

2. kontrolna naloga - 2. rok
2. A, 5. 1. 2022

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dosežene točke	možne točke	odstotki	ocena
27	34	79	4

ČAS PISANJA: 45 minut

1. Izračunaj natančno vrednost izraza $\frac{\cos 300^\circ \sin \alpha}{\tan 135^\circ}$ (brez računalu, viden naj bo postopek), če je $\tan \alpha = \frac{1}{2}$ in $180^\circ < \alpha < 270^\circ$. [7t] 2t

$$\frac{\cos 300^\circ \cdot \sin \alpha}{\tan 135^\circ} = \frac{\frac{1}{2} \cdot 0,45}{-1} = -0,22$$

30	45	60
sin	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
cos	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$
tan	$\frac{1}{\sqrt{3}}$	$\sqrt{3}$
cot	$\sqrt{3}$	$\frac{1}{\sqrt{3}}$

$$\begin{aligned} \tan \alpha &= \frac{1}{2} \\ 180^\circ < \alpha < 270^\circ \\ \alpha &= 26,56^\circ = 26^\circ 34' \\ \cos(360^\circ - 60^\circ) &= \cos 60^\circ = \frac{1}{2} \\ \tan(180^\circ - 45^\circ) &= -\tan 45^\circ = -1 \end{aligned}$$

$$\sin 26,56^\circ = 0,447 \approx 0,45$$

$$\tan \alpha = \frac{1}{2}$$

$$\frac{\sin \alpha}{\cos \alpha} = \frac{1}{2}$$

$$\sin \alpha = \frac{1}{2} \cos \alpha$$

$$\sin^2 \alpha + \cos^2 \alpha = 1$$

$$\sin \alpha = -\frac{\sqrt{3}}{5}$$

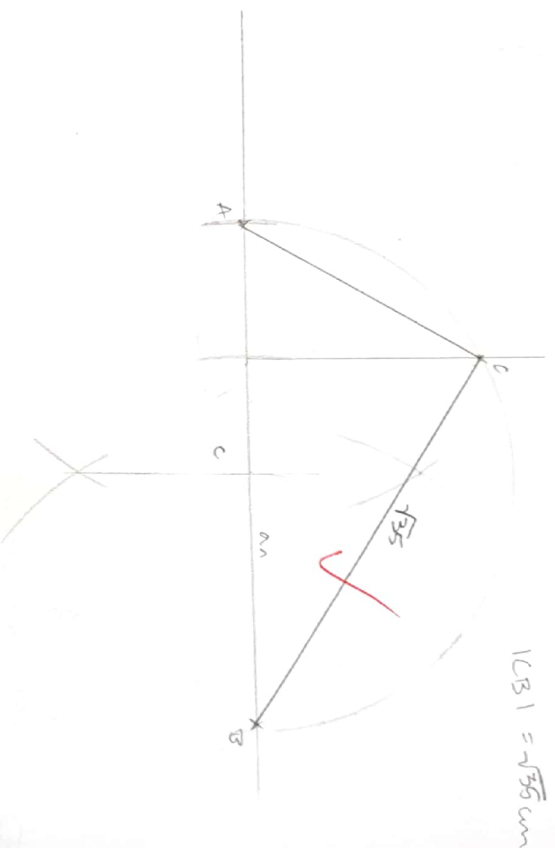
2. Poenostavi izraz: $\frac{\sin^2 x - \cos^2 x}{\sin x - \cos x} \cdot \frac{\tan x}{\sin x - \cos x}$. [4t] 4t

$$\begin{aligned} & \frac{\sin^2 x - \cos^2 x}{\frac{1}{\sin x} + \frac{1}{\cos x}} \cdot \frac{\frac{\sin x}{\cos x}}{\frac{\cos x}{\sin x - \cos x}} = \\ &= \frac{\sin^2 x - \cos^2 x}{\frac{\cos x + \sin x}{\sin x \cos x}} \cdot \frac{\sin x}{\frac{\cos x}{\sin x - \cos x}} = \\ &= \frac{(\sin^2 x - \cos^2 x) \sin x \cos x}{\cos x + \sin x} \cdot \frac{\sin x}{(\sin x - \cos x) \cos x} = \\ &= \frac{(\sin x + \cos x)(\sin x - \cos x) \sin x}{\cos x + \sin x} \cdot \frac{\sin x}{\sin x - \cos x} = \\ &= \sin^2 x \end{aligned}$$

