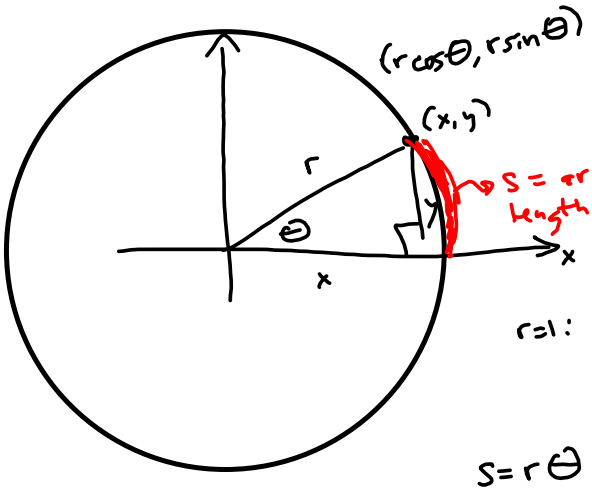


$\sin\theta = \frac{y}{r}$ $\quad \csc\theta = \frac{r}{y}$

$\cos\theta = \frac{x}{r}$ $\quad \sec\theta = \frac{r}{x}$

$\tan\theta = \frac{y}{x}$ $\quad \cot\theta = \frac{x}{y}$

$r=1$: unit circle:

$(x,y) = (\cos\theta, \sin\theta)$

$s = r\theta$, where θ is in radians.

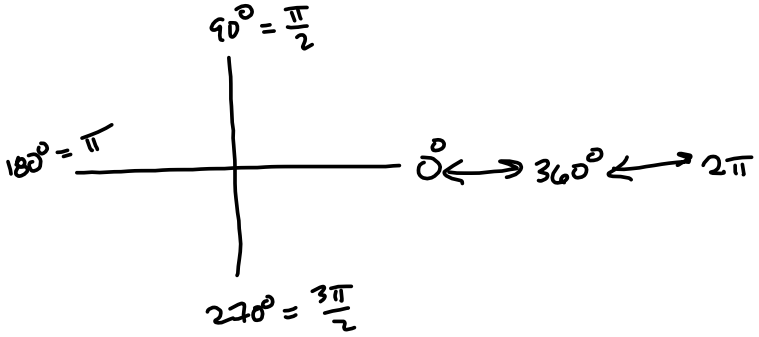
Full circle:

$360^\circ = 2\pi$ radians

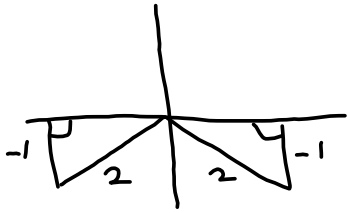
Circumference $= 2\pi r = r \cdot 2\pi =$ Radius · Angle

Definition of θ in radians:

$$\theta = \frac{s}{r}$$

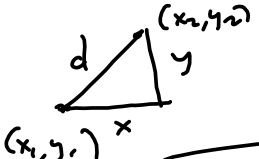


$\sin\theta = -\frac{1}{2}$



Pythagorous - $r^2 = x^2 + y^2$

= Distance formula in the plane

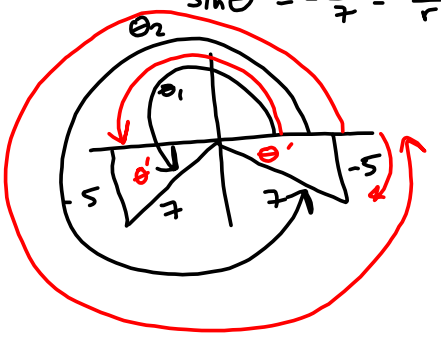


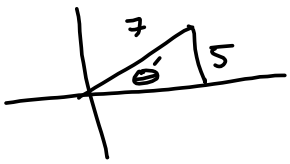
d = distance
= radius

$r = d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

Find the 6 trig

$\sin\theta = -\frac{5}{7} = \frac{y}{r}$, $r > 0$ always.





$\theta' = \arcsin\left(\frac{5}{7}\right)$

$\theta_1 = 180^\circ + \theta'$

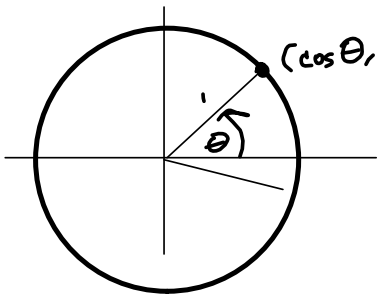
$= \pi + \arcsin\left(\frac{5}{7}\right)$ is exact

