

WS - THE UNIT CIRCLE

$$\#1 \sin 30^\circ = \boxed{1/2}$$

$$\#2 \cos 240^\circ = \boxed{-1/2}$$

$$\#3 \tan 135^\circ = \frac{\sin 135^\circ}{\cos 135^\circ} = \frac{\sqrt{2}/2}{-\sqrt{2}/2} = \boxed{-1}$$

$$\#4 \sin 120^\circ = \boxed{\sqrt{3}/2}$$

$$\#5 \cos 60^\circ = \boxed{1/2}$$

$$\#6 \tan 90^\circ = \frac{\sin 90^\circ}{\cos 90^\circ} = \frac{1}{0} \Rightarrow \boxed{\text{UNDEFINED}}$$

$$\#7 \sin 180^\circ = \boxed{0}$$

$$\#8 \cos 210^\circ = \boxed{-\sqrt{3}/2}$$

$$\#9 \tan 225^\circ = \frac{\sin 225^\circ}{\cos 225^\circ} = \frac{-\sqrt{2}/2}{-\sqrt{2}/2} = \boxed{1}$$

$$\#10 \sin 330^\circ = \boxed{-1/2}$$

$$\#11 \sin 390^\circ = \sin 30^\circ = \boxed{1/2}$$

$$\#12 \sec 405^\circ = \sec 45^\circ = \frac{1}{\cos 45^\circ} = \frac{1}{\sqrt{2}/2} = \frac{2}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \boxed{\sqrt{2}}$$

$$\#13 \cos 270^\circ = \boxed{0}$$

$$\#14 \tan 240^\circ = \frac{\sin 240^\circ}{\cos 240^\circ} = \frac{-\sqrt{3}/2}{-1/2} = \boxed{\sqrt{3}}$$

$$\#15 \cot 45^\circ = \frac{\cos 45^\circ}{\sin 45^\circ} = \frac{\sqrt{2}/2}{\sqrt{2}/2} = \boxed{1}$$

$$\#16 \sec 315^\circ = \frac{1}{\cos 315^\circ} = \frac{1}{\sqrt{2}/2} = \frac{2}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \boxed{\sqrt{2}}$$

$$\#17 \csc 0^\circ = \frac{1}{\sin 0^\circ} = \frac{1}{0} \Rightarrow \boxed{\text{UNDEFINED}}$$

$$\#18 \sin(-45^\circ) = \boxed{-\sqrt{2}/2}$$

$$\#19 \cos(-120^\circ) = \boxed{-1/2}$$

$$\#20 \tan(-30^\circ) = \frac{\sin(-30^\circ)}{\cos(-30^\circ)} = \frac{-1/2}{\sqrt{3}/2} = -\frac{1}{\sqrt{3}} = \boxed{-\frac{\sqrt{3}}{3}}$$

$$\#21 \cot 60^\circ = \frac{\cos 60}{\sin 60} = \frac{1/2}{\sqrt{3}/2} = \frac{1}{\sqrt{3}} = \boxed{\sqrt{3}/3}$$

$$\#22 \sec 45^\circ = \frac{1}{\cos 45} = \frac{1}{\sqrt{2}/2} = \frac{2}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \boxed{\sqrt{2}}$$

$$\#23 \cos 450^\circ = \cos 90^\circ = \boxed{0}$$

$$\#24 \csc 540^\circ = \csc 180^\circ = \frac{1}{\sin 180} = \frac{1}{0} \Rightarrow \boxed{\text{UNDEFINED}}$$

$$\#25 \csc 30^\circ = \frac{1}{\sin 30} = \frac{1}{1/2} = \boxed{2}$$

$$\#26 \cot 210^\circ = \frac{\cos 210}{\sin 210} = \frac{-\sqrt{3}/2}{-1/2} = \boxed{\sqrt{3}}$$

$$\#27 \sec 135^\circ = \frac{1}{\cos 135} = \frac{1}{-\sqrt{2}/2} = -\frac{2}{\sqrt{2}} = \frac{-2\sqrt{2}}{2} = \boxed{-\sqrt{2}}$$

$$\#28 \csc 300^\circ = \frac{1}{\sin 300} = \frac{1}{-\sqrt{3}/2} = -\frac{2}{\sqrt{3}} = \boxed{-\frac{2\sqrt{3}}{3}}$$

$$\#29 \sin(-300^\circ) = \boxed{\sqrt{3}/2} \quad \#30 \cos(-150^\circ) = \boxed{-\sqrt{3}/2}$$

$$\#31 \tan(-135^\circ) = \frac{\sin(-135)}{\cos(-135)} = \frac{-\sqrt{2}/2}{-\sqrt{2}/2} = \boxed{1}$$

$$\#32 \cot(-60^\circ) = \frac{\cos(-60)}{\sin(-60)} = \frac{1/2}{-\sqrt{3}/2} = -\frac{1}{\sqrt{3}} = \boxed{-\frac{\sqrt{3}}{3}}$$

$$\#33 \sec(-90^\circ) = \frac{1}{\cos(-90)} = \frac{1}{0} \Rightarrow \boxed{\text{UNDEFINED}}$$

$$\#34 \csc(-240^\circ) = \frac{1}{\sin(-240)} = \frac{1}{\sqrt{3}/2} = \frac{2}{\sqrt{3}} = \boxed{\frac{2\sqrt{3}}{3}}$$

$$\#35 \tan 420^\circ = \tan 60^\circ = \frac{\sin 60}{\cos 60} = \frac{\sqrt{3}/2}{1/2} = \boxed{\sqrt{3}}$$

