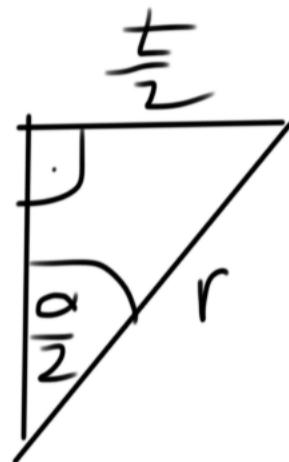
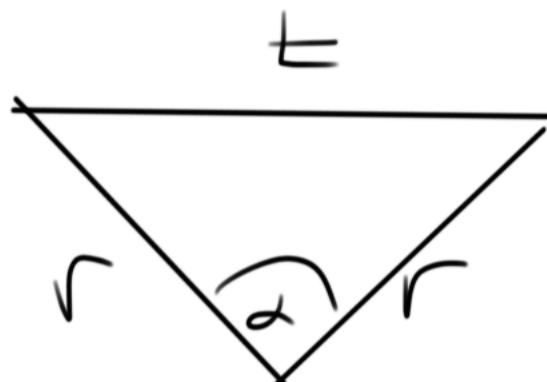
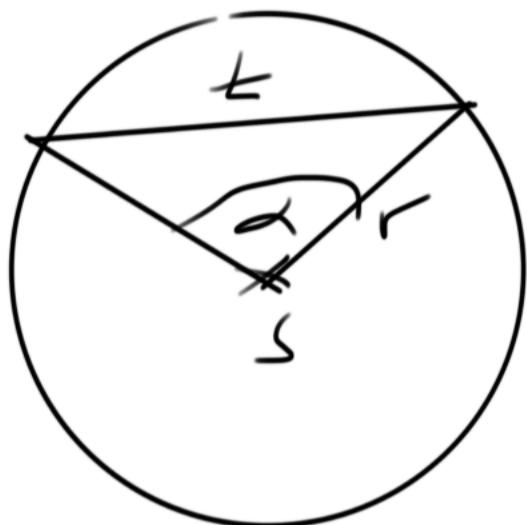


1) Vypracovatíte O s \odot

tedia $t = 4\text{cm}$ a príslušný
stredový ve $\alpha = 60^\circ$



$$\sin\left(\frac{\alpha}{2}\right) = \frac{\frac{t}{2}}{r}$$

$$r = \frac{t}{2 \sin\left(\frac{\alpha}{2}\right)}$$

$$\alpha = 60^\circ \rightarrow \frac{\alpha}{2} = 30^\circ \quad \sin 30^\circ = \frac{1}{2}$$

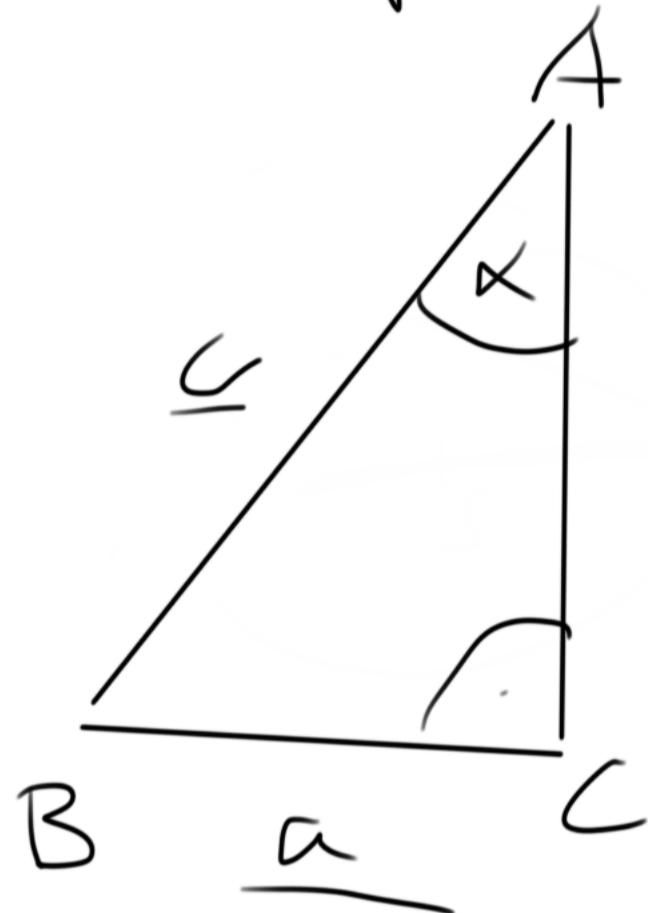
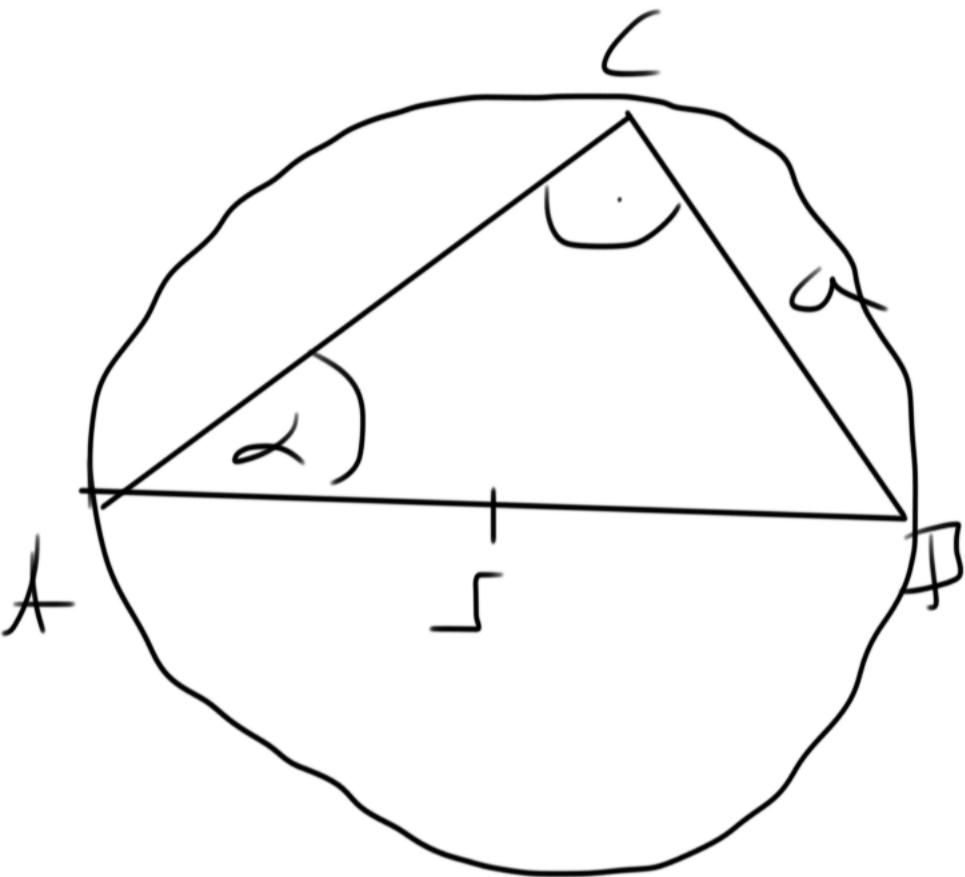
$$r = \frac{t}{2 \cdot \frac{1}{2}} = t = 4 \text{ cm}$$