$$\begin{aligned} \tan^2 \alpha &= \frac{1}{3} \\ \cot^2 \alpha + 1 &= \frac{1}{\sin^2 \alpha} \\ \sin^2 \alpha + \cos^2 \alpha &= 1 \\ \tan^2 \alpha &= \frac{\sin^2 \alpha}{\cos^2 \alpha} \quad \cot^2 \alpha = \frac{\cos^2 \alpha}{\sin^2 \alpha} \\ \tan \cdot \cot &= 1 \end{aligned}$$

3. Z uporabo Evklidovega izreka konstruiraj daljico dolžine $\sqrt{35}$. Pisanje poteka ni obvezno. [5t] **5t**

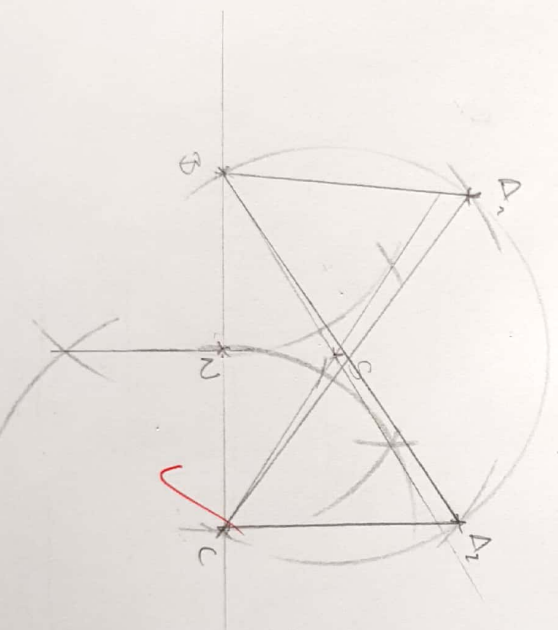
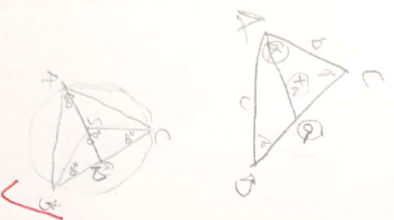
$\sqrt{35}$
 $a^2 = a_1 \cdot c$ ✓
 $35 = 5 \cdot 7$
 $a^2 = 35$ $a_1 = 5, c = 7$ ✓
 $\Rightarrow a = \sqrt{35}$



