Exercise

Evaluate without using a calculator: $\cos\left(\cos^{-1}\frac{3}{5}\right)$

Solution

$$\cos\left(\cos^{-1}\frac{3}{5}\right)=\frac{3}{5}$$

Exercise

Evaluate without using a calculator: $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$

Solution

$$\cos^{-1}\left(\cos\frac{7\pi}{6}\right)=\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)=\frac{5\pi}{6}$$

Exercise

Evaluate without using a calculator: $\tan\left(\cos^{-1}\frac{3}{5}\right)$

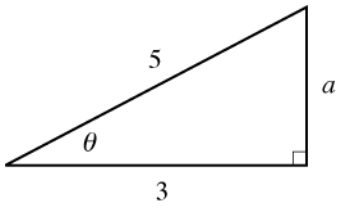
Solution

$$\tan\left(\cos^{-1}\frac{3}{5}\right)$$

$$5^2=3^2+a^2\rightarrow a=4$$

$$\tan\left(\cos^{-1}\frac{3}{5}\right)=\tan\theta$$

$$=\frac{4}{3}$$

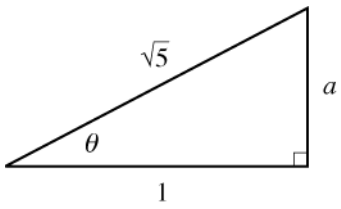


Exercise

Evaluate without using a calculator: $\sin\left(\cos^{-1}\frac{1}{\sqrt{5}}\right)$

Solution

$$\sin\left(\cos^{-1}\frac{1}{\sqrt{5}}\right)$$



$$\left(\sqrt{5}\right)^2 = 1^2 + a^2$$

$$\rightarrow a^2 = 5 - 1$$

$$\rightarrow a = 2$$

$$\sin\left(\cos^{-1}\frac{1}{\sqrt{5}}\right) = \sin\theta$$

$$= \frac{2}{\sqrt{5}}$$

Exercise

Evaluate without using a calculator: $\cos\left(\sin^{-1}\frac{1}{2}\right)$

Solution

$$\cos\left(\sin^{-1}\frac{1}{2}\right)$$

$$\sin\frac{\pi}{6} = \frac{1}{2} \Rightarrow \sin^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{6}$$

$$\cos\left(\sin^{-1}\frac{1}{2}\right) = \cos\frac{\pi}{6}$$

$$= \frac{\sqrt{3}}{2}$$

Exercise

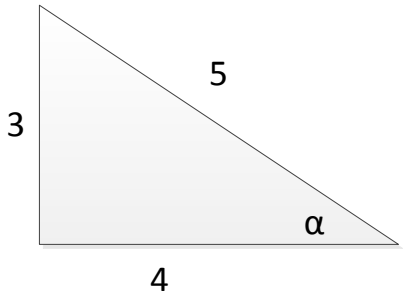
Evaluate without using a calculator: $\sin\left(\sin^{-1}\frac{3}{5}\right)$

Solution

$$\sin\left(\sin^{-1}\frac{3}{5}\right) = \frac{3}{5}$$

Exercise

Evaluate without using a calculator: $\cos\left(\tan^{-1}\frac{3}{4}\right)$



Solution

$$\alpha = \tan^{-1}\frac{3}{4} \Rightarrow \tan\alpha = \frac{3}{4}$$

$$r = \sqrt{3^2 + 4^2} = 5$$

$$\Rightarrow \boxed{\cos\alpha = \frac{4}{5}}$$

Exercise

Evaluate without using a calculator: $\tan\left(\sin^{-1}\frac{3}{5}\right)$

Solution

$$\sin\alpha = \frac{3}{5}$$

$$\boxed{\tan\left(\sin^{-1}\frac{3}{5}\right) = \frac{3}{4}}$$

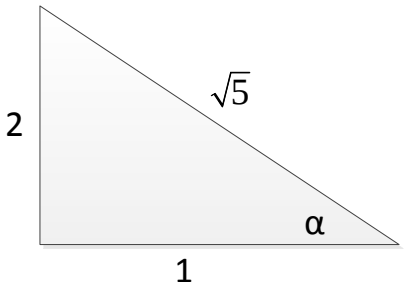
Exercise

Evaluate without using a calculator: $\sec\left(\cos^{-1}\frac{1}{\sqrt{5}}\right)$

Solution

$$\alpha = \cos^{-1}\frac{1}{\sqrt{5}} \quad \rightarrow \quad \cos\alpha = \frac{1}{\sqrt{5}}$$

$$\boxed{\sec\alpha = \frac{1}{\cos\alpha} = \frac{1}{\frac{1}{\sqrt{5}}} = \sqrt{5}}$$



Exercise

Evaluate without using a calculator: $\cot\left(\tan^{-1}\frac{1}{2}\right)$

Solution

$$\alpha = \tan^{-1}\frac{1}{2} \Rightarrow \tan\alpha = \frac{1}{2}$$

$$\boxed{\cot\alpha = \frac{1}{\tan\alpha} = 2}$$

Exercise

Write an equivalent expression that involves x only for $\cos\left(\cos^{-1} x\right)$

Solution

$$\alpha = \cos^{-1} x \Rightarrow \cos\alpha = x$$

$$\boxed{\cos\left(\cos^{-1} x\right) = \cos\alpha = x}$$

Exercise

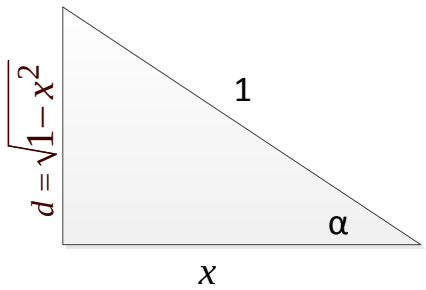
Write an equivalent expression that involves x only for $\tan\left(\cos^{-1} x\right)$

Solution

$$\alpha = \cos^{-1} x \Rightarrow \cos\alpha = x = \frac{x}{1}$$

$$x^2 + d^2 = 1 \Rightarrow d^2 = 1 - x^2$$

$$d = \sqrt{1-x^2}$$



$$\boxed{\tan\left(\cos^{-1} x\right) = \tan\alpha = \frac{\sqrt{1-x^2}}{x}}$$

Exercise

Write an equivalent expression that involves x only for $\csc\left(\sin^{-1}\frac{1}{x}\right)$

Solution

$$\alpha = \sin^{-1}\frac{1}{x} \Rightarrow \sin\alpha = \frac{1}{x}$$

$$\boxed{\csc\left(\sin^{-1} x\right) = \csc\alpha = \frac{1}{\sin\alpha} = x}$$