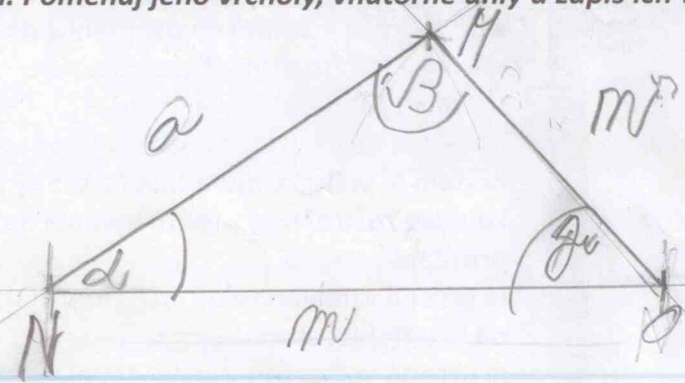
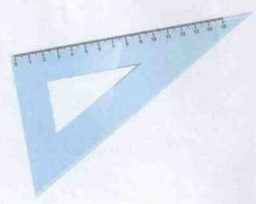


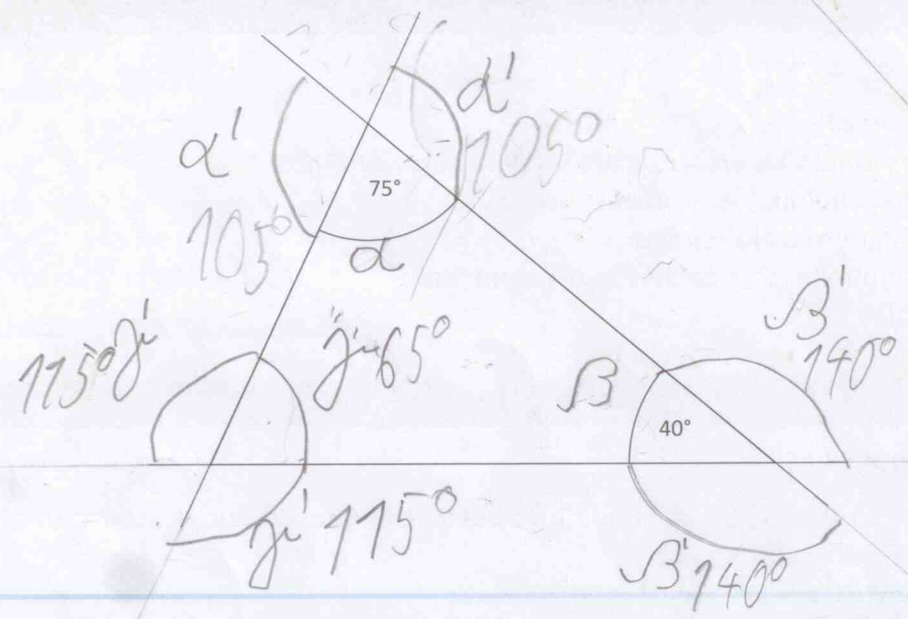
1 Narysuj trojuholník MNO, ak sú dané dĺžky jeho strán: $m = 8 \text{ cm}$, $n = 45 \text{ mm}$ a $o = 0,6 \text{ dm}$. Pomenuj jeho vrcholy, vnútorné uhly a zapíš ich veľkosť.



