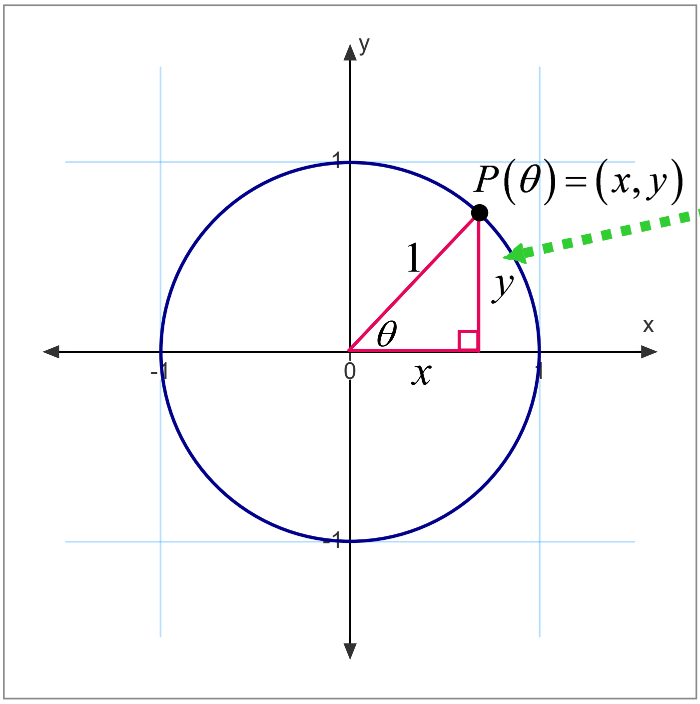
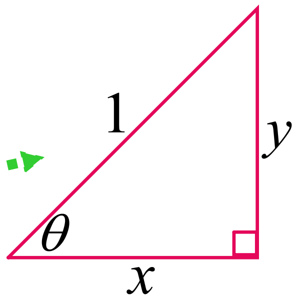


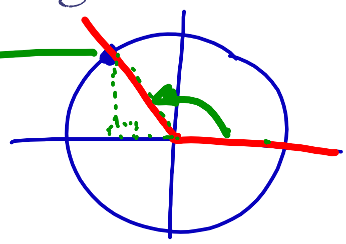


$$\boxed{x^2+y^2=1}$$

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

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

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

$$1 - \frac{25}{169}$$

$$\frac{169}{169} - \frac{25}{169}$$

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

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

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

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

$\theta \in [\pi/2, \pi] \Rightarrow Q2$

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

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

see last example

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

$\tan\theta = \dfrac{\frac{5}{13}}{\frac{-12}{13}} = \frac{5}{\cancel{13}} \cdot -\frac{\cancel{13}}{12} = -\frac{5}{12}$

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

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

If $\cos\theta = \frac{4}{5}$, where $\frac{3\pi}{2} \le \theta \le 2\pi$, find the exact values of the other 5 ratios.

Q_4

$$\cos^2\theta + \sin^2\theta = 1$$
$$\left(\frac{4}{5}\right)^2 + \sin^2\theta = 1$$
$$\frac{16}{25} + \sin^2\theta = 1$$
$$\sin^2\theta = \frac{25}{25} - \frac{16}{25} = \frac{9}{25}$$
$$\sin\theta = \pm \frac{3}{5}$$
$$\therefore \sin\theta = -\frac{3}{5}$$

$$\sec\theta = \frac{5}{4}$$
$$\csc\theta = -\frac{5}{3}$$
$$\tan\theta = \frac{-\frac{3}{5}}{\frac{4}{5}}$$
$$\Rightarrow -\frac{3}{\cancel{5}} \cdot \frac{\cancel{5}}{4}$$
$$\tan\theta = -\frac{3}{4}$$
$$\cot\theta = -\frac{4}{3}$$

If $\tan\theta = -\frac{8}{15}$, where $\frac{\pi}{2} \le \theta \le \pi$, find the exact values of the other 5 ratios.

$\rightarrow$ Q2 — $\cos\theta$ (−), $\sin\theta$ (+)

$\tan\theta = \frac{\sin\theta}{\cos\theta}$

$\sin\theta = \frac{8}{n}$ $\cos\theta = \frac{-15}{n}$

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

$\left(\frac{8}{n}\right)^2 + \left(\frac{-15}{n}\right)^2 = 1$

$\frac{64}{n^2} + \frac{225}{n^2} = 1$

$\frac{289}{n^2} = 1 \Rightarrow n^2 = 289$

$n = 17$

$\sin\theta = \frac{8}{17}$ $\cos\theta = -\frac{15}{17}$

$\csc\theta = \frac{17}{8}$ $\sec\theta = -\frac{17}{15}$

$\cot\theta = -\frac{15}{8}$