

Use the Unit Circle to find the EXACT value of each. Rationalize denominators as necessary.

1. $\sin 330^\circ = -\frac{1}{2}$

$$\sin 330^\circ = y\text{-coord at } 330^\circ \\ = -\frac{1}{2}$$

2. $\cos \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$

$$\cos \frac{5\pi}{4} = x\text{-coord at } \frac{5\pi}{4} \\ = -\frac{\sqrt{2}}{2}$$

3. $\cos(-210^\circ) = -\frac{\sqrt{3}}{2}$
coterminal between 0° & 360°
 $-210^\circ + 360^\circ = 150^\circ$

$$\cos(-210^\circ) = \cos 150^\circ \\ = x\text{-coord at } 150^\circ \\ = -\frac{\sqrt{3}}{2}$$

4. $\sin 810^\circ = 1$

coterminal between 0° & 360°
 $810^\circ - 720^\circ = 90^\circ$

$$\sin 810^\circ = \sin 90^\circ = y\text{-coord at } 90^\circ \\ = 1$$

5. $\cos \frac{8\pi}{3} = -\frac{1}{2}$

coterminal between 0 & 2π

$$\frac{8\pi}{3} - 2\pi = \frac{8\pi}{3} - \frac{6\pi}{3} = \frac{2\pi}{3}$$

$$\cos \frac{8\pi}{3} = \cos \frac{2\pi}{3} = x\text{-coord at } \frac{2\pi}{3} \\ = -\frac{1}{2}$$

6. $\tan 240^\circ = \sqrt{3}$

$$\tan 240^\circ = \frac{y}{x} \text{ at } 240^\circ \\ = \frac{-\sqrt{3}/2}{-1/2} = \frac{-\sqrt{3}}{2} \cdot \frac{2}{-1} \\ = \sqrt{3}$$

7. $\tan 225^\circ = 1$

$$\tan 225^\circ = \frac{y}{x} \text{ at } 225^\circ$$

$$= \frac{-\sqrt{2}/2}{-\sqrt{2}/2} = 1$$

8. $\tan \frac{7\pi}{2} = \text{undefined}$

coterminal between 0 & 2π

$$\frac{7\pi}{2} - 2\pi = \frac{7\pi}{2} - \frac{4\pi}{2} = \frac{3\pi}{2}$$

$$\tan \frac{7\pi}{2} = \tan \frac{3\pi}{2} = \frac{y}{x} \text{ at } \frac{3\pi}{2} \\ = -\frac{1}{0} \\ = \text{undefined}$$