$\alpha = 34^\circ$
 $\beta = 98^\circ$
 $\gamma = 68^\circ$



2 Vyznač a doplň veľkosti všetkých vonkajších a vnútorných uhlov v trojuholníku.



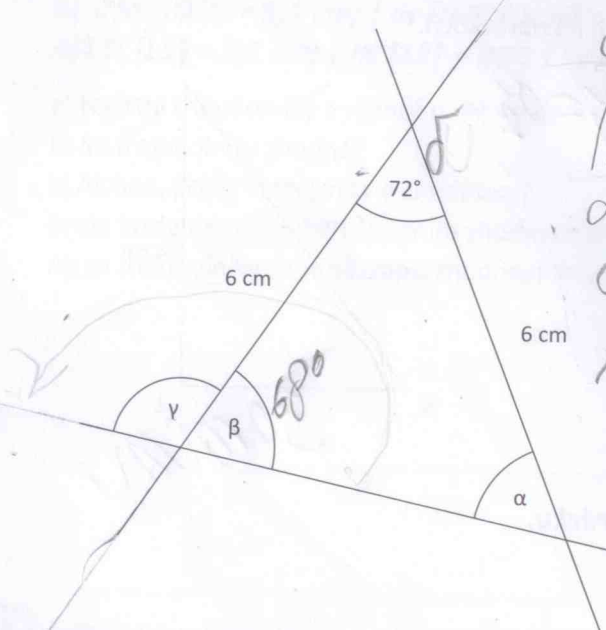
3 Vypočítaj veľkosti vonkajších uhlov trojuholníka ABC, keď poznáš veľkosti jeho dvoch vnútorných uhlov.

- a) $\alpha = 34^\circ$, $\beta = 65^\circ$
- b) $\beta = 94^\circ$, $\gamma = 28^\circ$
- c) $\gamma = 53^\circ 40'$, $\alpha = 71^\circ 20'$

4 Vypočítaj veľkosti zvyšných vnútorných a zvyšných vonkajších uhlov trojuholníka, keď poznáš:

- a) $\alpha = 33^\circ$, $\beta' = 108^\circ$
- b) $\alpha' = 162^\circ$, $\beta = 61^\circ 30'$
- c) $\alpha' = 93^\circ 26'$, $\gamma = 74^\circ 17'$

5) Zapiš veľkosti uhlov α , β , γ .



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

$$\beta = 68^\circ \quad \delta = 72^\circ$$

$$\alpha = 180 - 68 - 72 = 40$$

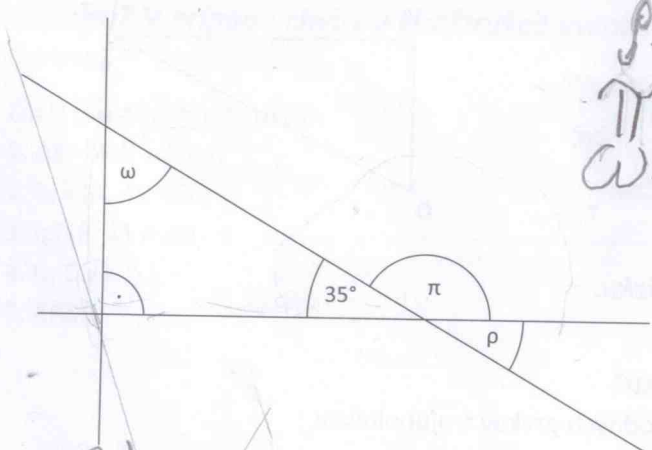
$$\alpha = 180 - (140) = 40$$

$$\beta + \gamma = 180$$

$$\gamma = 180 - \beta = 112$$

$$180 - 68 = 112$$

6) Vypočítaj veľkosti vyznačených uhlov ω , π , ρ .



