Precalculus Name: _____

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. $\arcsin\frac{\sqrt{3}}{2}$ $\frac{\pi}{3}$ b. $\arccos\frac{\sqrt{2}}{2}$ $\frac{\pi}{4}$ c. $\arctan\frac{1}{\sqrt{3}}$ $\rightarrow \frac{\sqrt{3}}{3}$ $\frac{\pi}{6}$

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

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

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

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

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. $\tan\left[\tan^{-1}(-9)\right]$ -9

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

$\frac{\pi}{3}$ $\frac{5\pi}{6}$ $-\frac{\pi}{6}$

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

$\arcsin(-1) = -\frac{\pi}{2}$ $\arccos(1) = 0$ $\arctan(1) = \frac{\pi}{4}$

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

$-\frac{\pi}{4}$ $\frac{3\pi}{4}$ $-\frac{\pi}{4}$

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

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

13. a. $\sin\left[\cos^{-1}\left(-\frac{1}{2}\right)\right]$ b. $\cos(\tan^{-1} 1)$ c. $\tan[\sin^{-1}(-1)]$

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

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

$\frac{\sqrt{3}}{2}$ 0 undefined

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

$\frac{\sqrt{5}}{2}$ $\frac{\sqrt{34}}{5}$ $\frac{4\sqrt{15}}{15}$

16. a. $\cot\left[\sin^{-1}\left(-\frac{2}{5}\right)\right]$ b. $\sec\left[\tan^{-1}\left(\frac{7}{4}\right)\right]$ c. $\csc\left[\cos^{-1}\left(\frac{1}{5}\right)\right]$

$-\frac{\sqrt{21}}{2}$ $\frac{\sqrt{65}}{4}$ $\frac{5}{2\sqrt{6}}$