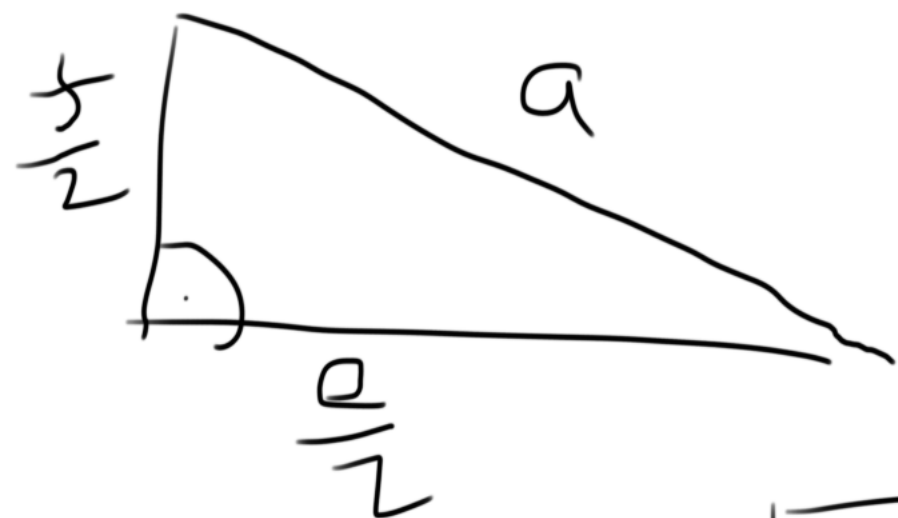


$$S = a \cdot h$$

$$= a^2 \cdot \sin \alpha$$

$$S = a \cdot b \cdot \sin \alpha$$

kosodélník



$$S = 4 \cdot S_D$$

$$S_D = \frac{1}{2} \cdot \frac{e}{2} \cdot \frac{f}{2} = \frac{e \cdot f}{8}$$

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

Kosočtverec,  $S = 54 \text{ cm}^2$ ,  
jedna úhlopříčka je o  $12 \text{ cm}$   
delší než ta druhá.

$$a = ? , e = ? , f = ?$$

$$S = \frac{e \cdot f}{2} = 54 \quad e = f + 12$$

$$54 = \frac{1}{2} (f + 12) \cdot f$$

$$108 = f^2 + 12f$$

$$0 = f^2 + 12f - 108$$

$$f_{1,2} = \frac{-12 \pm \sqrt{144 + 4 \cdot 108}}{2} = \frac{-12 \pm 24}{2} = \begin{matrix} 6 \\ -18 \end{matrix} \quad \text{X}$$