$$O = 2\pi r = 8\pi \text{ cm}$$

$$S = \pi r^2 = 16\pi \text{ cm}^2$$

2) Spoluťeje \odot s \odot opsanc
pravouhlému \triangle : $\alpha = 15^\circ$

$$a = \frac{1}{\sqrt{2+\sqrt{3}}} \text{ cm}$$



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

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

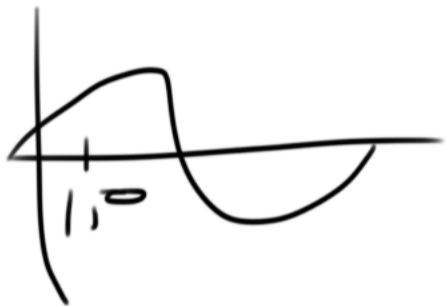
$$a = \frac{1}{\sqrt{2+\sqrt{3}}}$$

$$\alpha = 15^\circ$$

$$\sin 15^\circ = ?$$

Ein 30, um 30

$$\left| \sin \frac{\phi}{2} \right| = \sqrt{\frac{1 - \cos \phi}{2}} \quad \phi \in \left[-\frac{\pi}{2}, \frac{\pi}{2} \right]$$



$$\sin 15^\circ > 0$$

$$\sin 15^\circ = \sqrt{\frac{1 - \cos 30^\circ}{2}}$$

$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\sin 15^\circ = \sqrt{\frac{1 - \frac{\sqrt{3}}{2}}{2}}$$

$$a = \frac{1}{\sqrt{2+\sqrt{3}}}$$

$$= \sqrt{\frac{2-\sqrt{3}}{2}}$$

$$c = \frac{a}{\sin 15^\circ}$$

$$= \sqrt{\frac{2-\sqrt{3}}{4}} = \frac{\sqrt{2-\sqrt{3}}}{2}$$

$$c = \frac{\frac{1}{\sqrt{2+\sqrt{3}}}}{\frac{\sqrt{2-\sqrt{3}}}{2}} = \frac{2}{\sqrt{2+\sqrt{3}} \cdot \sqrt{2-\sqrt{3}}} = \frac{2}{\sqrt{(2+\sqrt{3})(2-\sqrt{3})}} =$$

$$(A+B)(A-B) =$$

$$= A^2 - B^2$$

$$= \sqrt{4-3} = 1$$



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

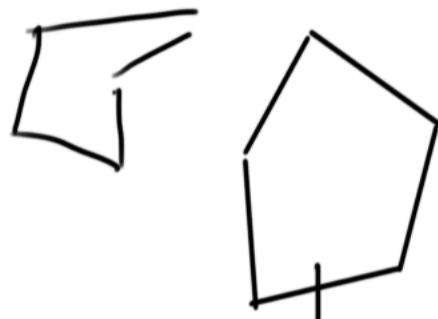
$$\Rightarrow r = \frac{c}{2} = 1 \text{ cm}$$