$$\#36 \cot 480^\circ = \cot 120^\circ = \frac{\cos 120}{\sin 120} = \frac{-1/2}{\sqrt{3}/2} = -\frac{1}{\sqrt{3}} = \boxed{-\frac{\sqrt{3}}{3}}$$

$$\#37 \quad \sin \pi/3 = \sqrt{3}/2$$

$$\#38 \quad \cos \pi/2 = 0$$

$$\#39 \quad \tan \pi/4 = \frac{\sin \pi/4}{\cos \pi/4} = \frac{\sqrt{2}/2}{\sqrt{2}/2} = 1$$

$$\#40 \quad \cot \frac{3\pi}{4} = \frac{\cos 3\pi/4}{\sin 3\pi/4} = \frac{-\sqrt{2}/2}{\sqrt{2}/2} = -1$$

$$\#41 \quad \sec \frac{2\pi}{3} = \frac{1}{\cos \frac{2\pi}{3}} = \frac{1}{-1/2} = -2$$

$$\#42 \quad \csc \frac{5\pi}{6} = \frac{1}{\sin \frac{5\pi}{6}} = \frac{1}{1/2} = 2$$

$$\#43 \quad \sin\left(-\frac{5\pi}{6}\right) = -1/2$$

$$\#44 \quad \csc\left(-\frac{3\pi}{4}\right) = \frac{1}{\sin\left(-\frac{3\pi}{4}\right)} = \frac{1}{-\frac{\sqrt{2}}{2}} = -\frac{2}{\sqrt{2}} = -\frac{2\sqrt{2}}{2} = -\sqrt{2}$$

$$\#45 \quad \sin \frac{13\pi}{6} = \sin \frac{\pi}{6} = 1/2$$

$$\#46 \quad \csc \frac{7\pi}{3} = \csc \frac{\pi}{3} = \frac{1}{\sin \pi/3} = \frac{1}{\sqrt{3}/2} = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

$$\#47 \quad \sin \pi = 0$$

$$\#48 \quad \cos \frac{7\pi}{6} = -\sqrt{3}/2$$

$$\#49 \quad \tan \frac{4\pi}{3} = \frac{\sin 4\pi/3}{\cos 4\pi/3} = \frac{-\sqrt{3}/2}{-1/2} = \sqrt{3}$$

$$\#50 \quad \cot \frac{3\pi}{2} = \frac{\cos 3\pi/2}{\sin 3\pi/2} = \frac{0}{-1} = 0$$

$$\#51 \quad \sec \frac{5\pi}{4} = \frac{1}{\cos \frac{5\pi}{4}} = \frac{1}{-\sqrt{2}/2} = -\frac{2}{\sqrt{2}} = -\frac{2\sqrt{2}}{2} = -\sqrt{2}$$

$$\#52 \quad \csc \frac{5\pi}{3} = \frac{1}{\sin \frac{5\pi}{3}} = \frac{1}{-\sqrt{3}/2} = -\frac{2}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$$

$$\#53 \quad \cos\left(-\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

$$\#54 \quad \sec\left(-\frac{\pi}{2}\right) = \frac{1}{\cos\left(-\frac{\pi}{2}\right)} = \frac{1}{0}$$

UNDEFINED

$$\#55 \quad \cos\frac{9\pi}{4} = \cos\frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\#56 \quad \sec\frac{5\pi}{2} = \sec\frac{\pi}{2} = \frac{1}{\cos\frac{\pi}{2}} = \frac{1}{0}$$

UNDEFINED

$$\#57 \quad \sin\frac{11\pi}{6} = -\frac{1}{2}$$

$$\#58 \quad \cos\frac{7\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\#59 \quad \tan 2\pi = \frac{\sin 2\pi}{\cos 2\pi} = \frac{0}{1} = 0$$

$$\#60 \quad \cot\left(-\frac{\pi}{6}\right) = \frac{\cos\left(-\frac{\pi}{6}\right)}{\sin\left(-\frac{\pi}{6}\right)} = \frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = -\sqrt{3}$$

$$\#61 \quad \sec\left(-\frac{3\pi}{4}\right) = \frac{1}{\cos\left(-\frac{3\pi}{4}\right)} = \frac{1}{-\frac{\sqrt{2}}{2}} = -\frac{2}{\sqrt{2}} = -\frac{2\sqrt{2}}{2} = -\sqrt{2}$$

$$\#62 \quad \csc\left(-\frac{\pi}{3}\right) = \frac{1}{\sin\left(-\frac{\pi}{3}\right)} = \frac{1}{-\frac{\sqrt{3}}{2}} = -\frac{2}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$$

$$\#63 \quad \tan\left(-\frac{2\pi}{3}\right) = \frac{\sin\left(-\frac{2\pi}{3}\right)}{\cos\left(-\frac{2\pi}{3}\right)} = \frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \sqrt{3}$$

$$\#64 \quad \cot(-\pi) = \frac{\cos(-\pi)}{\sin(-\pi)} = \frac{-1}{0} \Rightarrow \text{UNDEFINED}$$

$$\#65 \quad \tan 3\pi = \tan \pi = \frac{\sin \pi}{\cos \pi} = \frac{0}{-1} = 0$$

$$\#66 \quad \cot 4\pi = \cot 2\pi = \frac{\cos 2\pi}{\sin 2\pi} = \frac{1}{0} \Rightarrow \text{UNDEFINED}$$