$$D = 144 + 432 = 576$$

$$= 4 \cdot 144$$

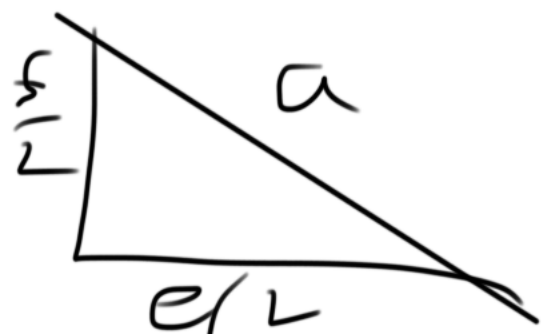
$$\sqrt{D} = 2 \cdot 12$$


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

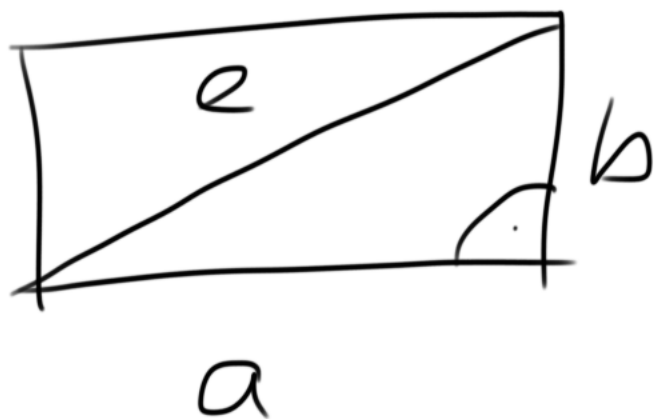
$$e = 18 \text{ cm}$$

$$a = ?$$

$$a = \sqrt{9^2 + 3^2} = \sqrt{90} = \underline{3\sqrt{10} \text{ cm}}$$



2)  ,  $O = 46 \text{ cm}$  ,  $e = 17 \text{ cm}$   
 $S = ?$



$$O = a + b + a + b$$

$$= 2(a + b)$$

$$e^2 = a^2 + b^2$$

$$46 = 2(a + b)$$

$$a + b = 23$$

$$b = 23 - a$$

$$17^2 = a^2 + (23 - a)^2$$

$$17^2 = a^2 + 23^2 - 46a + a^2$$

$$\begin{array}{r} 17 \\ 17 \\ \hline 179 \\ 17 \\ \hline 289 \end{array}$$

$$\begin{array}{r} 23 \\ 23 \\ \hline 69 \\ 46 \\ \hline 529 \end{array}$$

$$\Rightarrow 289 = 2a^2 - 46a + 529$$

$$0 = 2a^2 - 46a + 240$$

$$0 = a^2 - 23a + 120$$

$$D = 23^2 - 480$$

$$= 529 - 480 = 49$$

$$a_{1,2} = \frac{23 \pm 7}{2} = \begin{matrix} 15 \\ 8 \end{matrix}$$

$$a = 15$$

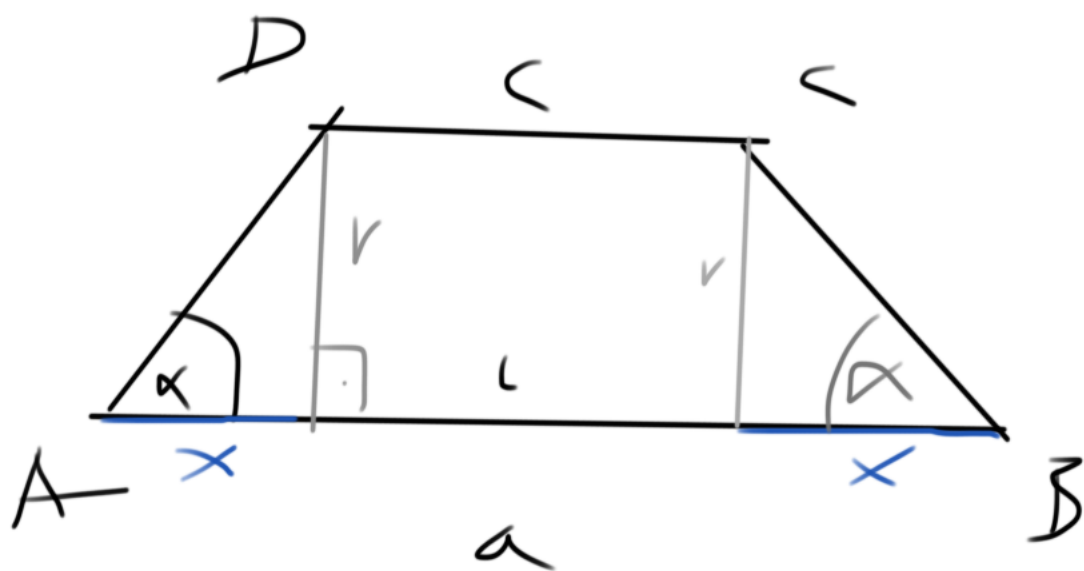
$$a = 8$$

$$b = 8$$

$$b = 15$$

$$S = 8 \cdot 15 = 120 \text{ cm}^2$$

3) Задача на чиниј лчодбѣѣн, к  
 $a = 20 \text{ cm}$ ,  $v = 6 \text{ cm}$ ,  $\alpha = 45^\circ$   
 $S = ?$



$$S = \frac{1}{2} \cdot v \cdot (a + c)$$



$$\cot \alpha = \frac{x}{v}$$

$$x = v \cdot \cot \alpha$$

$$\alpha = 45^\circ \Rightarrow \cot \alpha = 1$$

$$\underline{x = v}$$

$$c = a - 2 \cdot x$$

$$= a - 2 \cdot v$$

$$= 20 - 2 \cdot 6 = 8 \text{ cm}$$

$$S = \frac{1}{2} \cdot v \cdot (a + c) = \frac{1}{2} \cdot 6 \cdot 28 = 84 \text{ cm}^2$$