$$O = 2\pi r = 2\pi \text{ cm} \quad S = \pi r^2 = \pi \text{ cm}^2$$

3) Odvodte vzorec pro obsah pravidelného n-úhelníku

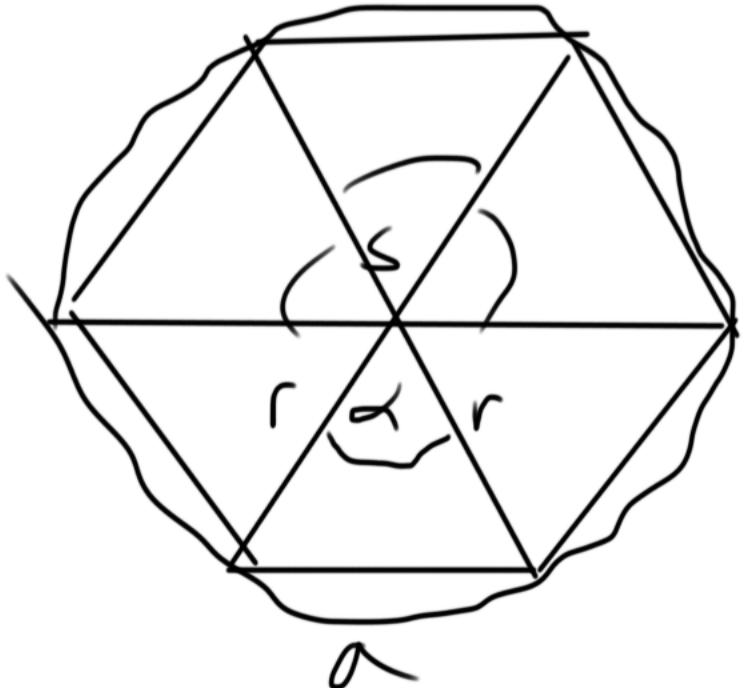
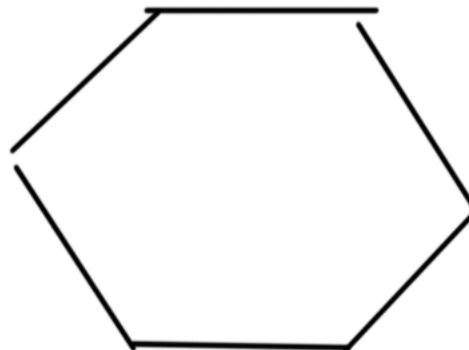
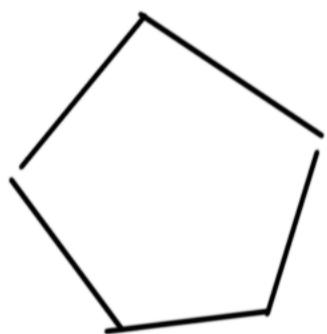
n-úhelník - n vnitřních úhlů

nepravidelný $n=5$: (obecný)



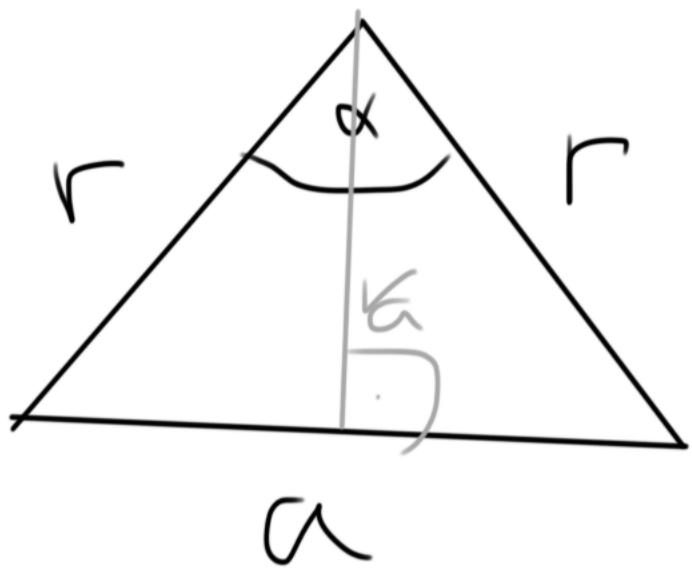
pravidelný

→ všechny strany stejně dlouhé
⇒ všechny vnitřní úhly jsou stejné velikosti



$$S_n = n \cdot S_\Delta$$

$$\alpha = \frac{2\pi}{n} \quad \frac{360}{n}$$



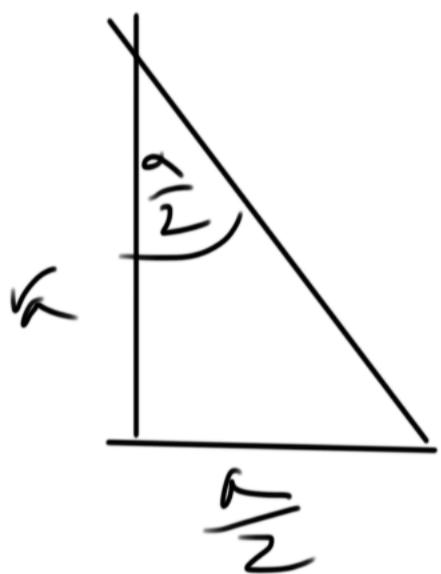
a - strana

$$\alpha = \frac{2\pi}{n}$$

$$S_n = n \cdot S_{\Delta}$$

$$S_{\Delta} = \frac{1}{2} \cdot a \cdot r_a$$

$$\cotg\left(\frac{\alpha}{2}\right) = \frac{r_a}{\frac{a}{2}}$$



$$r_a = \frac{a}{2} \cdot \cotg\left(\frac{\alpha}{2}\right)$$

$$S_{\Delta} = \frac{1}{2} \cdot a \cdot r_a = \frac{1}{2} \cdot a \cdot \frac{a}{2} \cdot \cotg\left(\frac{\alpha}{2}\right)$$

