

1. Find each exact value without using a calculator.

$$\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) = \boxed{-\frac{\pi}{4}}$$

$$\sin \square = -\frac{\sqrt{2}}{2}$$

$$\uparrow$$

$$\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$$

$$\cos^{-1} 1 = \boxed{0}$$

$$\cos \square = 1$$

$$\uparrow$$

$$[0, \pi]$$

$$\tan^{-1}(-1) = \boxed{-\frac{\pi}{4}}$$

$$\tan \square = -1$$

$$\uparrow$$

$$\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$$

$$\tan^{-1}\frac{\sqrt{3}}{3} = \boxed{\frac{\pi}{6}}$$

$$\tan \square = \frac{\sqrt{3}}{3} = \frac{1}{\sqrt{3}}$$

$$\uparrow$$

$$\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$$

$$\csc^{-1}\sqrt{2} = \sin^{-1}\frac{1}{\sqrt{2}} = \boxed{\frac{\pi}{4}}$$

$$\sin \square = \frac{1}{\sqrt{2}}$$

$$\uparrow$$

$$\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$$

$$\cot^{-1}(-\sqrt{3}) = \boxed{\frac{5\pi}{6}}$$

$$\cot \square = -\sqrt{3}$$

$$\tan \square = -\frac{1}{\sqrt{3}}$$

$$\uparrow$$

$$(0, \pi)$$

2. Evaluate the following expression without using a calculator.

$$\sin\left(\tan^{-1}\frac{3}{2}\right)$$

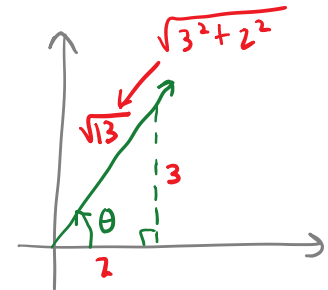
$$\theta$$

$$= \sin \theta$$

$$= \boxed{\frac{3}{\sqrt{13}}}$$

$$\tan^{-1}\frac{3}{2} = \theta \leftarrow \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$$

$$\tan \theta = \frac{3}{2}$$



3. Rewrite the expression as an algebraic expression in  $x$ .

$$\tan(\cos^{-1} x)$$

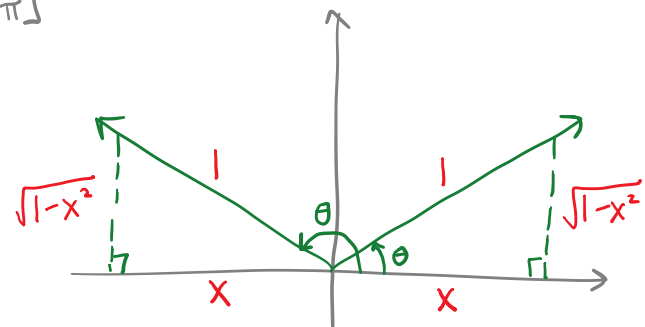
$$\theta$$

$$= \tan \theta$$

$$= \boxed{\frac{\sqrt{1-x^2}}{x}}$$

$$\cos^{-1} x = \theta \leftarrow [0, \pi]$$

$$\cos \theta = x = \frac{x}{1}$$



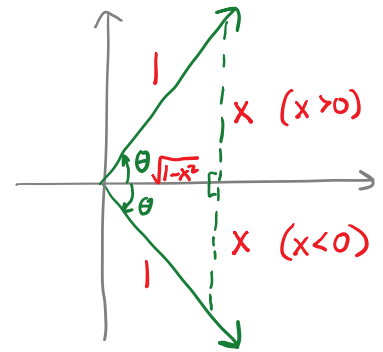
4. Write  $\cos(2 \sin^{-1} x)$  as an algebraic expression in  $x$ .

$$\begin{aligned}
 & \cos(2 \sin^{-1} x) \\
 & \quad \theta \\
 & = \cos 2\theta \\
 & = 2\cos^2 \theta - 1 \\
 & = 2\left(\frac{\sqrt{1-x^2}}{1}\right)^2 - 1 \\
 & = 2(1-x^2) - 1 \\
 & = 2 - 2x^2 - 1 \\
 & = \boxed{1 - 2x^2}
 \end{aligned}$$

OR

$$\begin{aligned}
 & = 1 - 2\sin^2 \theta \\
 & = \boxed{1 - 2x^2}
 \end{aligned}$$

$$\begin{aligned}
 \sin^{-1} x &= \theta \quad \left[-\frac{\pi}{2}, \frac{\pi}{2}\right] \\
 \sin \theta &= x = \frac{x}{1}
 \end{aligned}$$



5. Use a calculator to give  $\arcsin 0.81926439$  as a real number value. (Be sure the calculator is in radians mode).

$$\boxed{0.96012698}$$

Q: A man leaves home and, after making three left turns, he ends up back at home, and finds two masked men waiting for him. What is happening?