4) Výška a rovnoběžné strany jsou  
v poměru  
 $v:a:c = 2:3:5$   $S = 512 \text{ cm}^2$

$$a = ? \quad v = ? \quad c = ?$$

$$v = 2j$$

$$a = 3j$$

$$\frac{v}{a} = \frac{2j}{3j} = \frac{2}{3}$$

$$\frac{a}{c} = \frac{3}{5}$$

$$S = \frac{1}{2} v \cdot (a + c)$$

$$\frac{v}{c} = \frac{2}{5} \Rightarrow v = \frac{2}{5} c$$

$$\frac{a}{c} = \frac{3}{5} \Rightarrow a = \frac{3}{5} c$$

$$S = \frac{1}{2} \cdot \frac{2}{5} c \cdot \left( \frac{3}{5} c + c \right) = \frac{1}{5} c^2 \left( \frac{3}{5} + 1 \right) = \frac{8}{25} c^2$$

$$S = 512 \text{ cm}^2$$

$$512 = \frac{8}{25} c^2$$


$$c^2 = \frac{25 \cdot 512}{8} = 1600$$


$$1600 = 256 \cdot 64$$

$$c = \frac{5 \cdot 16}{2} = 40 \text{ cm}$$

$$v = \frac{2}{5} 40 = 16 \text{ cm}$$

$$a = \frac{3}{5} 40 = 24 \text{ cm}$$

5)  ,  $e = 34 \text{ cm}$

pokud se zvětší strany  o  $4 \text{ cm}$ ,  
jeho obsah se zvětší o  $200 \text{ cm}^2$ .

