

## Ponavljanje za pismeni ispit – primjene trigonometrije na pravokutni trokut

1. Odredi mjeru većeg šiljastog kuta pravokutnog trokuta ako je omjer duljina kateta 5 : 7.

ako uzmemo da je  $a : b = 5 : 7$ , tražiti ćemo kut  $\beta$ , koji se nalazi nasuprot dulje stranice  $b$

$$\operatorname{tg}\beta = \frac{b}{a}$$

$$\operatorname{tg}\beta = \frac{7}{5}$$

$$\boxed{\beta} = \operatorname{tg}^{-1}\left(\frac{7}{5}\right) = \boxed{54^{\circ}27'44''}$$

2. U pravokutnom trokutu je mjera jednog šiljastog kuta 7 puta veća od mjere drugog šiljastog kuta. Ako je dulja kateta duga 15 cm, odredi opseg i površinu tog trokuta.

ako uzmemo da je  $\alpha = 7 \cdot \beta$ , dulja kateta će biti  $a = 15$  cm

$$\alpha + \beta = 90^{\circ}$$

$$7\beta + \beta = 90^{\circ}$$

$$8\beta = 90^{\circ} \quad / : 8$$

$$\beta = 11^{\circ}15''$$

$$\operatorname{tg}\beta = \frac{b}{a}$$

$$b = a \cdot \operatorname{tg}\beta = 15 \cdot \operatorname{tg}11^{\circ}15' = 2.984 \text{ cm}$$

$$c^2 = a^2 + b^2$$

$$c = \sqrt{a^2 + b^2} = \sqrt{15^2 + 2.984^2} = 15.294 \text{ cm}$$

$$\boxed{O} = a + b + c = 15 + 2.984 + 15.294 = \boxed{33.27 \text{ cm}}$$

$$\boxed{P} = \frac{a \cdot b}{2} = \frac{15 \cdot 2.984}{2} = \boxed{22.38 \text{ cm}^2}$$

3. Odredi nepoznate elemente pravokutnog trokuta ako je  $c - b = 2$  i  $\alpha = 67^{\circ}22'48''$ .

$$\alpha + \beta = 90^{\circ}$$

$$\boxed{\beta} = 90^{\circ} - \alpha = 90^{\circ} - 67^{\circ}22'48'' = \boxed{22^{\circ}37'12''}$$

$$\cos\alpha = \frac{b}{c}$$

$$b = c \cdot \cos\alpha$$

$$b = c \cdot \cos 67^{\circ}22'48''$$

$$b = 0.385c$$

$$c - b = 2$$

$$c - 0.385c = 2$$

$$0.615c = 2 \quad / : 0.615$$

$$\boxed{c} = 3.252$$

$$\boxed{b} = 0.385c = \boxed{1.252}$$

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

$$\boxed{a} = \sqrt{c^2 - b^2} = \sqrt{3.252^2 - 1.252^2} = \boxed{3.001}$$

4. Odredi nepoznate elemente pravokutnog trokuta ako je zadana površina  $P = 180 \text{ cm}^2$  i kut  $\alpha = 43^\circ 36' 10''$ .

$$\alpha + \beta = 90^\circ$$

$$\beta = 90^\circ - \alpha = 90^\circ - 43^\circ 36' 10'' = 46^\circ 23' 50''$$

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

$$a \cdot b = 2P$$

$$a \cdot b = 360 \quad (*)$$

$$\text{tg} \alpha = \frac{a}{b}$$

$$a = b \cdot \text{tg} \alpha$$

$$a = b \cdot \text{tg} 43^\circ 36' 10''$$

$$a = 0.952b$$

povratak u (\*)

$$0.952b \cdot b = 360$$

$$0.952b^2 = 360 \quad / : 0.952$$

$$b^2 = 378.151 \quad / \sqrt{\quad}$$

$$b = 19.446 \text{ cm}$$

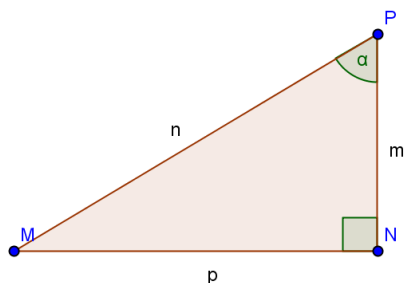
$$a = 0.952b$$

$$a = 18.513 \text{ cm}$$

$$c^2 = a^2 + b^2$$

$$c = \sqrt{a^2 + b^2} = \sqrt{18.513^2 + 19.446^2} = 26.849 \text{ cm}$$

5. U pravokutnom trokutu MNP, u kojem je |MP| hipotenuza, vrijedi da je |NM| = 27 mm, a |NP| = 18 mm. Odredi vrijednost sinusa kuta kod vrha P.



