Unit Circle (Solution)

Complete the following exercises without using a calculator.

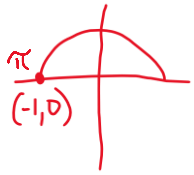
1. Determine the exact value for each of the following expressions. If a value is undefined, then write DNE.

a) $\sin 225° =$ $-\frac{\sqrt{2}}{2}$

b) $\cos\left(-\frac{7\pi}{6}\right) =$ $-\frac{\sqrt{3}}{2}$

c) $\tan\frac{5\pi}{3} =$ $-\sqrt{3}$

d) $\cos\pi =$ -1



e) $\sin\left(\frac{15\pi}{6}\right) =$ 1

$\frac{15\pi}{6} - \frac{12\pi}{6} = \frac{3\pi}{6} = \frac{\pi}{2}$

f) $\tan\left(-\frac{3\pi}{2}\right) = \frac{1}{0}$ DNE

g) $\sec(300°) =$ 2

$\cos(60°) = \frac{1}{2}$

h) $\csc\left(\frac{2\pi}{3}\right) =$ $\frac{2}{\sqrt{3}}$

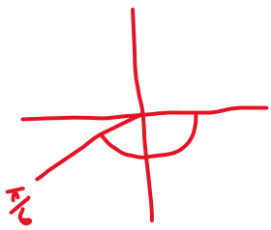
$\sin\left(\frac{\pi}{3}\right) = \frac{\sqrt{3}}{2}$

i) $\cos 600° =$ $-\frac{1}{2}$

$600 - 360 = 240$

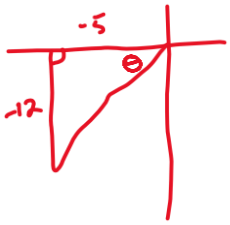
j) $\cot\left(-\frac{5\pi}{6}\right) =$ $\sqrt{3}$

$\tan\left(\frac{\pi}{6}\right) = \frac{1}{\sqrt{3}}$



2. If $\tan\theta = \frac{12}{5}$ and $\sin\theta < 0$, determine the values of $\cos\theta$ and $\csc\theta$.

Q1 or Q3 — Q3 or Q4



$5^2 + 12^2 = c^2$

$25 + 144 = c^2$

$169 = c^2$

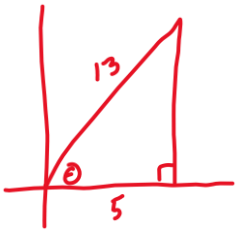
$13 = c$

$\cos\theta = -\frac{5}{13}$

$\csc\theta = -\frac{13}{12}$

3. Given that $\sec\theta = \frac{13}{5}$ and $\cot\theta > 0$, find $\tan\theta$ and $\sin\theta$.

Q1 & Q4 — Q1 & Q3



$5^2 + y^2 = 13^2$

$25 + y^2 = 169$

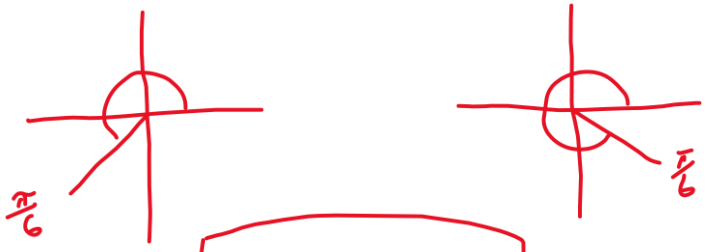
$y^2 = 144$

$y = 12$

$\tan\theta = \frac{12}{5}$

$\sin\theta = \frac{12}{13}$

4. Find any angles between 0 and 2π that satisfy the equation $\sin\theta = -\frac{1}{2}$. Q3 & Q4



$\theta = \frac{7\pi}{6}$ or $\frac{11\pi}{6}$