

TRIGONOMETRIJA PRAVOUGLOG TROUGLA:

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

$$\alpha + \beta = \frac{\pi}{2}$$

$$\sin\alpha = \frac{\text{naspramna kateta}}{\text{hipotenuza}} = \frac{a}{c}$$

$$\cos\alpha = \frac{\text{nalegla kateta}}{\text{hipotenuza}} = \frac{b}{c}$$

$$\operatorname{tg}\alpha = \frac{\text{naspramna kateta}}{\text{nalegla kateta}} = \frac{a}{b}$$

$$\operatorname{ctg}\alpha = \frac{\text{nalegla kateta}}{\text{naspramna kateta}} = \frac{b}{a}$$

OSNOVNE RELACIJE IZMEĐU TRIGONOMETRIJSKIH FUNKCIJA:

$$\sin^2\alpha + \cos^2\alpha = 1$$

$$\operatorname{tg}\alpha = \frac{\sin\alpha}{\cos\alpha}$$

$$\operatorname{ctg}\alpha = \frac{\cos\alpha}{\sin\alpha}$$

$$\operatorname{tg}\alpha \operatorname{ctg}\alpha = 1$$

TRIGONOMETRIJSKA KRUŽNICA:

$$-1 \leq \sin\alpha \leq 1$$

$$-1 \leq \cos\alpha \leq 1$$

$$\sin\alpha: \begin{array}{|c|c|} \hline + & + \\ \hline - & - \\ \hline \end{array} \quad \cos\alpha: \begin{array}{|c|c|} \hline - & + \\ \hline - & + \\ \hline \end{array} \quad \operatorname{tg}\alpha: \begin{array}{|c|c|} \hline - & + \\ \hline + & - \\ \hline \end{array} \quad \operatorname{ctg}\alpha: \begin{array}{|c|c|} \hline - & + \\ \hline + & - \\ \hline \end{array}$$

α	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$\sin\alpha$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0
$\cos\alpha$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	-1	0	1
$\operatorname{tg}\alpha$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	-	0	-	0
$\operatorname{ctg}\alpha$	-	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0	-	0	-

$$\sin(\alpha + 2k\pi) = \sin\alpha$$

$$\cos(\alpha + 2k\pi) = \cos\alpha$$

$$\operatorname{tg}(\alpha + k\pi) = \operatorname{tg}\alpha$$

$$\operatorname{ctg}(\alpha + k\pi) = \operatorname{ctg}\alpha$$

SVOĐENJE NA PRVI KVADRANT:

$$\sin(\pi - \alpha) = \sin\alpha$$

$$\sin(\pi + \alpha) = -\sin\alpha$$

$$\sin(-\alpha) = -\sin\alpha$$

$$\sin\left(\frac{\pi}{2} - \alpha\right) = \cos\alpha$$

$$\cos(\pi - \alpha) = -\cos\alpha$$

$$\cos(\pi + \alpha) = -\cos\alpha$$

$$\cos(-\alpha) = \cos\alpha$$

$$\cos\left(\frac{\pi}{2} - \alpha\right) = \sin\alpha$$

$$\operatorname{tg}(\pi - \alpha) = -\operatorname{tg}\alpha$$

$$\operatorname{tg}(\pi + \alpha) = \operatorname{tg}\alpha$$

$$\operatorname{tg}(-\alpha) = -\operatorname{tg}\alpha$$

$$\operatorname{tg}\left(\frac{\pi}{2} - \alpha\right) = \operatorname{ctg}\alpha$$

$$\operatorname{ctg}(\pi - \alpha) = -\operatorname{ctg}\alpha$$

$$\operatorname{ctg}(\pi + \alpha) = \operatorname{ctg}\alpha$$

$$\operatorname{ctg}(-\alpha) = -\operatorname{ctg}\alpha$$

$$\operatorname{ctg}\left(\frac{\pi}{2} - \alpha\right) = \operatorname{tg}\alpha$$

