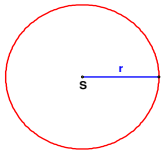
KRUŽNICA I KRUG (m©h)

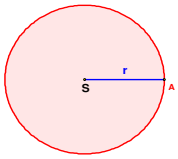


kružnica



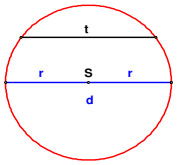
kružnica je skup svih točaka ravnine jednako udaljenih od jedne čvrste točke te iste ravnine
središte S nije točka kružnice
r – polumjer (radijus)

krug



krug je nutrina kružnice skupa s kružnicom
krug je skup svih točaka ravnine kojima je udaljenost od središta S jednaka ili manja od polumjera r

tetiva i promjer



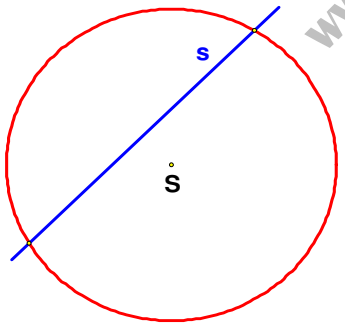
tetiva je spojnica dviju točaka kružnice
promjer (dijametar) je tetiva koja prolazi središtem kružnice

$$d = 2 \cdot r \Rightarrow r = \frac{d}{2}$$

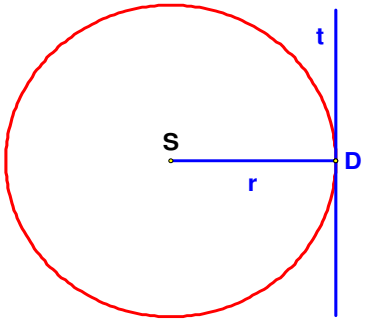
opseg i površina

$$O = 2 \cdot r \cdot \pi \ , \ O = d \cdot \pi \ , \ P = r^2 \cdot \pi \ , \ P = \frac{d^2 \cdot \pi}{4} \ , \ \pi \approx 3.14$$

sekanta i tangenta

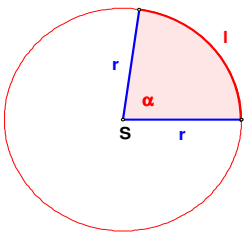


sekanta i kružnica imaju dvije zajedničke točke



tangenta i kružnica imaju jednu zajedničku točku, D je diralište

duljina kružnog luka i kružni isječak (sektor)



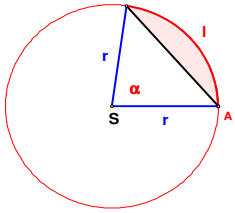
kružni luk je dio kružnice između dviju točaka kružnice

$$l = \frac{r \cdot \pi \cdot \alpha}{180^0} \ , \ \alpha = \frac{l \cdot 180^0}{r \cdot \pi} \ , \ r = \frac{l \cdot 180^0}{\alpha \cdot \pi} \ , \ O = l + 2 \cdot r$$

$$P = \frac{r^2 \cdot \pi \cdot \alpha}{360^0} \ , \ P = \frac{r \cdot l}{2}$$

$$P = \frac{r^2 \cdot \alpha}{2} \ , \ \alpha \text{ u radijanima}$$

kružni odsječak (segment)

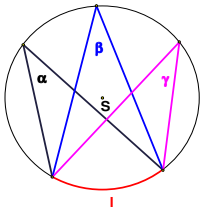


kružni odsječak je dio kruga što ga odsijeca tetiva

$$P=\frac{r^2\cdot\pi\cdot\alpha}{360^0}-\frac{r^2\cdot\sin\alpha}{2}\ ,\ O=l+2\cdot r\cdot\sin\frac{\alpha}{2}$$

$$P=\frac{r\cdot l}{2}-\frac{r^2\cdot\sin\alpha}{2}$$

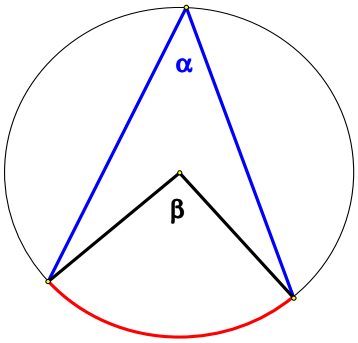
obodni kut

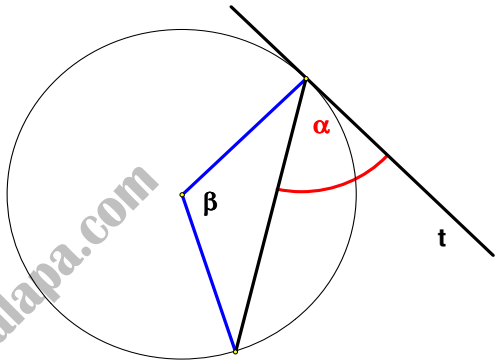


obodni kutovi nad istim kružnim lukom međusobno su jednaki

$$\alpha=\beta=\gamma$$

poučak o obodnom i središnjem kutu



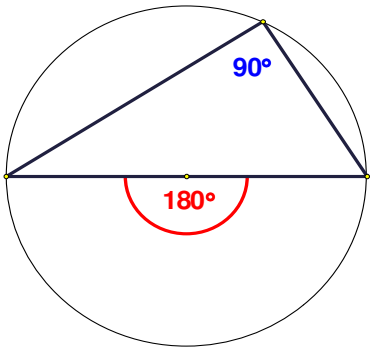


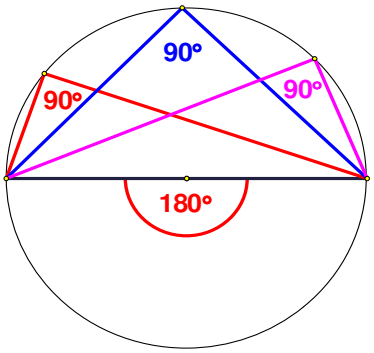
središnji kut nad kružnim lukom dva puta je veći od obodnog kuta nad istim lukom

