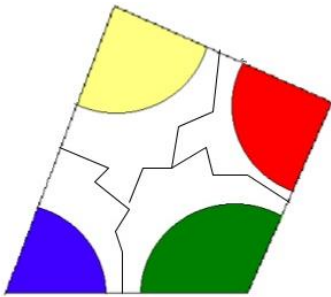


## UGLOVI ČETVOROUGLA

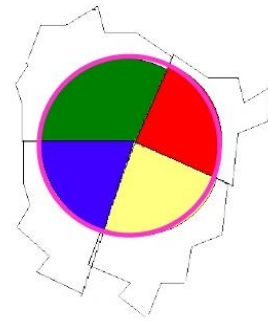
(udžbenik strana 158)

Nacrtaj na kartonu (papiru) četvorougao i oboj uglove kao na slici. Pažljivo izreži dijelove uglova i nadoveži ih tako da im poklopiš tjemena i dva po dva kraka.

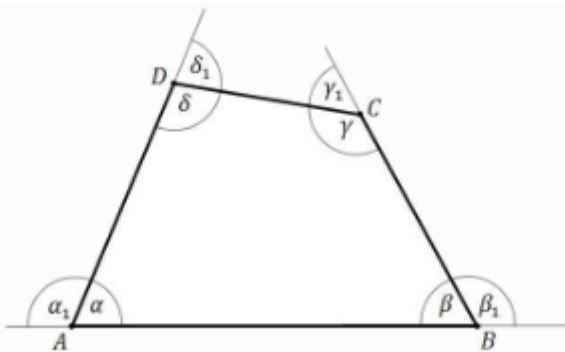


Kakav ćeš ugao dobiti?  
Zaokruži tačan odgovor:

- oštar
- prav
- opružen
- pun



Isti postupak možeš sprovesti za spoljašnje uglove četvorougla. Kakav ćeš ugao dobiti? Isto



Zbir unutrašnjih uglova četvorougla je  $360^\circ$ .

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

Zbir spoljašnjih uglova četvorougla je  $360^\circ$ .

$$\alpha_1 + \beta_1 + \gamma_1 + \delta_1 = 360^\circ$$

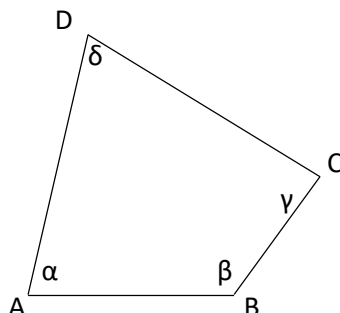
Kada dopunimo svaki unutrašnji ugao  $\alpha, \beta, \gamma, \delta$  četvorougla ABCD sa spoljašnjim uglovima  $\alpha_1, \beta_1, \gamma_1, \delta_1$  dobijamo

$$\alpha + \alpha_1 = 180^\circ \quad \beta + \beta_1 = 180^\circ \quad \gamma + \gamma_1 = 180^\circ \quad \delta + \delta_1 = 180^\circ$$

### ZADACI:



1. Tri unutrašnja ugla četvorougla su  $80^\circ, 65^\circ, 85^\circ$ . Kolika je mjera četvrtog ugla?

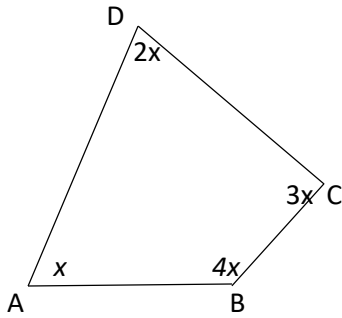


$$\begin{aligned} \alpha &= 80^\circ \\ \beta &= 65^\circ \\ \gamma &= 85^\circ \\ \delta &= ? \end{aligned}$$

$$\begin{aligned} \alpha + \beta + \gamma + \delta &= 360^\circ \\ 80^\circ + 65^\circ + 85^\circ + \delta &= 360^\circ \\ 230^\circ + \delta &= 360^\circ \\ \delta &= 360^\circ - 230^\circ \\ \delta &= 130^\circ \end{aligned}$$