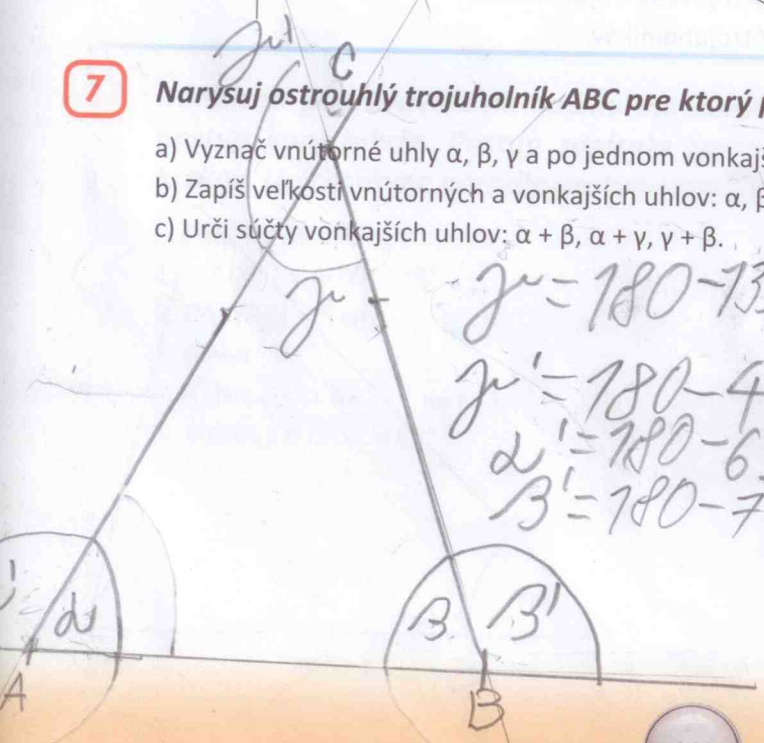
$$\beta = 35^\circ$$

$$\pi = 180 - 35 = 145^\circ$$

$$\omega = 180 - 125 = 55^\circ$$

7) Narysuj ostrouhlý trojuholník ABC pre ktorý platí: $\alpha = 62^\circ$, $\beta = 71^\circ$, $|AB| = 6$ cm.

- Vyznač vnútorné uhly α , β , γ a po jednom vonkajšom uhle pri každom vrchole α' , β' , γ' .
- Zapiš veľkosti vnútorných a vonkajších uhlov: α , β , γ , α' , β' , γ' .
- Urči súčty vonkajších uhlov: $\alpha + \beta$, $\alpha + \gamma$, $\gamma + \beta$.



$$\gamma = 180 - 133 = 47^\circ$$

$$\gamma' = 180 - 47 = 133^\circ$$

$$\alpha' = 180 - 62 = 118^\circ$$

$$\beta' = 180 - 71 = 109^\circ$$

$$\alpha + \beta = 62 + 71 = 133^\circ$$

$$\alpha + \gamma = 62 + 47 = 109^\circ$$

$$\beta + \gamma = 71 + 47 = 118^\circ$$

V TROJUHOLNÍK, ZHODNOSŤ TROJUHOLNÍKOV

Delenie (Δ) trojuholníkov

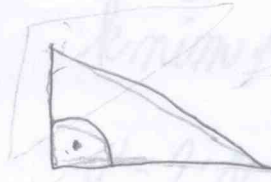
1. podľa veľkosti uhlov:

a) ostrouhlý



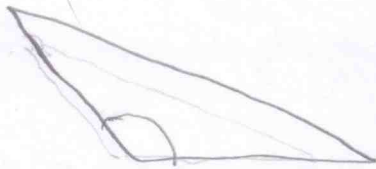
3 ostré uhly
(menšie ako 90°)

b) pravouhlý



1 pravý uhol (90°)
2 ostré uhly

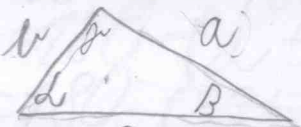
c) tupouhlý



1 tupý uhol ($> 90^\circ$)
2 ostré uhly

2. podľa veľkosti strán

a) rôznostranný

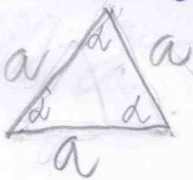


$$a \neq b \neq c \quad \alpha \neq \beta \neq \gamma$$

$$\sigma = b + a + c$$

má 3 rôzne dlhé strany, 3 rôzne vnútorné uhly

b) rovnostranný



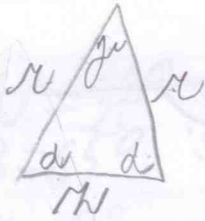
$$\alpha = \beta = \gamma = 180 : 3 = 60^\circ$$

$$\sigma = a + a + a = 3 \cdot a$$

má 3 rovnaké strany a tri rovnaké uhly

~~c) rovnostranný~~

c) rovnoramenný



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

$$2 \cdot d + z = 180^\circ$$

$$\text{tedy: } d = (180^\circ - z) : 2$$

$$z = 180^\circ - 2 \cdot d$$

n - rameno

d - základní

má 2 shodné ramena a úhly k nim přiléhající ($n = n, d = d$)