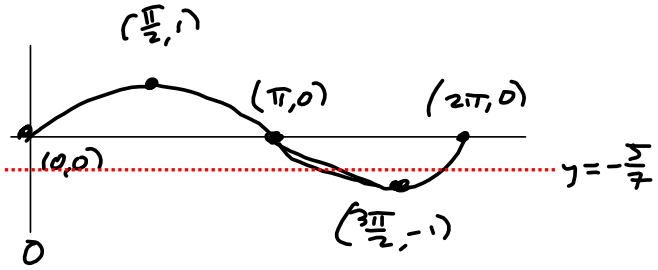
$\theta_2 = 360^\circ - \theta'$

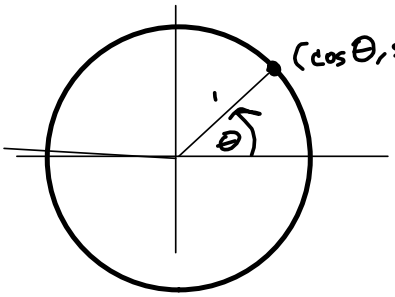
Positive $= 2\pi - \arcsin\left(\frac{5}{7}\right)$

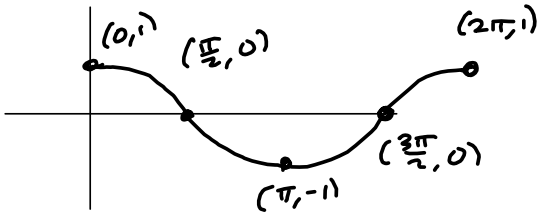
Negative $= -\arcsin\left(\frac{5}{7}\right)$

Graph of $\sin\theta$



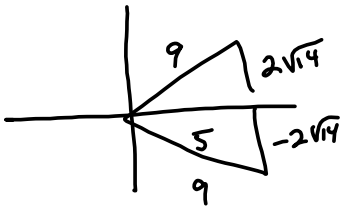






$\tan\theta = -\frac{5}{7}$

Solve $\sec\theta = \frac{9}{5} \Rightarrow \cos\theta = \frac{5}{9}$ $\quad x^2+y^2=r^2$



$y^2 = 9^2-5^2 = 81-25 = 56 = r^2-x^2$

$y = \pm\sqrt{56}$

Exact: $\arccos\left(\frac{5}{9}\right)$, $-\arccos\left(\frac{5}{9}\right)$

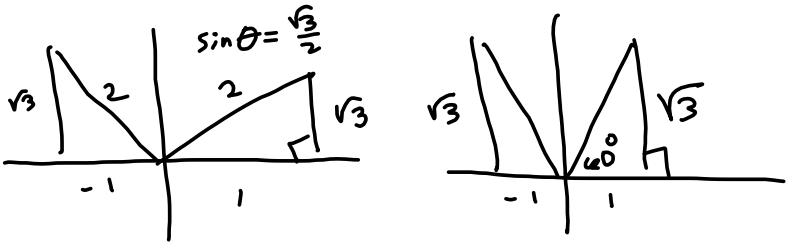
If you want angles $0°$ & $360°$, i.e., between 0 & 2π, then

$\theta = 2\pi - \arccos\left(\frac{5}{9}\right)$ in radians mode

$= 360° - \arccos\left(\frac{5}{9}\right)$ in Degrees mode

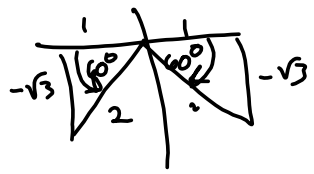
$\sin^2\theta = \frac{3}{4} \Rightarrow$

$\sin\theta = \pm\sqrt{\frac{3}{4}} = \pm\frac{\sqrt{3}}{2}$



$\theta = 60^\circ = \frac{\pi}{3}$

$\sin\theta = -\frac{\sqrt{3}}{2}$



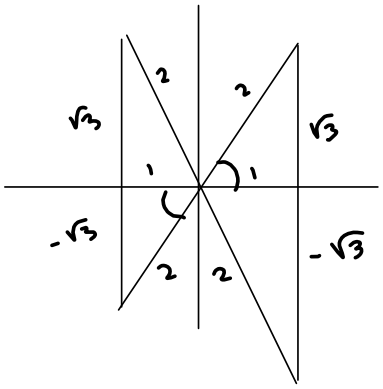
$\pi + \frac{\pi}{3} = \frac{4\pi}{3}$

$2\pi - \frac{\pi}{3} = \frac{5\pi}{3}$

$\theta \in (0, 2\pi) \Rightarrow$

$\theta \in \left\{\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}\right\}$

Find ALL REAL SOLUTIONS!



$\left\{\frac{\pi}{3} + 2n\pi, \frac{2\pi}{3} + 2n\pi, \frac{4\pi}{3} + 2n\pi, \frac{5n\pi}{3} + 2n\pi \;\middle|\; n \in \mathbb{Z}\right\}$

$\mathbb{N} = 1, 2, 3, 4, \ldots$ Natural #s

$\mathbb{Z} = -3, -2, -1, 0, 1, 2, 3, \ldots$ Integers

$\mathbb{Q} = \left\{\frac{a}{b} \;\middle|\; a, b \in \mathbb{Z},\ b \neq 0\right\}$ Rational #s

$\left\{\frac{\pi}{3} + n\pi, \frac{2\pi}{3} + n\pi \;\middle|\; n \in \mathbb{Z}\right\}$

Trig Stuff on harryzaims.com!!!