2. Izračunaj veličine unutrašnjih uglova četvorougla prikazanog na slici



$$\begin{aligned} \alpha &= x \\ \beta &= 4x \\ \gamma &= 3x \\ \delta &= 2x \end{aligned}$$

$$\begin{aligned} \alpha + \beta + \gamma + \delta &= 360^\circ \\ x + 4x + 3x + 2x &= 360^\circ \\ 10x &= 360^\circ \\ x &= 360^\circ : 10 \\ x &= 36^\circ \end{aligned}$$

$$\begin{aligned} \alpha &= x = 36^\circ \\ \beta &= 4x = 4 \cdot 36^\circ = 144^\circ \\ \gamma &= 3x = 3 \cdot 36^\circ = 108^\circ \\ \delta &= 2x = 2 \cdot 36^\circ = 72^\circ \end{aligned}$$



zapisujemo

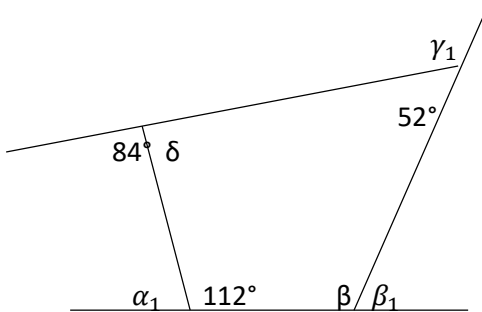
$$2 \cdot x + 3 \cdot x = 5 \cdot x$$

ili

$$2x + 3x = 5x$$



3. Izračunaj nepoznate unutrašnje i spoljašnje uglove četvorougla prikazanog na slici.



$$\begin{aligned} \alpha &= 112^\circ \\ \gamma &= 52^\circ \\ \delta_1 &= 84^\circ \\ \beta, \delta &=? \\ \alpha_1, \beta_1, \gamma_1 &=? \end{aligned}$$

$$\begin{aligned} \delta + \delta_1 &= 180^\circ \\ \delta + 84^\circ &= 180^\circ \\ \delta &= 180^\circ - 84^\circ \\ \delta &= 96^\circ \end{aligned}$$

$$\begin{aligned} \alpha + \alpha_1 &= 180^\circ \\ 112^\circ + \alpha_1 &= 180^\circ \\ \alpha_1 &= 180^\circ - 112^\circ \\ \alpha_1 &= 68^\circ \end{aligned}$$

$$\begin{aligned} \alpha + \beta + \gamma + \delta &= 360^\circ \\ 112^\circ + \beta + 52^\circ + 96^\circ &= 360^\circ \\ 260^\circ + \beta &= 360^\circ \\ \beta &= 360^\circ - 260^\circ \\ \beta &= 100^\circ \end{aligned}$$

$$\begin{aligned} \beta + \beta_1 &= 180^\circ \\ 100^\circ + \beta_1 &= 180^\circ \\ \beta_1 &= 180^\circ - 100^\circ \\ \beta_1 &= 80^\circ \end{aligned}$$

$$\begin{aligned} \gamma + \gamma_1 &= 180^\circ \\ 52^\circ + \gamma_1 &= 180^\circ \\ \gamma_1 &= 180^\circ - 52^\circ \\ \gamma_1 &= 128^\circ \end{aligned}$$



4. U četvorouglu ABCD ugao  $\alpha$  je  $\frac{4}{5}$  pravog ugla, ugao  $\beta$  je 80% opruženog ugla a ugao  $\gamma$  je  $72^\circ$ . Izračunaj sve unutrašnje i spoljašnje uglove četvorougla.

$$\begin{aligned} \alpha &= \frac{4}{5} \cdot 90^\circ = \frac{4}{5} \cdot \frac{90}{1} = 72^\circ \\ \beta &= 80\% \cdot 180^\circ = \frac{80}{100} \cdot \frac{180}{1} = 144^\circ \\ \gamma &= 72^\circ \\ \delta &=? \\ \alpha_1, \beta_1, \gamma_1, \delta_1 &=? \end{aligned}$$