$$\alpha = 2 \cdot n + n$$

112/4

$$d = 33^\circ$$

$$a) \beta + \beta' = 180$$

$$\beta = 180 - \beta' = 180 - 108 = 72^\circ$$

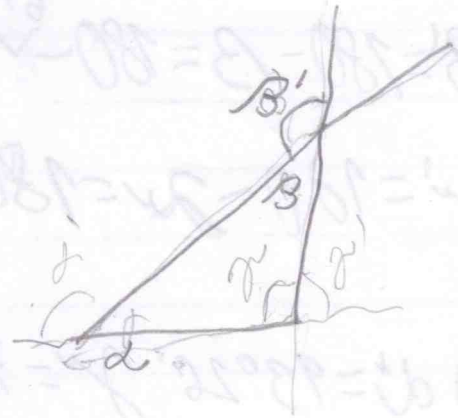
$$d + \beta + \gamma = 180^\circ$$

$$\gamma = 180 - (d + \beta)$$

$$\gamma = 180 - (33 + 72) = 180 - 105 = 75^\circ$$

$$d' = 180 - d = 147^\circ$$

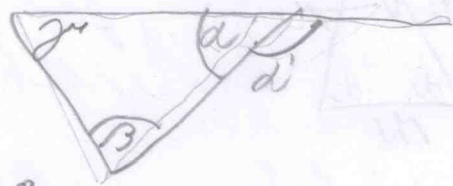
$$\gamma' = 180 - \gamma = 180 - 75 = 105^\circ$$



1128/4

$$b) d' = 744^\circ$$

$$B = 67^\circ 30'$$



$$d' = 180 - d = 180 - 144 = 36^\circ$$

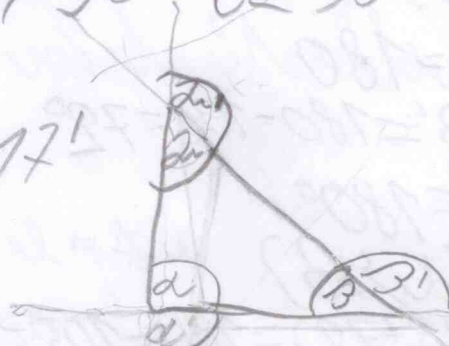
$$d + B + \gamma = 180^\circ$$

$$\gamma = 180 - (d + B) = 180 - 97^\circ 30'$$

$$B' = 180 - B = 180 - 67^\circ 30' = 112^\circ 30'$$

$$\gamma' = 180 - \gamma = 180 - 97^\circ 30' = 82^\circ 30'$$

$$c) d' = 93^\circ 26' \quad \gamma = 74^\circ 17'$$



$$d = 180 - d' = 180 - 93^\circ 26' = 86^\circ 34'$$

$$d + B + \gamma = 180^\circ$$

$$d + B = 180 - (d + \gamma) = 180 - 162^\circ 51' = 17^\circ 9'$$

$$B' = 180 - B = 180 - 17^\circ 9' = 162^\circ 52'$$

$$\gamma' = 180 - \gamma = 180 - 74^\circ 17' = 105^\circ 43'$$

11213

11.6.

$$a) \alpha = 34^\circ$$

$$\beta = 65^\circ$$

$$\gamma = ?^\circ$$

$$\gamma = 180 - (34 + 65) = 81^\circ$$

$$\alpha' = 180 - 81 = 99^\circ$$

$$\beta' = 180 - 65 = 115^\circ$$

$$\alpha'' = 180 - 34 = 146^\circ$$

$$b) \beta = 94^\circ$$

$$\gamma = 28^\circ$$

$$\alpha = ?^\circ$$

$$\alpha = 180 - (94 + 28) = 58^\circ$$

$$\alpha' = 180 - 58 = 122^\circ$$

$$\beta' = 180 - 94 = 86^\circ$$

$$\alpha'' = 180 - 28 = 152^\circ$$

$$c) \gamma = 53^\circ 40'$$

$$\alpha = 71^\circ 20'$$

$$\beta = ?^\circ ?'$$

$$\beta = 180 - (53^\circ 40' + 71^\circ 20') = 55^\circ$$

$$\gamma' = 180 - 53^\circ 40' = 126^\circ 20'$$

$$\alpha' = 180 - 71^\circ 20' = 108^\circ 40'$$

$$\beta' = 180 - 55 = 125^\circ$$