

Example: Determine the exact values of the coordinates of the following points.

a) $P\left(\frac{26\pi}{3}\right) = P\left(\overbrace{8\pi}^{4 \text{ turns}} + \frac{2\pi}{3}\right)$

$\frac{26\pi}{3} =$ coterminal with $\frac{2\pi}{3}$

$\therefore P\left(\frac{26\pi}{3}\right) = \left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

b) $P\left(\frac{47\pi}{6}\right) = P\left(7\pi + \frac{5\pi}{6}\right)$

coterminal with $\frac{11\pi}{6}$

$\therefore P\left(\frac{47\pi}{6}\right) = \left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

c) $P\left(-\frac{43\pi}{4}\right) = P\left(10\pi + -\frac{3\pi}{4}\right)$

coterminal with $\frac{5\pi}{4}$

$\therefore P\left(-\frac{43\pi}{4}\right) = \left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

Example: Determine the values of the coordinates of the following points.

$$P\left(\frac{2\pi}{5}\right) = \left(\cos \frac{2\pi}{5}, \sin \frac{2\pi}{5}\right) = (0.3090, 0.9511)$$

not a special angle

calculator in RADIAN mode

$$P\left(\frac{7\pi}{9}\right) = \left(\cos \frac{7\pi}{9}, \sin \frac{7\pi}{9}\right) = (-0.7660, 0.6428)$$

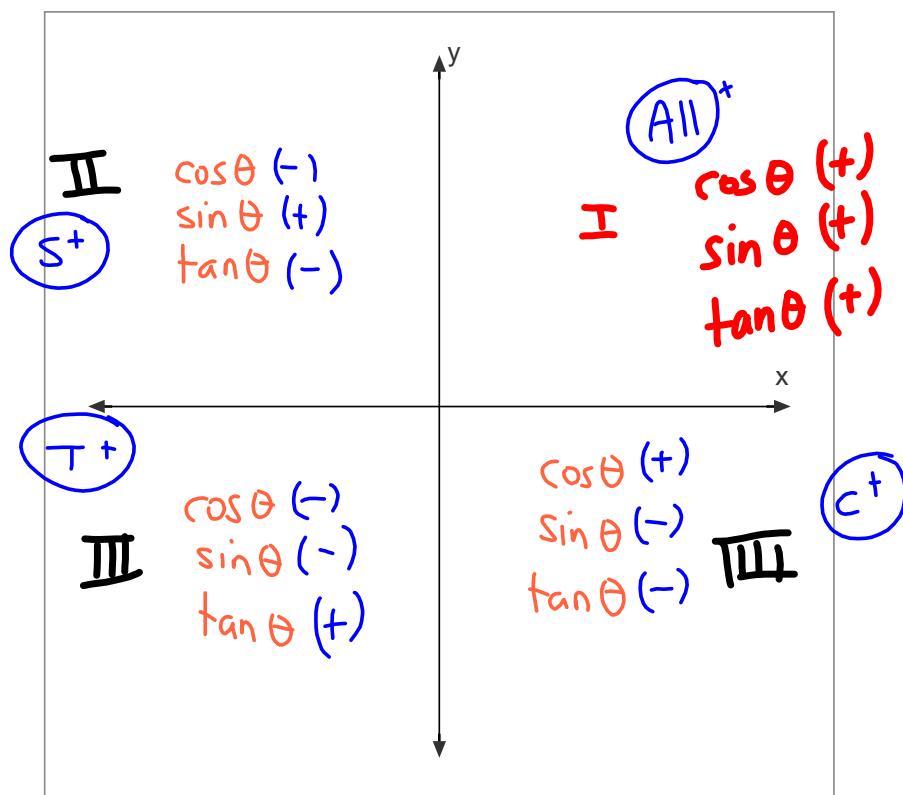
Determine the exact value of...

$$\begin{aligned}
 \tan\left(\frac{15\pi}{4}\right) &= \tan\left(3\pi + \frac{3}{4}\pi\right) \\
 &= \tan\left(\frac{7\pi}{4}\right) \\
 &= \frac{\sin\frac{7\pi}{4}}{\cos\frac{7\pi}{4}} \\
 &= \frac{-\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} \\
 &= -1
 \end{aligned}$$