$$\alpha=\frac{1}{2}\cdot\beta\ \Rightarrow\ \beta=2\cdot\alpha$$

$$\alpha=\frac{1}{2}\cdot\beta\ \Rightarrow\ \beta=2\cdot\alpha$$

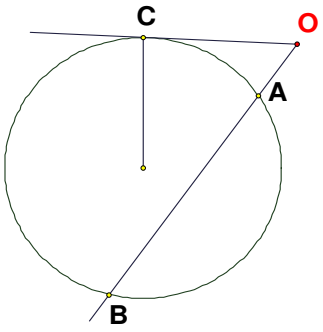
Talesov poučak



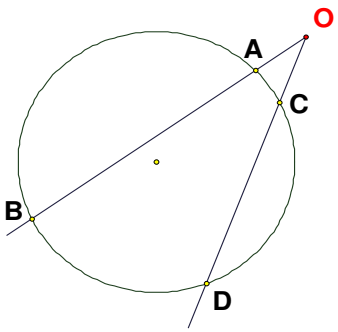


obodni kut nad promjerom kružnice je pravi kut $\left(90^0\ \text{ili}\ \frac{\pi}{2}\ \text{radijana}\right)$

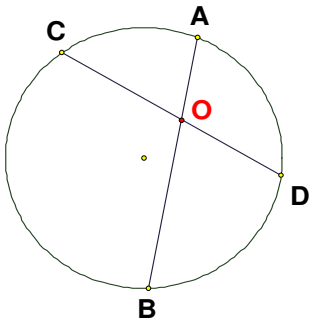
potencije točke s obzirom na kružnicu



$$|OA|\cdot|OB|=|OC|^2$$

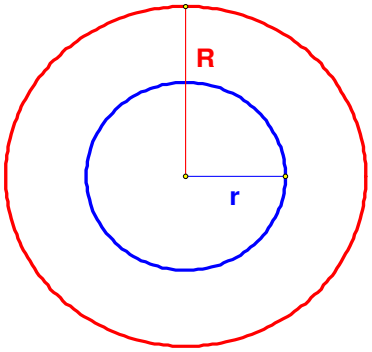


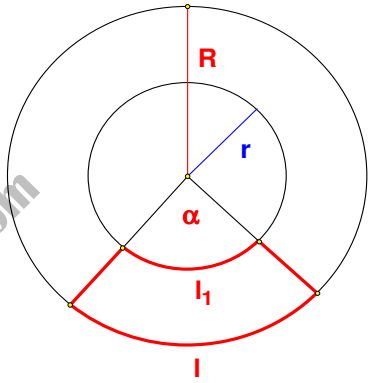
$$|OA|\cdot|OB|=|OC|\cdot|OD|$$



$$|OA|\cdot|OB|=|OC|\cdot|OD|$$

kružni vijenac i isječak kružnog vijenca

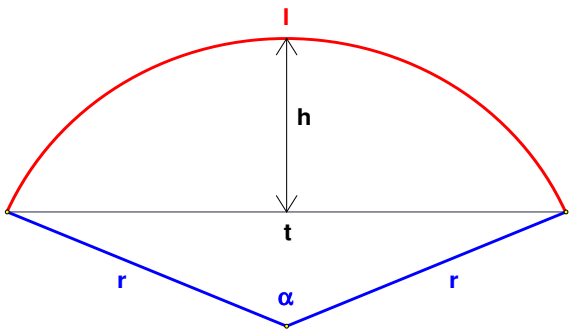




$$P=R^2\cdot\pi-r^2\cdot\pi$$
$$P=\left(R^2-r^2\right)\cdot\pi$$
$$P=(R+r)\cdot(R-r)\cdot\pi$$

$$P=\frac{\pi\cdot\alpha}{360^0}\cdot\left(R^2-r^2\right)$$
$$P=\frac{l+l_1}{2}\cdot(R-r)$$

odsječak (segment) i isječak (sektor) kruga



l – duljina luka
t – duljina tetive
α – središnji kut (u stupnjevima)
h – visina segmenta
r – polumjer kružnice

$$t=2\cdot\sqrt{2\cdot h\cdot r-h^2}$$

$$t=2\cdot r\cdot\sin\frac{\alpha}{2}$$

$$h=r-\sqrt{r^2-\frac{t^2}{4}}=r\cdot\left(1-\cos\frac{\alpha}{2}\right)=\frac{t}{2}\cdot tg\frac{\alpha}{4}=2\cdot r\cdot\sin^2\frac{\alpha}{4}$$