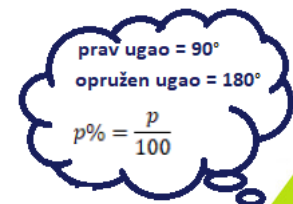
$$\begin{aligned} \alpha + \alpha_1 &= 180^\circ \\ 72^\circ + \alpha_1 &= 180^\circ \\ \alpha_1 &= 180^\circ - 72^\circ \\ \alpha_1 &= 108^\circ \end{aligned}$$

$$\begin{aligned} \beta + \beta_1 &= 180^\circ \\ 144^\circ + \beta_1 &= 180^\circ \\ \beta_1 &= 180^\circ - 144^\circ \\ \beta_1 &= 36^\circ \end{aligned}$$

$$\begin{aligned} \gamma + \gamma_1 &= 180^\circ \\ 72^\circ + \gamma_1 &= 180^\circ \\ \gamma_1 &= 180^\circ - 72^\circ \\ \gamma_1 &= 108^\circ \end{aligned}$$

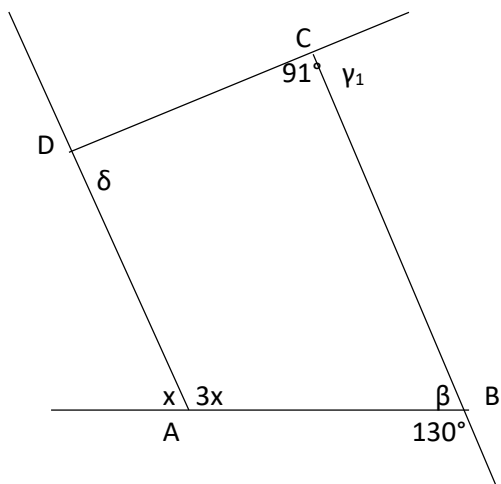
$$\begin{aligned} \delta + \delta_1 &= 180^\circ \\ 72^\circ + \delta_1 &= 180^\circ \\ \delta_1 &= 180^\circ - 72^\circ \\ \delta_1 &= 108^\circ \end{aligned}$$

$$\begin{aligned} \alpha + \beta + \gamma + \delta &= 360^\circ \\ 72^\circ + 144^\circ + 72^\circ + \delta &= 360^\circ \\ 288^\circ + \delta &= 360^\circ \\ \delta &= 360^\circ - 288^\circ \\ \delta &= 72^\circ \end{aligned}$$





5. Izračunaj nepoznate uglove četvorougla na slici.



$$\begin{aligned} \alpha &= 3x \\ \alpha_1 &= x \\ \beta &= 130^\circ \\ \gamma &= 91^\circ \\ \beta, \gamma_1, \delta &=? \end{aligned}$$

$$\begin{aligned} \alpha + \alpha_1 &= 180^\circ \\ 3x + x &= 180^\circ \\ 4x &= 180^\circ \\ x &= 180^\circ : 4 \\ x &= 45^\circ \end{aligned}$$

$$\begin{aligned} \gamma + \gamma_1 &= 180^\circ \\ 91^\circ + \gamma_1 &= 180^\circ \\ \gamma_1 &= 180^\circ - 91^\circ \\ \gamma_1 &= 89^\circ \end{aligned}$$

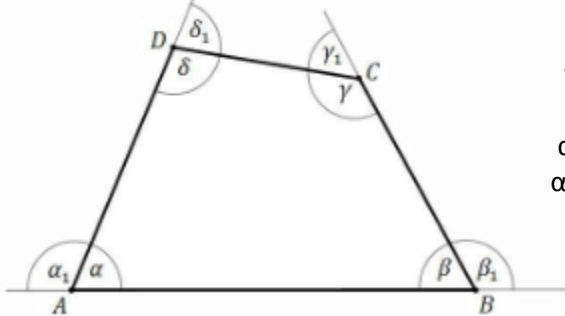
$$\begin{aligned} \alpha &= 3x \\ \alpha &= 3 \cdot 45^\circ \\ \alpha &= 135^\circ \end{aligned}$$

$$\begin{aligned} \beta + \beta_1 &= 180^\circ \\ \beta + 130^\circ &= 180^\circ \\ \beta &= 180^\circ - 130^\circ \\ \beta &= 50^\circ \end{aligned}$$

$$\begin{aligned} \alpha + \beta + \gamma + \delta &= 360^\circ \\ 135^\circ + 50^\circ + 91^\circ + \delta &= 360^\circ \\ 276^\circ + \delta &= 360^\circ \\ \delta &= 360^\circ - 276^\circ \\ \delta &= 84^\circ \end{aligned}$$