TRIGONOMETRIJSKE FUNKCIJE ZBIRA I RAZLIKE DVA UGLA:

$$\sin(\alpha \pm \beta) = \sin\alpha \cos\beta \pm \cos\alpha \sin\beta$$

$$\cos(\alpha \pm \beta) = \cos\alpha \cos\beta \mp \sin\alpha \sin\beta$$

$$\operatorname{tg}(\alpha \pm \beta) = \frac{\operatorname{tg}\alpha \pm \operatorname{tg}\beta}{1 \mp \operatorname{tg}\alpha \operatorname{tg}\beta}$$

$$\operatorname{ctg}(\alpha \pm \beta) = \frac{\operatorname{ctg}\alpha \operatorname{ctg}\beta \mp 1}{\operatorname{ctg}\alpha \pm \operatorname{ctg}\beta}$$

TRIGONOMETRIJSKE FUNKCIJE DVOSTRUKOG UGLA I POLUUGLA:

$$\sin 2\alpha = 2\sin\alpha \cos\alpha \qquad \sin^2 \frac{\alpha}{2} = \frac{1 - \cos\alpha}{2}$$

$$\cos 2\alpha = \cos^2\alpha - \sin^2\alpha \qquad \cos^2 \frac{\alpha}{2} = \frac{1 + \cos\alpha}{2}$$

$$\operatorname{tg} 2\alpha = \frac{2\operatorname{tg}\alpha}{1 - \operatorname{tg}^2\alpha} \qquad \operatorname{tg}^2 \frac{\alpha}{2} = \frac{1 - \cos\alpha}{1 + \cos\alpha}$$

$$\operatorname{ctg} 2\alpha = \frac{\operatorname{ctg}^2\alpha - 1}{2\operatorname{ctg}\alpha} \qquad \operatorname{ctg}^2 \frac{\alpha}{2} = \frac{1 + \cos\alpha}{1 - \cos\alpha}$$

TRANSFORMACIJE ZBIRA I RAZLIKE:

$$\sin\alpha + \sin\beta = 2\sin\frac{\alpha + \beta}{2} \cos\frac{\alpha - \beta}{2}$$

$$\sin\alpha - \sin\beta = 2\cos\frac{\alpha + \beta}{2} \sin\frac{\alpha - \beta}{2}$$

$$\cos\alpha + \cos\beta = 2\cos\frac{\alpha + \beta}{2} \cos\frac{\alpha - \beta}{2}$$

$$\cos\alpha - \cos\beta = -2\sin\frac{\alpha + \beta}{2} \sin\frac{\alpha - \beta}{2}$$

$$\operatorname{tg}\alpha \pm \operatorname{tg}\beta = \frac{\sin(\alpha \pm \beta)}{\cos\alpha \cos\beta}$$

$$\operatorname{ctg}\alpha \pm \operatorname{ctg}\beta = \pm \frac{\sin(\alpha \pm \beta)}{\sin\alpha \sin\beta}$$

TRANSFORMACIJA PROIZVODA:

$$\sin\alpha \sin\beta = \frac{1}{2}(\cos(\alpha - \beta) - \cos(\alpha + \beta))$$

$$\cos\alpha \cos\beta = \frac{1}{2}(\cos(\alpha + \beta) + \cos(\alpha - \beta))$$

$$\sin\alpha \cos\beta = \frac{1}{2}(\sin(\alpha + \beta) + \sin(\alpha - \beta))$$

SINUSNA TEOREMA

$$\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} = \frac{c}{\sin\gamma} = 2R \text{ gde je } R \text{ poluprečnik kružnice opisane oko trougla } ABC$$

KOSINUSNA TEOREMA

$$a^2 = b^2 + c^2 - 2bc \cos\alpha$$

$$b^2 = a^2 + c^2 - 2ac \cos\beta$$

$$c^2 = a^2 + b^2 - 2ab \cos\gamma$$