$\sin\theta = \frac{O}{H}$

Precalculus

$\sin^{-1}\left(\frac{H}{O}\right) = \theta$

Name: Key

Practice With Inverse Trig Functions

Find the exact value of the expression whenever it is defined.

1. a. $\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) = -\frac{\pi}{4}$ b. $\cos^{-1}\left(-\frac{1}{2}\right) = \frac{2\pi}{3}$ c. $\tan^{-1}\left(-\sqrt{3}\right) = -\frac{\pi}{3}$

2. a. $\sin^{-1}\left(-\frac{1}{2}\right) = -\frac{\pi}{6}$ b. $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right) = \frac{3\pi}{4}$ c. $\tan^{-1}(-1) = -\frac{\pi}{4}$

3. a. $\arcsin\frac{\sqrt{3}}{2}$ $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{3}$ b. $\arccos\frac{\sqrt{2}}{2} = \frac{\pi}{4}$ c. $\arctan\frac{1}{\sqrt{3}} = \frac{\pi}{6}$

4. a. $\arcsin 0 = 0$ b. $\arccos(-1) = \pi$ c. $\arctan 0 = 0$

5. a. $\sin^{-1}\left(\frac{0\pi}{3}\right)$ = undefined b. $\cos^{-1}\left(\frac{4\pi}{2}\right)$ = undefined c. $\tan^{-1}(1) = \frac{\pi}{4}$

3 π

6. a. $\arcsin\left(\frac{0\pi}{2}\right)$ = undefined b. $\arccos\left(\frac{4\pi}{3}\right)$ = undefined c. $\arctan\left(-\frac{\sqrt{3}}{3}\right) = -\frac{\pi}{6}$

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

7. a. $\sin\left[\arcsin\left(-\frac{3}{10}\right)\right] = -\frac{3}{10}$ b. $\cos\left[\arccos\frac{1}{2}\right] = \frac{1}{2}$ c. $\tan(\arctan 14) = 14$

10 -3 2 1 14 θ 1

8. a. $\sin\left(\sin^{-1}\frac{2}{3}\right) = \frac{2}{3}$ b. $\cos\left[\cos^{-1}\left(-\frac{1}{5}\right)\right] = -\frac{1}{5}$ c. $\tan\left[\tan^{-1}\left(\frac{-9}{1}\right)\right] = -9$

3 2 5 θ 1 1 -9

9. a. $\sin^{-1}\left(\sin\frac{\pi}{3}\right) = \frac{\pi}{3}$ b. $\cos^{-1}\left[\cos\left(\frac{5\pi}{6}\right)\right] = \frac{5\pi}{6}$ c. $\tan^{-1}\left[\tan\left(-\frac{\pi}{6}\right)\right] = -\frac{\pi}{6}$

10. a. $\arcsin\left[\sin\left(-\frac{\pi}{2}\right)\right]$ $\arcsin(-1) = -\frac{\pi}{2}$ b. $\arccos(\cos 0) = 0$ c. $\arctan\left(\tan\frac{\pi}{4}\right) = \frac{\pi}{4}$

(9,1)

11. a. $\arcsin\left(\sin\frac{5\pi}{4}\right) = -\frac{\pi}{4}$ b. $\arccos\left(\cos\frac{5\pi}{4}\right) = \frac{3\pi}{4}$ c. $\arctan\left(\tan\frac{7\pi}{4}\right) = -\frac{\pi}{4}$

12. a. $\sin^{-1}\left(\sin\frac{2\pi}{3}\right) = \frac{\pi}{3}$ b. $\cos^{-1}\left(\cos\frac{4\pi}{3}\right) = \frac{2\pi}{3}$ c. $\tan^{-1}\left(\tan\frac{7\pi}{6}\right) = \frac{\pi}{6}$

$\pi/2$ $-\pi/2$

13. a. $\sin\left[\cos^{-1}\left(-\frac{1}{2}\right)\right] = \frac{\sqrt{3}}{2}$ b. $\cos\left(\tan^{-1}1\right) =$ $\cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$ c. $\tan\left[\sin^{-1}(-1)\right]$ = undefined

(0, −1)

14. a. $\sin\left[\tan^{-1}\sqrt{3}\right]$ $\frac{\sqrt{3}}{2}$ b. $\cos\left[\sin^{-1}1\right]$ $\cos\left(\frac{\pi}{2}\right) = 0$ c. $\tan\left(\cos^{-1}0\right)$ = undefined

(0, 1)

15. a. $\cot\left(\sin^{-1}\frac{O}{H}\frac{2}{3}\right) = \frac{\sqrt{5}}{2}$ b. $\sec\left[\tan^{-1}\left(\frac{O}{A}\frac{3}{5}\right)\right] = \frac{\sqrt{34}}{5}$ c. $\csc\left[\cos^{-1}\left(\frac{A}{H}\frac{1}{4}\right)\right] = \frac{4}{\sqrt{15}}$ or $\frac{4\sqrt{15}}{15}$

$2^2 + b^2 = 3^2$
$b^2 = 5$
$b = \sqrt{5}$

$(-1)^2 + b^2 = 4^2$
$b^2 = 15$

16. a. $\cot\left[\sin^{-1}\left(-\frac{2}{5}\right)\right] = \frac{-\sqrt{21}}{2}$ b. $\sec\left[\tan^{-1}\left(\frac{70}{40}\right)\right] = \frac{\sqrt{65}}{4}$ c. $\csc\left[\cos^{-1}\left(\frac{A}{H}\frac{1}{5}\right)\right] = \frac{5}{2\sqrt{6}}$ or $\frac{5\sqrt{6}}{12}$

$(-2)^2 + b^2 = 5^2$
$4 + b^2 = 25$
$b^2 = 21$
$b = \sqrt{21}$

$1^2 + b^2 = 5^2$
$b^2 = 24$
$b = 2\sqrt{6}$

$\csc\theta = \frac{H}{A}$