6. Ako je  $\beta = \alpha + 40^\circ$ ,  $\gamma = \beta + 30^\circ$ ,  $\delta = \gamma + 40^\circ$  izračunaj ostale unutrašnje i spoljašnje uglove četvorougla.



$$\begin{aligned} \beta &= \alpha + 40^\circ \\ \gamma &= \beta + 30^\circ \\ \delta &= \gamma + 40^\circ \\ \alpha, \beta, \gamma, \delta &=? \\ \alpha_1, \beta_1, \gamma_1, \delta_1 &=? \end{aligned}$$

$$\begin{aligned} \alpha + \beta + \gamma + \delta &= 360^\circ \\ \alpha + \alpha + 40^\circ + \beta + 30^\circ + \gamma + 40^\circ &= 360^\circ \\ \alpha + \alpha + 40^\circ + \alpha + 40^\circ + 30^\circ + \beta + 30^\circ + 40^\circ &= 360^\circ \\ \alpha + \alpha + 40^\circ + \alpha + 40^\circ + 30^\circ + \alpha + 40^\circ + 30^\circ + 40^\circ &= 360^\circ \\ 4 \cdot \alpha + 220^\circ &= 360^\circ \\ 4 \cdot \alpha &= 360^\circ - 220^\circ \\ 4 \cdot \alpha &= 140^\circ \\ \alpha &= 140^\circ : 4 \\ \alpha &= 35^\circ \end{aligned}$$

$$\begin{aligned} \beta &= \alpha + 40^\circ \\ \beta &= 35^\circ + 40^\circ \\ \beta &= 75^\circ \end{aligned}$$

$$\begin{aligned} \beta + \beta_1 &= 180^\circ \\ 75^\circ + \beta_1 &= 180^\circ \\ \beta_1 &= 180^\circ - 75^\circ \\ \beta_1 &= 105^\circ \end{aligned}$$

$$\begin{aligned} \gamma &= \beta + 30^\circ \\ \gamma &= 75^\circ + 30^\circ \\ \gamma &= 105^\circ \end{aligned}$$

$$\begin{aligned} \gamma + \gamma_1 &= 180^\circ \\ 105^\circ + \gamma_1 &= 180^\circ \\ \gamma_1 &= 180^\circ - 105^\circ \\ \gamma_1 &= 75^\circ \end{aligned}$$

$$\begin{aligned} \delta &= \gamma + 40^\circ \\ \delta &= 105^\circ + 40^\circ \\ \delta &= 145^\circ \end{aligned}$$

$$\begin{aligned} \delta + \delta_1 &= 180^\circ \\ 145^\circ + \delta_1 &= 180^\circ \\ \delta_1 &= 180^\circ - 145^\circ \\ \delta_1 &= 35^\circ \end{aligned}$$



ZADACI ZA SAMOSTALNO RJEŠAVANJE:



1. Izračunaj ostale (unutrašnje i spoljašnje) uglove četvorougla ako je  $\beta_1 = 35^\circ$ ,  $\gamma_1 = 96^\circ$ ,  $\delta = 120^\circ$ .



2. Jedan ugao četvorougla je  $48^\circ$ , a ostala tri su jednaka. Izračunaj ostale uglove četvorougla.



3. Izračunaj unutrašnje uglove četvorougla ABCD ako je  $\beta = \frac{1}{2} \cdot \alpha$ ,  $\gamma = \frac{2}{3} \cdot \alpha$ ,  $\delta = \frac{5}{6} \cdot \alpha$ .



**Domaći zadatak:** zbirka zadataka

strana	101
zadaci	950(slika 1.6), 960



- ❖ Sadržaj ovog nastavnog materijala prepisati u školsku svesku
- ❖ Zadatke za samostalni rad riješiti
- ❖ U cilju boljeg razumjevanja gradiva pogledati video:  
<https://youtu.be/vXcXoJ-HRFA>
- ❖ Uraditi domaći zadatak, poslati na mail nastavnika
- ❖ Pokušaj! Istražuj! Nije teško!
- ❖ #OstaniDoma #UčiDoma