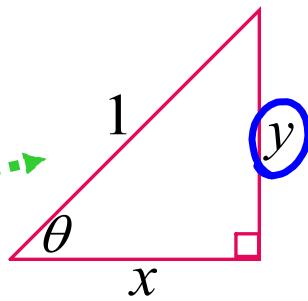
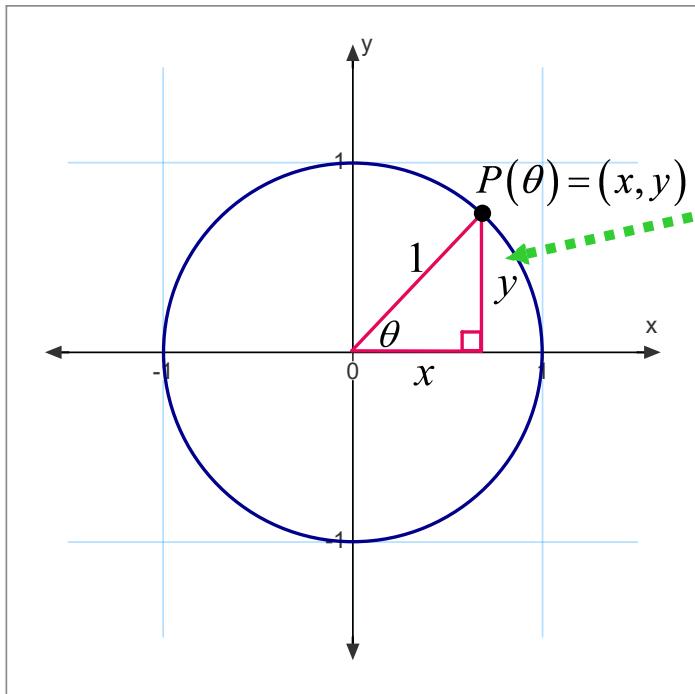
$$\begin{aligned}
 \csc\left(\frac{31\pi}{6}\right) &= \csc\left(5\pi + \frac{\pi}{6}\right) \\
 &= \csc\left(\frac{7\pi}{6}\right) \\
 &= \frac{1}{\sin\frac{7\pi}{6}} \\
 &= \frac{1}{-\frac{1}{2}} = -2
 \end{aligned}$$

Determine the sign of $\sin \theta$, $\cos \theta$ and $\tan \theta$ in each of the four quadrants.



Determine the missing value (exact) of a trigonometric point in quadrant 2, if $P(\theta) = \left(x, \frac{5}{13}\right)$.

x is negative



$$x^2 + y^2 = 1$$

or

$$\cos^2 \theta + \sin^2 \theta = 1$$

Determine the missing value (exact) of a trigonometric point in quadrant 2, if $P(\theta) = \left(x, \frac{5}{13}\right)$.



x is negative

$$x^2 + y^2 = 1$$

$$x^2 + \left(\frac{5}{13}\right)^2 = 1$$

$$x^2 + \frac{25}{169} = 1$$

$$x^2 = 1 - \frac{25}{169}$$

$$x^2 = \frac{169}{169} - \frac{25}{169}$$

$$x^2 = \frac{144}{169}$$

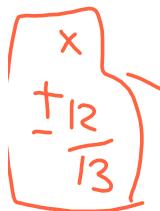
$$x = \pm \frac{12}{13}$$

$$\therefore x = -\frac{12}{13}$$



If $\sin \theta = \frac{5}{13}$, where $\frac{\pi}{2} \leq \theta \leq \pi$ (Q2), find the exact values of the other 5 ratios.

$$\sin \theta = \frac{5}{13}$$



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

$$\tan \theta = \frac{\sin \theta}{\cos \theta} = -\frac{5}{12}$$

$$\csc \theta = \frac{13}{5}$$

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

$$\cot \theta = -\frac{12}{5}$$