \alpha + b \cdot \sin \alpha = 0$$

$$b(\sin \beta + \sin \alpha) = 15 \sin \alpha$$

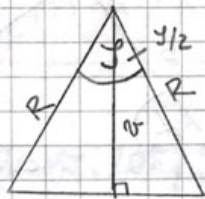
$$b = \frac{15 \sin \alpha}{\sin \beta + \sin \alpha}$$

$$b = \frac{15 \cdot \sin 58^\circ}{\sin 58^\circ + \sin 42^\circ} = \underline{8,38 \text{ cm}}$$

$$a = (15-b) \text{ cm} = \underline{6,62 \text{ cm}}$$

$$S = a \cdot b = \underline{55,47 \text{ cm}^2}$$

6) Izračunaj najkrajšo diagonalo v pravilnem 18-kotniku, ki je vrtan krogu s polmerom $R=4\text{m}$.



$$n=18$$

$$R=4\text{m}$$

$$d = 2 \cdot r$$

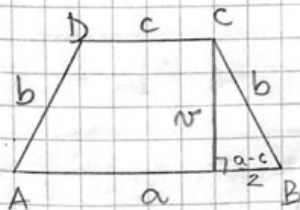
$$d = ?$$

$$\alpha = \frac{360^\circ}{18} = 20^\circ$$

$$\cos \frac{\alpha}{2} = \frac{r}{R} \Rightarrow r = \cos 10^\circ \cdot 4\text{m} = \underline{3,94 \text{ m}}$$

$$d = 2 \cdot r = \underline{7,88 \text{ m}}$$

7) V enakokrakem trapezu merita osnovnici 7 dm in 13 dm, krak pa 5 dm. Izračunaj ploščino trapeza.



$$a = 13 \text{ dm}$$

$$c = 7 \text{ dm}$$

$$b = 5 \text{ dm}$$

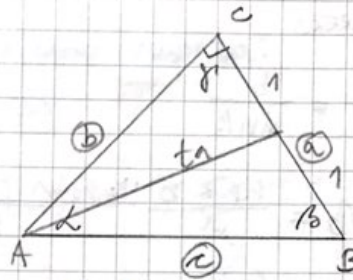
$$S = ?$$

$$S = 40 \text{ dm}^2$$

$$S = \frac{a+c}{2} \cdot h \quad h^2 = b^2 - \left(\frac{a-c}{2}\right)^2 = 4 \text{ dm}^2$$

Trikotnik

h) $a = 8\text{m}$
 $b = 15\text{m}$
 $c = 17\text{m}$



$S_{\Delta}, r, R, R_a, R_b, R_c, \alpha, \beta, \gamma, t_a = ?$

$$- S_{\Delta} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \frac{a+b+c}{2} = \frac{(8+15+17)}{2} \text{m} = 20\text{m}$$

$$S_{\Delta} = \sqrt{20(20-8)(20-15)(20-17)} \text{m}^2$$

$$S_{\Delta} = \sqrt{20 \cdot 12 \cdot 5 \cdot 3} \text{m}^2$$

$$S_{\Delta} = \sqrt{3600} \text{m}^2 = 60\text{m}^2 \quad \checkmark$$

$$- r = \frac{S_{\Delta}}{s} = \frac{60\text{m}^2}{20\text{m}} = 3\text{m} \quad \checkmark$$

$$- R = \frac{a \cdot b \cdot c}{4S} = \frac{8 \cdot 15 \cdot 17 \text{m}^3}{4 \cdot 60\text{m}^2} = \frac{17}{2} \text{m} = 8.5\text{m} \quad \checkmark$$

$$- S_{\Delta} = \frac{c \cdot R_c}{2} = \frac{a \cdot R_a}{2} = \frac{b \cdot R_b}{2}$$

$$R_c = \frac{2S}{c} = \frac{2 \cdot 60\text{m}^2}{17\text{m}} = \frac{120}{17} \text{m} = 7 \frac{1}{17} \text{m}$$

$$R_a = \frac{2S}{a} = \frac{2 \cdot 60\text{m}^2}{8\text{m}} = 15\text{m}$$

$$R_b = \frac{2S}{b} = \frac{2 \cdot 60\text{m}^2}{15\text{m}} = 8\text{m}$$

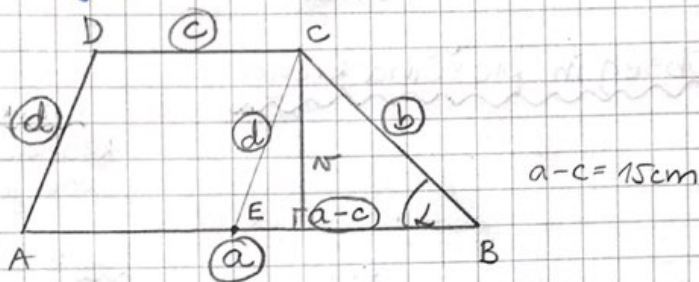
$$\text{Po kos. izreku: } \cos \alpha = \frac{b^2 + c^2 - a^2}{2bc} = \frac{225 + 289 - 64}{510} = \frac{450}{510}$$

$$\cos \alpha = \frac{45}{51} \Rightarrow \alpha = 28^{\circ} 4' \quad \checkmark$$

3 |

Učb. str. 206/10. Izračunaj ploščino trapeza:

a) $a = 19 \text{ cm}$
 $b = 12 \text{ cm}$
 $c = 4 \text{ cm}$
 $d = 9 \text{ cm}$
 $S = ?$



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

$$S_{\Delta EBC} = \sqrt{s(s-b)(s-a-c)(s-d)}$$

Iz ploščine Δ bomo izračunali višino h , ki je hkrati višina trapeza.

$$s = \frac{d+b+(a-c)}{2} = \frac{18 \text{ cm}}{2}$$

$$S_{\Delta} = \frac{(a-c) \cdot h}{2}$$

$$S_{\Delta EBC} = \sqrt{18(18-12)(18-15)(18-9)} \text{ cm}^2$$

$$h = \frac{2S}{a-c} = \frac{2 \cdot 54 \text{ cm}^2}{15 \text{ cm}}$$

$$S_{\Delta EBC} = \sqrt{18 \cdot 6 \cdot 3 \cdot 9} \text{ cm}^2$$

$$h = 7,2 \text{ cm}$$

$$S_{\Delta EBC} = \sqrt{2916} \text{ cm}^2$$

Ploščina trapeza (trapeza = trikotnika):

$$S_{\Delta EBC} = 54 \text{ cm}^2$$

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

$$S_{\Delta} = \frac{19 \text{ cm} + 4 \text{ cm}}{2} \cdot 7,2 \text{ cm}$$

$$S_{\Delta} = 82,8 \text{ cm}^2$$

2. Način:

Višino trapeza lahko dobimo tudi s pomočjo kota d , kot d pa lahko izračunamo po kosinusnem izreku.

DIV

+

10b.