$$S_{\Delta} = \frac{1}{4} a^2 \cotg\left(\frac{\alpha}{2}\right)$$

$$S_n = n \cdot S_{\Delta}$$

$$\alpha = \frac{2\pi}{n}$$

$$\frac{\alpha}{2} = \frac{\pi}{n}$$

$$S_n = \frac{n}{4} a^2 \cotg\left(\frac{\pi}{n}\right)$$

$$S_n = \frac{n}{4} a^2 \cotg\left(\frac{\pi}{n}\right)$$

$n=4$: čtverec



$$S = a^2$$

$$\cotg\left(\frac{\pi}{4}\right) = 1$$

$$S_4 = \frac{4}{4} a^2 \cdot 1 = a^2 \quad \checkmark$$



rozhosť o stranu Δ

$$\cotg\left(\frac{\pi}{3}\right) = \frac{\cos \frac{\pi}{3}}{\sin \frac{\pi}{3}} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{\sqrt{3}}{3}$$

$$S_3 = \frac{3}{4} a^2 \cdot \frac{\sqrt{3}}{3} = \frac{\sqrt{3}}{4} a^2$$

$$n=6: \cotg\left(\frac{\pi}{6}\right) = \frac{\cos \frac{\pi}{6}}{\sin \frac{\pi}{6}} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$$

$$S_6 = \frac{6}{4} a^2 \cdot \sqrt{3} = \frac{3}{2} \sqrt{3} a^2$$

Vypočítejte polohu kružnic

chyba na přednáška

$$\text{iii)} \quad r_1 + r_2 > r > r_1 - r_2 \quad \begin{array}{l} \text{x sítne} \\ \text{správne} \end{array}$$

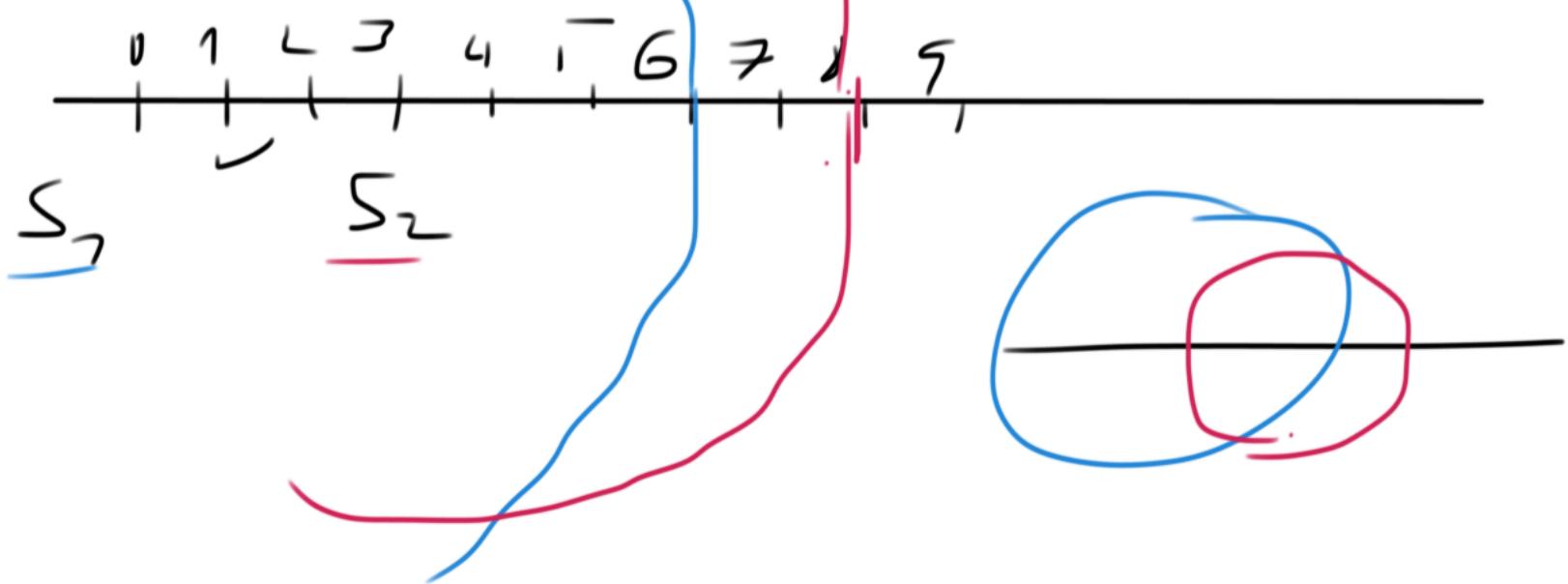
$$r_1 = 6 \text{ cm} \quad r_2 = 5 \text{ cm}, \quad r = 3 \text{ cm}$$