skiciramo opisani pravokutni trokut i označimo traženi kut s  $\alpha$

$$p = |MN| = |NM| = 27$$

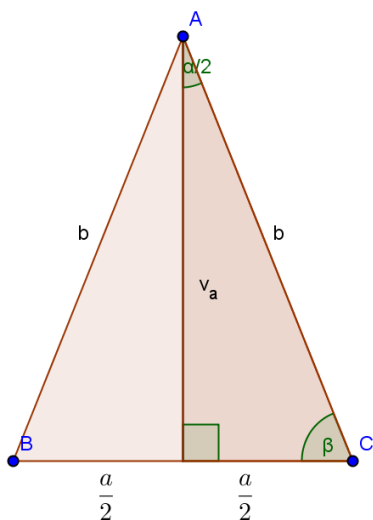
$$m = |NP| = 18$$

$$n^2 = p^2 + m^2$$

$$n = \sqrt{p^2 + m^2} = \sqrt{27^2 + 18^2} = 32.45$$

$$\sin \alpha = \frac{p}{n} = \frac{27}{32.45} = 0.832$$

6. U jednakokrakom trokutu ABC duljina kraka je 24 cm, a osnovica je za četvrtinu te duljine kraća. Kolika je duljina visine iz vrha na osnovicu? Kolika je mjera kuta nasuprot osnovice?



$$b = 24 \text{ cm}$$

$$a = 24 - \frac{24}{4} = 24 - 6 = 18 \text{ cm}$$

$$v_a = \sqrt{b^2 - \left(\frac{a}{2}\right)^2} = \sqrt{24^2 - 9^2} = 22.249$$

$$\cos \frac{\alpha}{2} = \frac{v_a}{b}$$

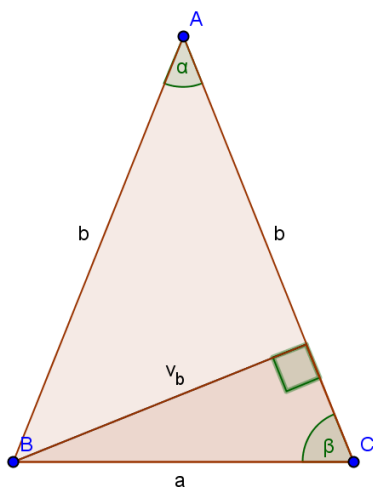
$$\cos \frac{\alpha}{2} = \frac{22.249}{24}$$

$$\frac{\alpha}{2} = \cos^{-1}\left(\frac{22.249}{24}\right)$$

$$\frac{\alpha}{2} = 22^\circ 11' 18'' \quad / \cdot 2$$

$$\alpha = 44^\circ 2' 36''$$

7. Odredi mjere kutova jednakokrakog trokuta ako je duljina visine na krak  $v_b = 10$ , a osnovice  $a = 13$ .



$$\sin \beta = \frac{v_b}{a}$$

$$\sin \beta = \frac{10}{13}$$

$$\beta = \sin^{-1}\left(\frac{10}{13}\right) = 50^{\circ}17'55''$$

$$\alpha + 2\beta = 180^{\circ}$$

$$\alpha = 180^{\circ} - 2\beta = 180^{\circ} - 100^{\circ}35'50'' = 79^{\circ}24'10''$$

8. U jednakokrakom trokutu izrazi visinu na osnovicu  $v_a$  pomoću osnovice  $a$  i nasuprotnog kuta  $\alpha$ .

skica je ista kao u zadatku 6.

$$\operatorname{tg} \frac{\alpha}{2} = \frac{\frac{a}{2}}{v_a}$$

$$v_a = \frac{\frac{a}{2}}{\operatorname{tg} \frac{\alpha}{2}}$$

$$v_a = \frac{a}{2 \operatorname{tg} \frac{\alpha}{2}}$$

9. Omjer duljina kraka i visine na krak jednakokrakog trokuta iznosi 20 : 17 . Odredi mjeru kuta uz osnovicu.

skica je ista kao u zadatku 7.

$$b : v_b = 20 : 17$$

$$v_b : b = 17 : 20$$

$$\sin \alpha = \frac{v_b}{b}$$

$$\sin \alpha = \frac{17}{20}$$

$$\alpha = \sin^{-1}\left(\frac{17}{20}\right) = 58^{\circ}12'42''$$

$$\alpha + 2\beta = 180^{\circ}$$

$$2\beta = 180^{\circ} - \alpha$$

$$2\beta = 180^{\circ} - 58^{\circ}12'42''$$

$$2\beta = 121^{\circ}47'18'' \quad / : 2$$

$$\beta = 60^{\circ}53'39''$$

10. Izračunaj duljine stranica jednakokrakog trokuta kojemu je opseg 270, a kut nasuprot osnovice  $39^{\circ}$ .

skica je ista kao u zadatku 6.

$$a + 2b = 270 \quad (*)$$

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

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

$$a = 2b \cdot \sin \frac{\alpha}{2}$$

$$a = 0.668b$$

povratak u (\*)

$$0.668b + 2b = 270$$

$$2.668b = 270 \quad / : 2.668$$

$$\boxed{b = 101.199}$$

$$\boxed{a} = 270 - 2b = \boxed{67.602}$$