4. Konstruiraj trikotnik ABC s podatki: $a = 5$ cm, $b_a = 4$ cm in $\alpha = 60^\circ$.

[6t] **6t**

$a = 5$ cm
 $b_a = 4$ cm
 $\alpha = 60^\circ$

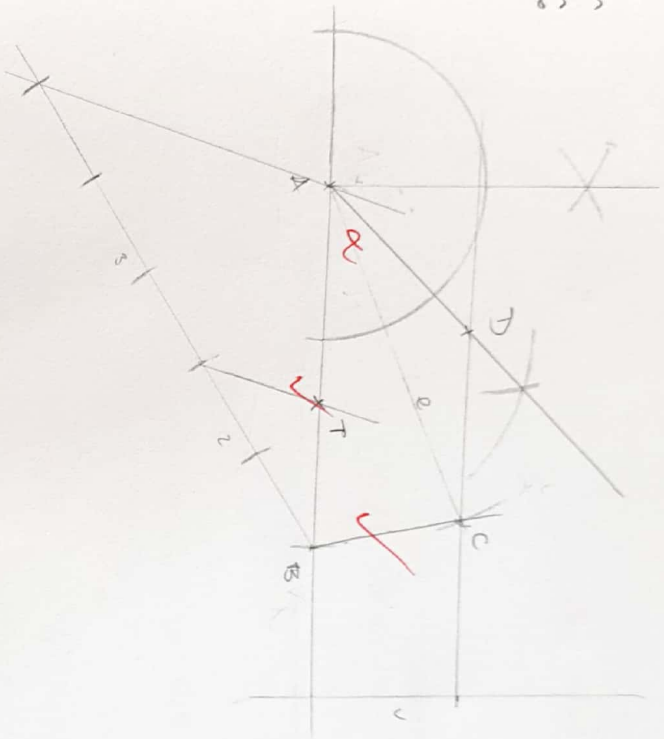


- ① $a \rightarrow BC = a$
 ② $\triangle BCS$
 $l(S, r = |BS|)$
 ③ razpolovišče $a \rightarrow N$
 $l(N, r = b_a) \rightarrow A_1, A_2$
 ④ $\triangle A_1BC, \triangle A_2BC$ ✓

5. Konstruiraj trapez $ABCD$ s podatki: $a = 5$ cm, $e = 5$ cm, $v = 2$ cm in $\alpha = 45^\circ$. Na stranici $a = AB$ določi točko T , tako da se oglišče A pri središčnem raztegu s središčem v T in koeficientom raztega $k = -\frac{2}{3}$ preslika v oglišče B .

[6t] 6t

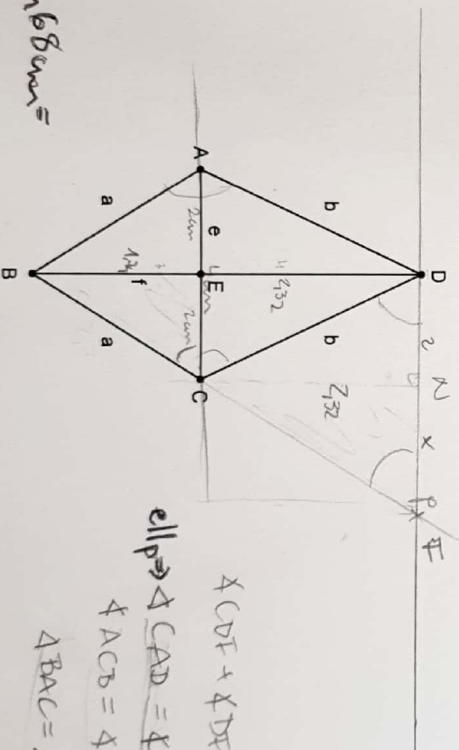
$$\begin{aligned} a &= 5 \text{ cm} \\ e &= 5 \text{ cm} \\ v &= 2 \text{ cm} \\ \alpha &= 45^\circ \end{aligned}$$



- 1) $a \rightarrow A, B$
- 2) $\alpha, v \rightarrow D, C$
- 3) $e \rightarrow C$
- 4) $k = -\frac{2}{3}$ trapez $ABCD$

6. V deltoиду na sliki diagonala e meni 4 cm, točka E pa deli diagonalo f v razmerju $|BE| : |ED| = 3 : 4$. Nariši vzporednico p diagonali e skozi oglišče D . Premica p in nosilka stranice BC se sekata v točki F . Izračunaj dolžino daljice DF . Pokaži še, da je $\angle CDF + \angle DFC = \angle BAD$.

[6t] 4t



$$\angle CDF + \angle DFC = \angle BAD :$$

$$e \parallel p \Rightarrow \angle CAD = \angle CDE \checkmark$$

$$\angle ACB = \angle DFC \checkmark$$

$$\angle BAC = \angle ACB \checkmark$$

$$\angle BAD = \angle BAC + \angle CAD$$

$$\Rightarrow \angle BAD = \angle CDF + \angle DFC \checkmark$$

$$\begin{aligned} |DF| &= 2 \text{ cm} + 2,68 \text{ cm} = \\ &= 4,68 \text{ cm} \end{aligned}$$

to velja samo v pravokotnem Δ $\Delta BCE \sim \Delta CDE$ \checkmark

$$x^2 = 3x \cdot 4x$$

$$3 \cdot 0,58 = 1,74 \text{ cm}$$

$$4x = 12x^2 \quad | : 12$$

$$4 \cdot 0,58 = 2,32 \text{ cm}$$

$$x^2 = \frac{12}{4} = 3$$

$$x = \sqrt{3}$$

$$x = \sqrt{3} \approx 1,73$$

$$x = 1,73$$

$$x = 2,68$$

$$f = 1,06 \text{ cm}$$