$$r_1 + r_2 = 11 \text{ cm}$$

$$r_1 - r_2 = 1 \text{ cm}$$

$$r_1 + r_2 > r > r_1 - r_2$$

\Rightarrow kružnice se protínají
 → 2 sp. body

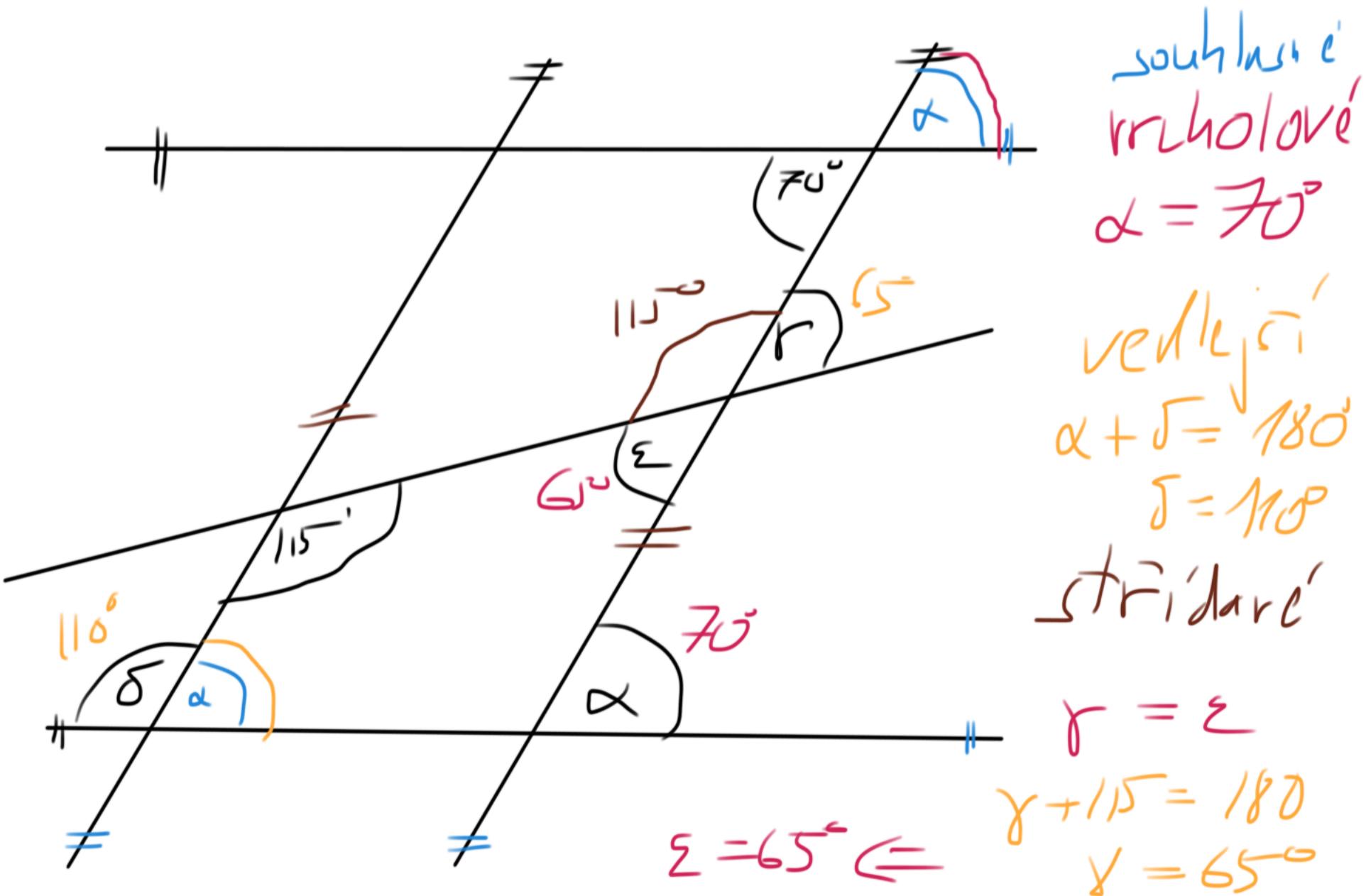
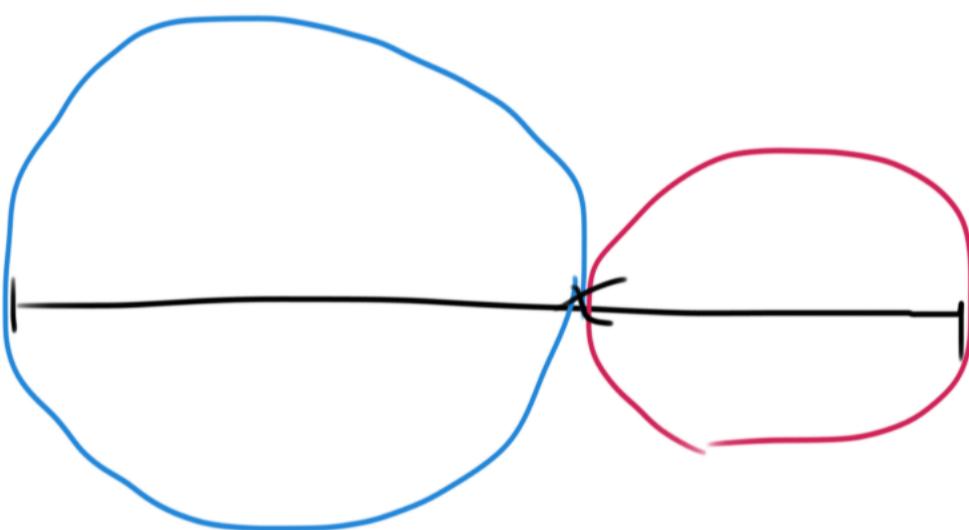