$a = ?$     $b = ?$

$$S = a \cdot b$$

$$a' = a + 4$$

$$b' = b + 4$$

$$S' = a' \cdot b'$$

$$S' = S + 200$$

$$a' \cdot b' = S + 200$$

$$(a+4) \cdot (b+4) = S + 200$$

$$\cancel{a \cdot b} + 4a + 4b + 16 = \cancel{S} + 200$$

$$4(a+b) = 184$$

$$\underline{a+b = 46}$$

$$\rightarrow b = 46 - a$$

$$34^2 = a^2 + (46 - a)^2$$

$$34^2 = a^2 + 46^2 - 92a + a^2$$

$$0 = 2a^2 - 92a + 46^2 - 34^2$$

$$0 = 2a^2 - 92a + 46^2 - 34^2$$

$$46^2 - 34^2 = (46+34)(46-34) = 80 \cdot 12 = \underline{960}$$

$$A^2 - B^2 = (A+B)(A-B)$$

$$0 = 2a^2 - 92a + 960 \quad / : 2$$

$$0 = a^2 - 46a + 480$$

$$D = 46^2 - 4 \cdot 480 = 4 \cdot (23^2 - 480)$$

529

$$46 = 2 \cdot 23$$

$$46^2 = 4 \cdot \underline{23^2} = 4 \cdot 49$$

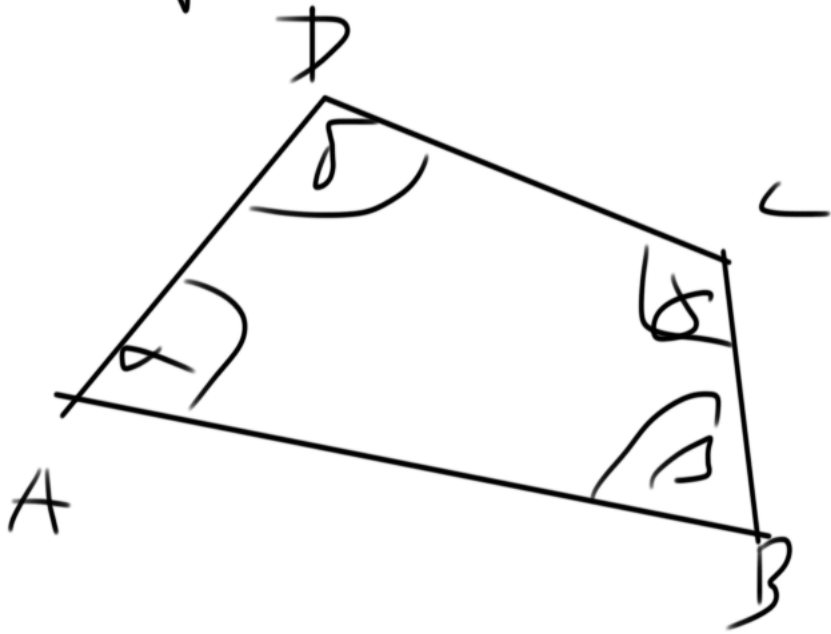
$$\sqrt{D} = 2 \cdot 7 = 14$$

$$a_{1,2} = \frac{46 \pm 14}{2} = \begin{cases} 30 \\ 16 \end{cases} \quad \} \oplus \underline{46}$$

$$a = \underline{30}, b = \underline{16}$$

b) Jak velké jsou úhly v čtyřúhelníku,  
jeho-li v poměru  $8:9:10:13$ ?

$$\alpha : \beta : \gamma : \delta$$



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

$$\alpha = 8$$

$$\beta = 9$$

$$8 + 9 + 10 + 13 = 40$$

$$\begin{array}{r} \uparrow 40 \text{ j} \dots \dots \dots 360^\circ \\ \uparrow 1 \text{ j} \dots \dots \dots x^\circ \\ \hline \end{array}$$

$$x = \frac{1}{40} \cdot 360^\circ = 9^\circ$$

$$\alpha = 8 \cdot 9^\circ = 72^\circ$$

$$\beta = 9 \cdot 9^\circ = 81^\circ$$

$$\gamma = 10 \cdot 9^\circ = 90^\circ$$

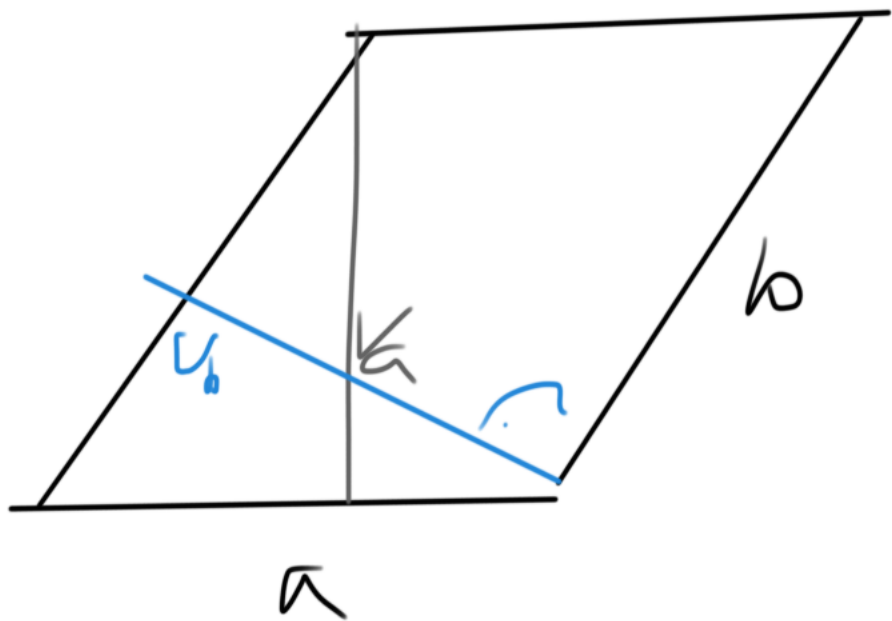
$$\delta = 13 \cdot 9^\circ = 117^\circ$$

} 360°



Vypočítejte obsah obce a druhou výšku  
r rovnoběžníku, znáte-li:

$$a = 5 \text{ cm}, b = 7 \text{ cm}, v_a = 7 \text{ cm}$$



$$S = a \cdot v_a$$

$$= 35 \text{ cm}$$

$$S = \underline{b} \cdot v_b$$

$$v_b = \frac{S}{b} = \frac{35}{7} = 5 \text{ cm}$$

Plechová střecha  $\square$   $7,5 \text{ m} \times 4 \text{ m}$ .

