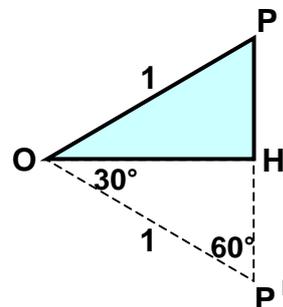
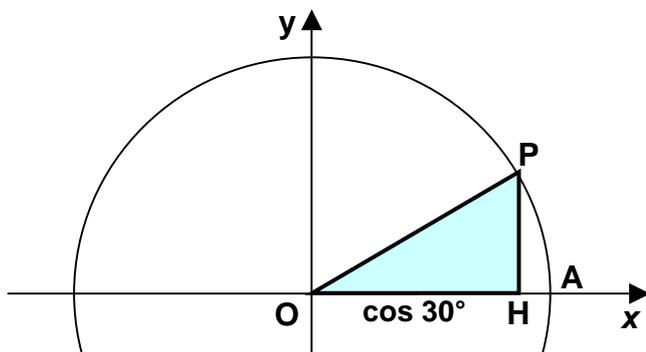


Valori delle funzioni goniometriche di angoli particolari

$$\alpha = 30^\circ$$

Simmetrizzando il triangolo $\triangle HOP$ rispetto al lato OH si ottiene il triangolo equilatero $\triangle OPP'$.

Essendo $OP = 1$ (raggio della circonferenza) $\Rightarrow PH = \frac{1}{2} \Rightarrow \sin 30^\circ = \frac{1}{2}$.



$$\text{Inoltre } \cos 30^\circ = \pm \sqrt{1 - \sin^2 30^\circ} = + \sqrt{1 - \left(\frac{1}{2}\right)^2} = \sqrt{1 - \frac{1}{4}} = \sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{\sqrt{4}} = \frac{\sqrt{3}}{2}.$$

$$\operatorname{tg} 30^\circ = \frac{\sin 30^\circ}{\cos 30^\circ} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

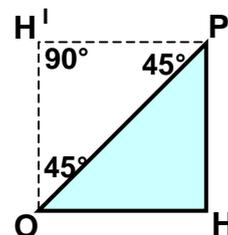
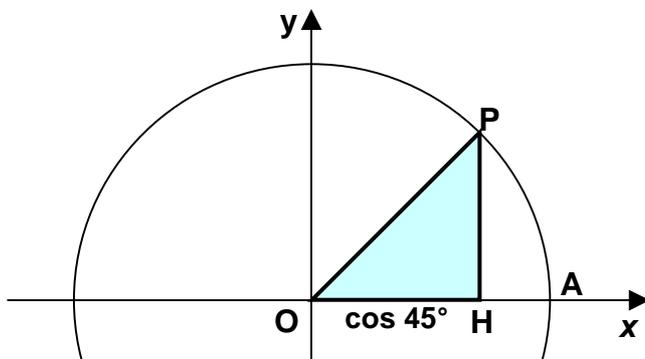
$$\operatorname{cotg} 30^\circ = \frac{\cos 30^\circ}{\sin 30^\circ} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}.$$

$$\alpha = 45^\circ$$

Simmetrizzando il triangolo $\triangle HOP$ rispetto al lato OP si ottiene il quadrato $\triangle OHPH'$.

Nota la diagonale del quadrato la misura del lato si ottiene con la formula: $l = \frac{\sqrt{2}}{2} d$

Essendo la diagonale $OP = 1 \Rightarrow OH = \frac{\sqrt{2}}{2} OP = \frac{\sqrt{2}}{2} \cdot 1 = \frac{\sqrt{2}}{2} \Rightarrow \cos 45^\circ = \frac{\sqrt{2}}{2}$.



Inoltre $\sin 45^\circ = PH = OH = \frac{\sqrt{2}}{2}$.

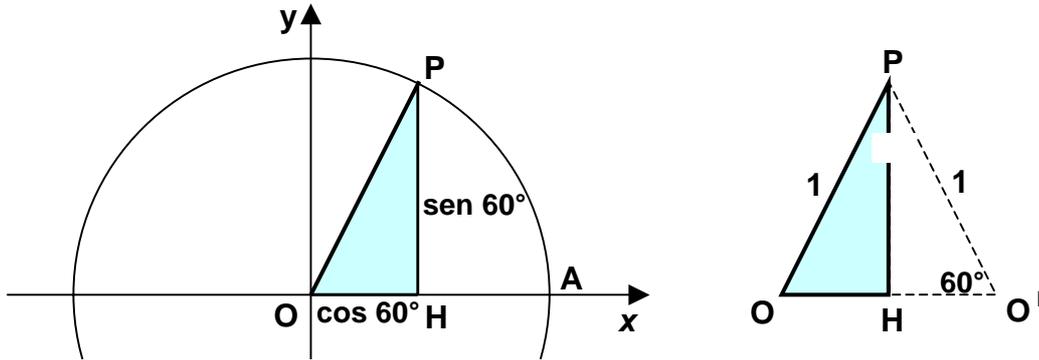
$$\operatorname{tg} 45^\circ = \frac{\sin 45^\circ}{\cos 45^\circ} = \frac{1}{1} = 1$$

$$\operatorname{cotg} 45^\circ = \frac{\cos 45^\circ}{\sin 45^\circ} = \frac{1}{1} = 1$$

$$\alpha = 60^\circ$$

Simmetrizzando il triangolo $\triangle HOP$ rispetto al lato PH si ottiene il triangolo equilatero $\triangle OPO'$.

Essendo $OP = 1$ (raggio della circonferenza) $\Rightarrow OH = \frac{1}{2} \Rightarrow \cos 60^\circ = \frac{1}{2}$.



$$\text{Inoltre } \sin 60^\circ = \pm \sqrt{1 - \cos^2 60^\circ} = + \sqrt{1 - \left(\frac{1}{2}\right)^2} = \sqrt{1 - \frac{1}{4}} = \sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{\sqrt{4}} = \frac{\sqrt{3}}{2}.$$

$$\operatorname{tg} 60^\circ = \frac{\sin 60^\circ}{\cos 60^\circ} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}.$$

$$\operatorname{cot} g 60^\circ = \frac{\cos 60^\circ}{\sin 60^\circ} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}.$$