$$r_1 = 32 \text{ cm}, r_2 = 75 \text{ cm}, v = 47 \text{ cm}$$

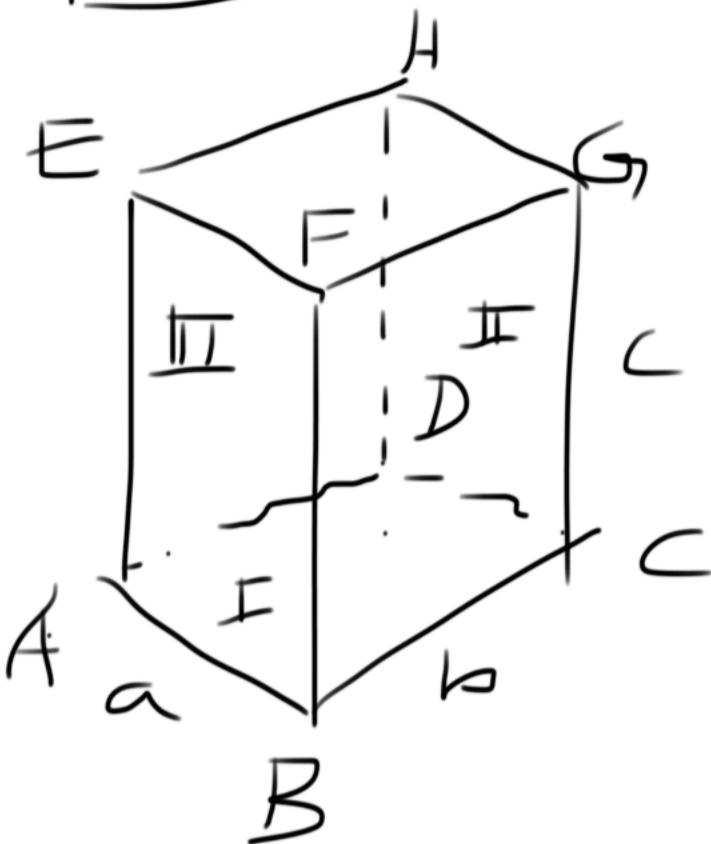
$$r_1 + r_2 = 47 \text{ cm}$$

$$r_1 + r_2 = v$$

\rightarrow Vnější díly k \rightarrow 1 sp. bod



Kvádr

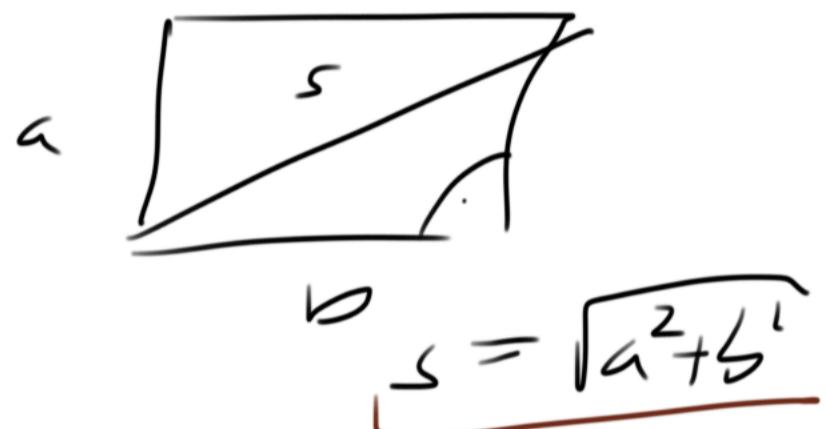


$$V = a \cdot b \cdot c$$

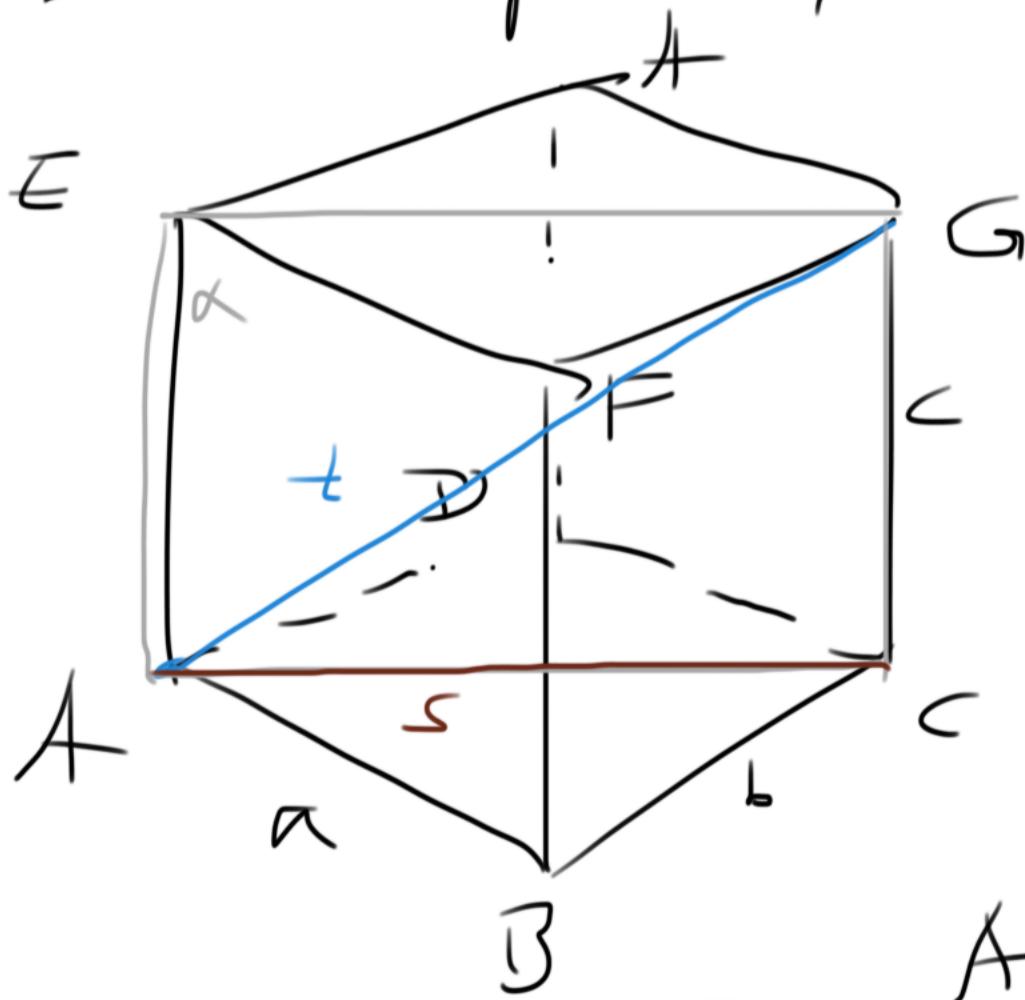
$$S = 2 \cdot (S_I + S_{II} + S_{III})$$