Kolik kg barvy potřebujete,  
jestliže 1 kg vystačí na  $8 \text{ m}^2$ ?

$$S = 30 \text{ m}^2$$

$$\begin{array}{rcl} \uparrow 1 \text{ kg} & \dots & 8 \text{ m}^2 \uparrow \\ x \text{ kg} & \dots & 30 \text{ m}^2 \end{array}$$

$$x = \frac{30}{8} = 3 \frac{3}{4} = 3,750 \text{ kg}$$

Čtverec o straně  $a$ .

$$a' = ?$$
$$S' = 2 \cdot S$$

---

$$a' = k \cdot a, \quad k \in \mathbb{R}$$

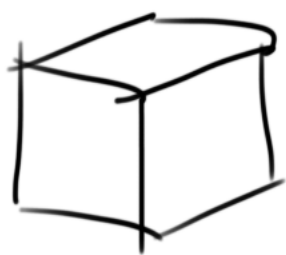
$$S = a^2 \quad S' = a'^2 \quad S' = 2 \cdot S$$

$$(a')^2 = 2 \cdot a^2$$

$$k^2 \cdot a^2 = 2 \cdot a^2$$

$$k = \sqrt{2}$$

$$\boxed{a' = \sqrt{2} \cdot a}$$



$$a' = k \cdot a$$

$$V' = 2 \cdot V$$

$$\Rightarrow a' = \sqrt[3]{2} a$$

---

Je možné, aby jeden čtverec měl:

a)  $S = 49 \text{ cm}^2$

$$O = 36 \text{ cm}$$

b)  $a = 5 \text{ cm}$   $e = \sqrt{2} \cdot 5 \text{ cm}$



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

$$e = \sqrt{2} \cdot 5 = \sqrt{2} \cdot a$$

$$O = 4 \cdot a \Rightarrow a = 9 \text{ cm}$$

$$S = a^2 \Rightarrow a = 7 \text{ cm}$$

$$\Rightarrow \text{NE}$$

ANO

c). Círeľe' stejny' obvod a obsah.

$$O = S$$

$$O = 4 \cdot a$$

$$S = a^2$$

$$4a = a^2$$

$$0 = a^2 - 4a$$

$$0 = a(a - 4)$$

$$a = 0$$

$$a = 4$$

$$O = 4 \cdot 4 = 16 \text{ m}$$

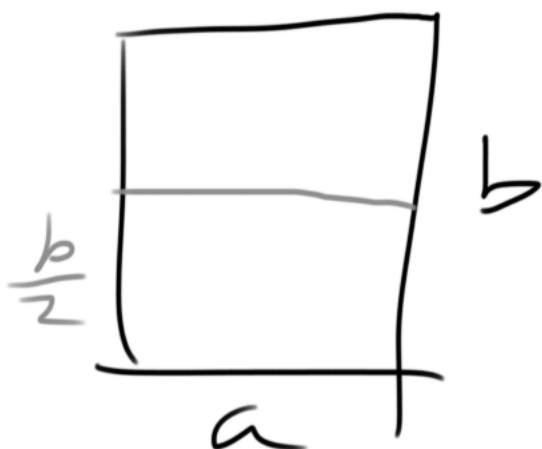
$$S = 4^2 = 16 \text{ m}^2$$

FOR 1 AT PAPIKU

A4.

A, B, C

A:



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

$$b^2 = 2a^2$$

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

$$A_0: S = 1 \text{ m}^2$$

$$S = a \cdot b$$

$$1 = a \cdot \sqrt{2} \cdot a$$

$$a^2 = \frac{1}{\sqrt{2}}$$

$$a = \frac{1}{\sqrt[4]{2}} \text{ m}$$

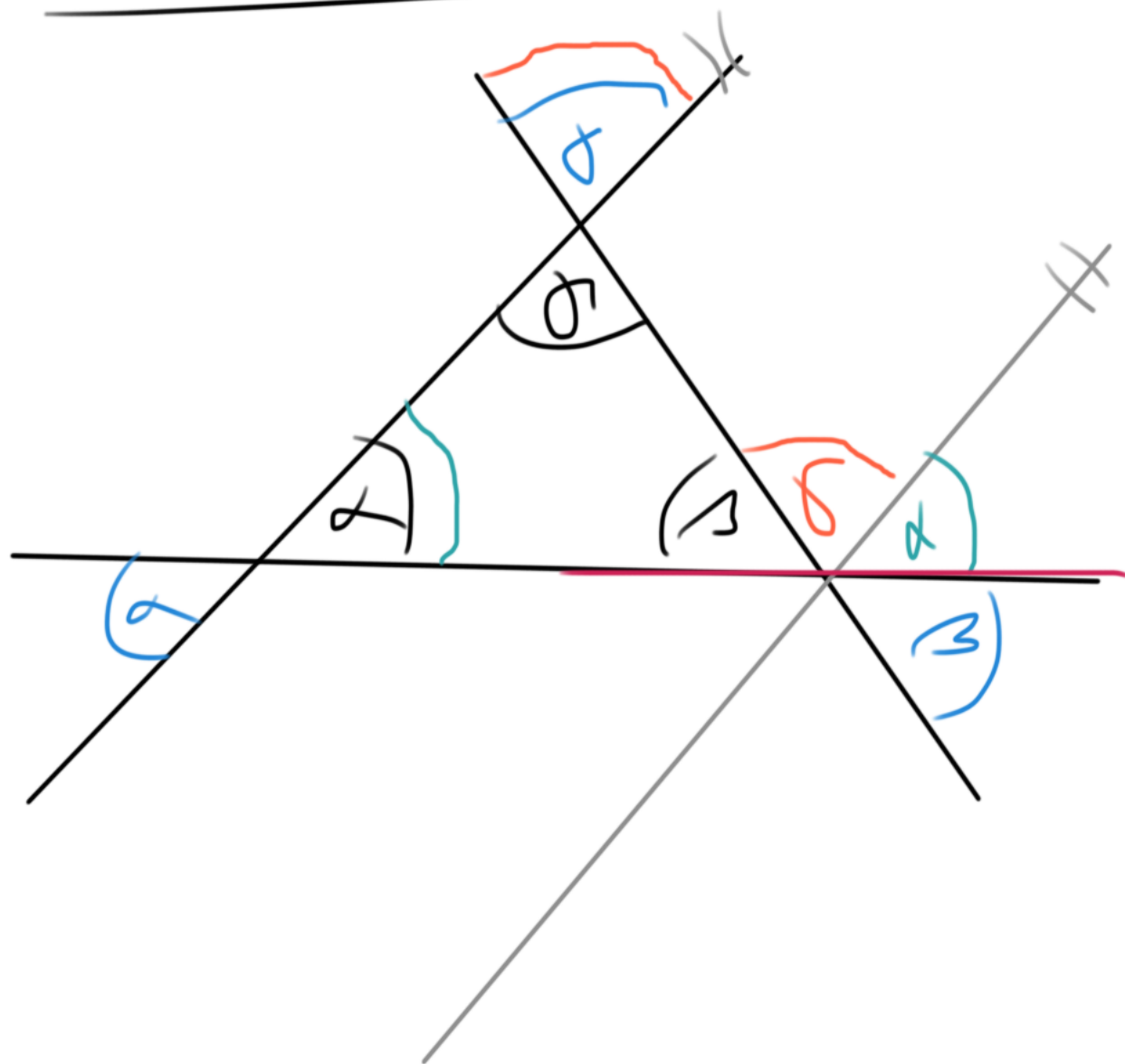
$$b = \sqrt{2} \cdot a = \frac{\sqrt{2}}{\sqrt[4]{2}}$$

$$= \frac{2^{\frac{1}{2}}}{2^{\frac{1}{4}}} = 2^{\frac{1}{4}} = \sqrt[4]{2}$$

$$b = 1,19 \text{ m} \quad a = 0,84 \text{ m}$$

$$A_4: b = 29,7 \text{ m} \quad a = 21 \text{ m}$$

# SOUČET VNITŘNÍCH ÚHLŮ $\Delta$



VRCHOLY  
SOUHLASNĚ I  
SOUHLASNĚ II

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