$$S_I = a \cdot b \quad S_{II} = a \cdot c \\ S_{III} = b \cdot c$$

stěnové výškopříčky



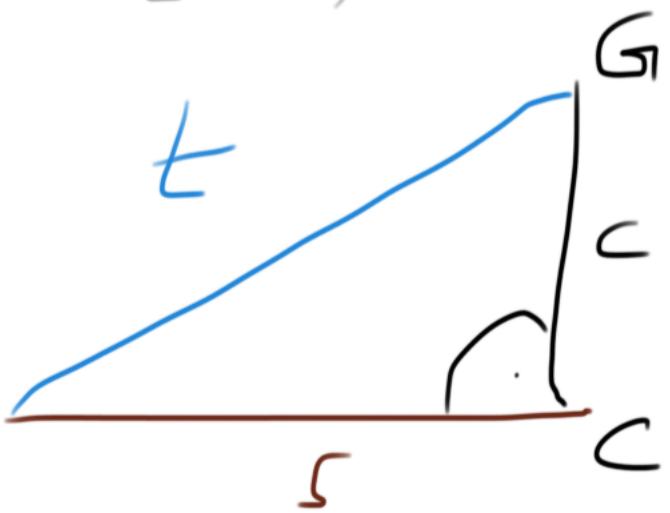
tělesové výškopříčky



$$t = \overrightarrow{AG}$$

$$\alpha = \angle ACG$$

$$t = \alpha \wedge s + t_{AC}$$



$$t = \sqrt{s^2 + l^2} = \sqrt{a^2 + b^2 + c^2}$$

6) Délka řezové uhl. krychle
je $3\sqrt{6}$ cm.

a) $a = ?$ b) $V = ?$ c) S

krychle: $a = b = c$

$$V = a^3 \quad S = 6 \cdot S_{\square} = 6 \cdot a^2$$

$$c = \sqrt{a^2 + a^2} = \sqrt{2}a$$

$$c = \sqrt{a^2 + a^2 + a^2} = \sqrt{3}a$$

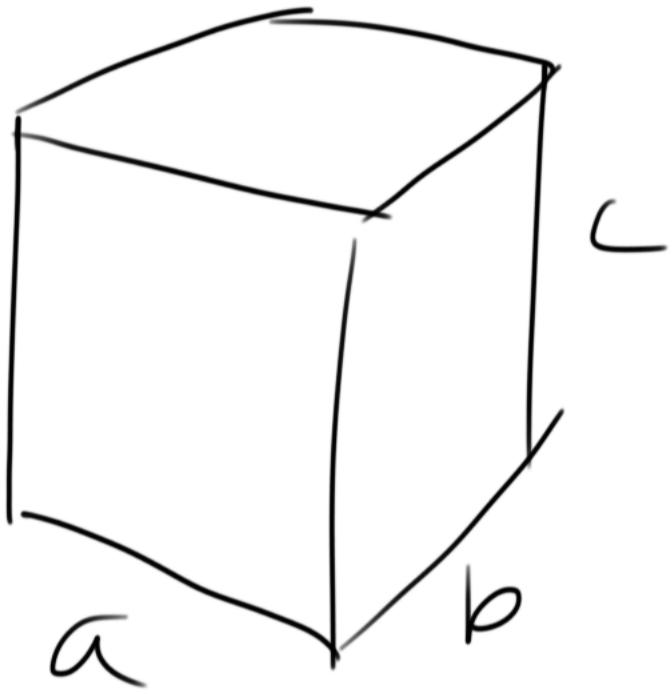
a) $\sqrt{3}a = 3\sqrt{6}$ bl $V = a^3$
 $a = 3\sqrt{2}$ cm $V = 27 \cdot 2^{\frac{3}{2}} \text{ cm}^3$

c) $S = 6 \cdot a^2$
 $S = 6 \cdot (3\sqrt{2})^2 = 6 \cdot 18 = 108 \text{ cm}^2$

7) krychle: $a \rightarrow a' = 2a$
 $r' = ?$ $s' = ?$

$$V = a^3 \quad V' = a'^3 = (2a)^3 = 8a^3 \\ = 8 \cdot V$$

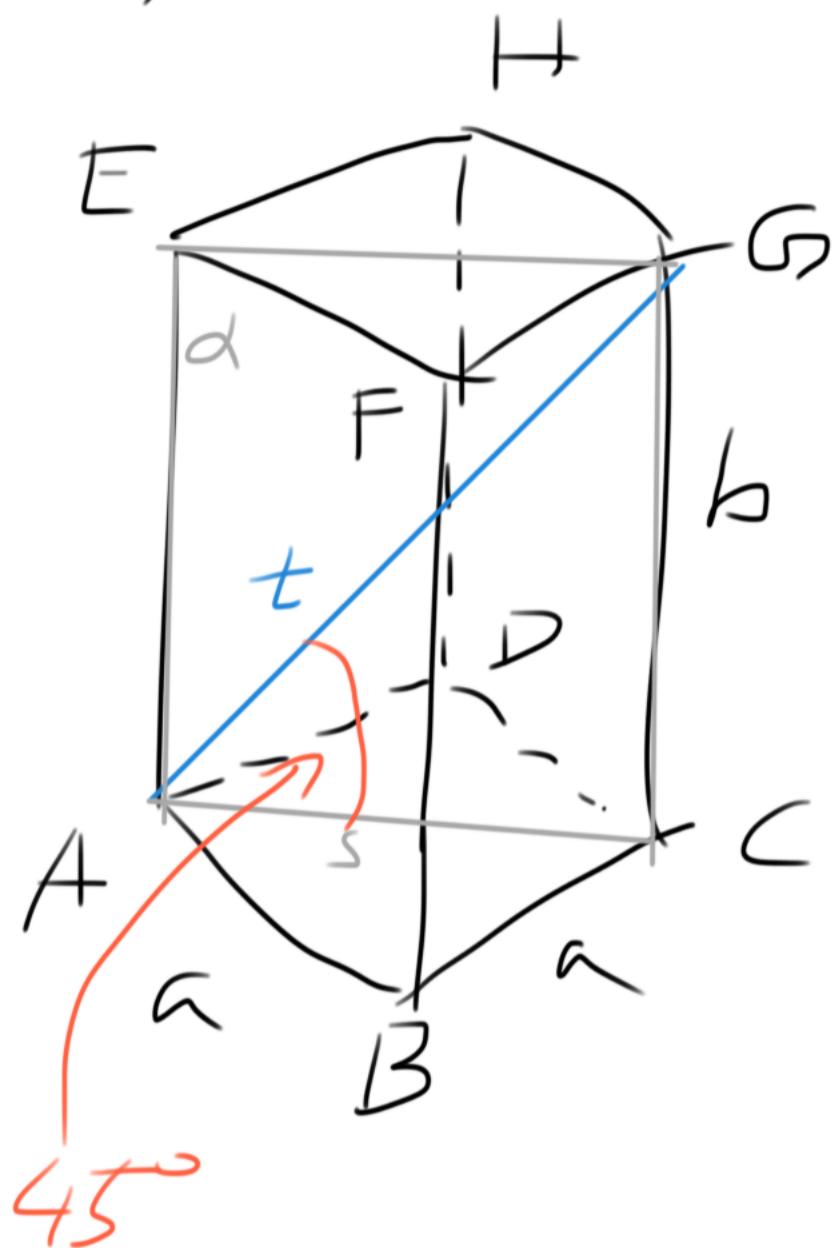
$$S' = 6 \cdot a'^2 = 6 \cdot (2a)^2 = 4 \cdot 6a^2 = 4 \cdot S$$



$$a' = 2a \\ b' = b \\ c' = c$$

$$V' = a' \cdot b' \cdot c' \\ = 2a \cdot b \cdot c = 2 \cdot V$$

8) kvalit s c Čtvercovou podstavou



$$V = 64 \text{ cm}^3$$

odkylka t = AG
od roviny ABC je 45°.

$$S = ?$$

$$t \in \alpha$$

$$\alpha \perp ABC$$

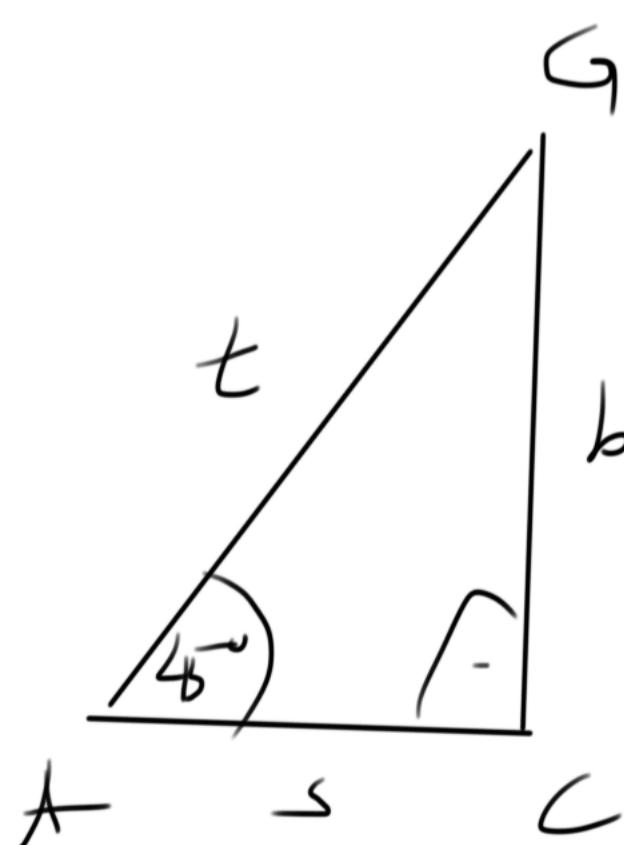
$$\alpha \cap ABC = S$$

$$1. \text{ čtverec: } S = \sqrt{2} \cdot a$$

$$2. 45^\circ \quad \tan 45^\circ = \frac{b}{s}$$

$$b = \tan 45^\circ \cdot s$$

$$b = \sqrt{2}a$$



$$a_1 \wedge \sqrt{2}a$$

$$V = 64 \text{ cm}^3$$

$$V = \sqrt{2} a^3$$

$$\sqrt{2} a^3 = 64$$

$$2^{1/2} a^3 = 2^6$$

$$a^3 = 2^{11/2}$$

$$a = \boxed{2^{\frac{11}{6}}}$$