#s 15, 16 S1.1 #15

Coterminal angles, one positive

15 (a) $\frac{\pi}{6}$: $\frac{\pi}{6} + 2\pi = \frac{\pi + 12\pi}{6} = \frac{13\pi}{6}$

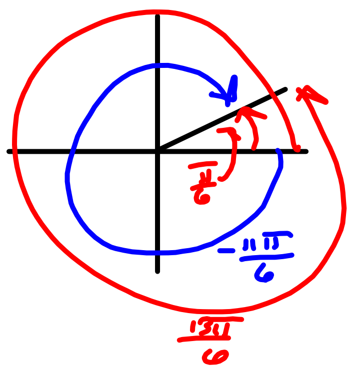
$\frac{\pi}{6} - 2\pi = \frac{\pi - 12\pi}{6} = \frac{-11\pi}{6}$

$\frac{\pi}{6} = 30^\circ$

$30^\circ + 360^\circ$, $30^\circ - 360^\circ$

(b) $-\frac{5\pi}{6}$

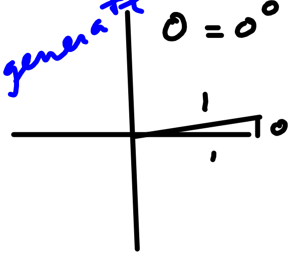
using $\frac{\pi}{180^\circ}$ & $\frac{180^\circ}{\pi}$



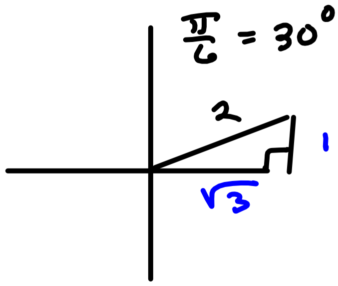
Recall Trigs for 1st Quadrant

Degenerate

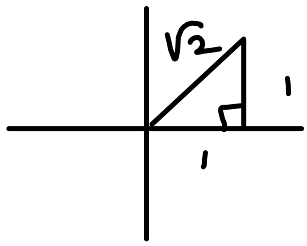
$0 = 0°$



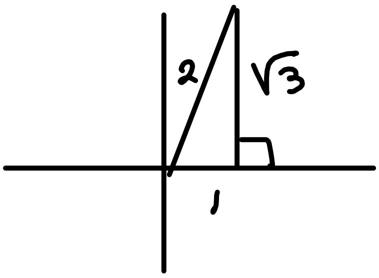
$\frac{\pi}{6} = 30°$



$\frac{\pi}{4} = 45°$

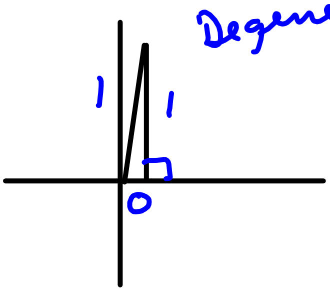


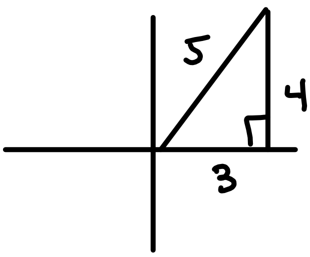
$\frac{\pi}{3} = 60°$



$\frac{\pi}{2} = 90°$

Degenerate.





Prove the sum of the radicals is not the radical of the sum.

$9 + 16 = 25$

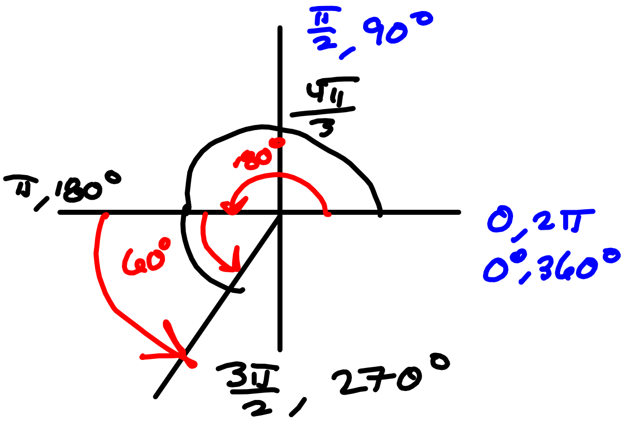
is how you prove

$\sqrt{a+b} \neq \sqrt{a} + \sqrt{b}$

$\sqrt{9+16} = \sqrt{25} = 5$

$\sqrt{9} + \sqrt{16} = 3 + 4 = 7$

We can do trig functions all around the circle:



$\sin \frac{4\pi}{3}$

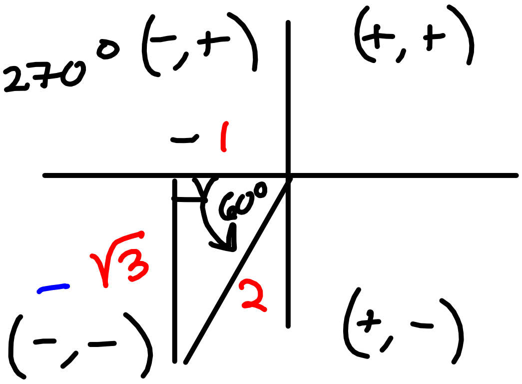
$$\frac{4\pi}{3} = \frac{3\pi}{3} + \frac{\pi}{3}$$
$$= \pi + \frac{\pi}{3}$$
$$= 180^\circ + 60^\circ$$

$$\frac{4\pi}{3} \cdot \frac{180^\circ}{\pi} = 4 \cdot 60 = 240^\circ$$

$180^\circ < 240^\circ < 270^\circ$

Q III

REFERENCE ANGLE: 60°



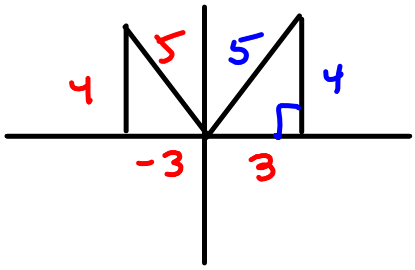
$\sin \frac{4\pi}{3} = -\frac{\sqrt{3}}{2}$ $\qquad$ $\csc \frac{4\pi}{3} = -\frac{2}{\sqrt{3}}$

$\cos \frac{4\pi}{3} = -\frac{1}{2}$ $\qquad$ $\sec \frac{4\pi}{3} = -2$

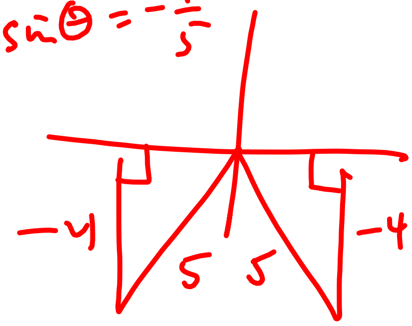
$\tan \frac{4\pi}{3} = \frac{-\sqrt{3}}{-1} = \sqrt{3}$ $\qquad$ $\cot \frac{4\pi}{3} = \frac{1}{\sqrt{3}}$

Draw the triangle(s) for

$\sin\theta = \frac{4}{5}$



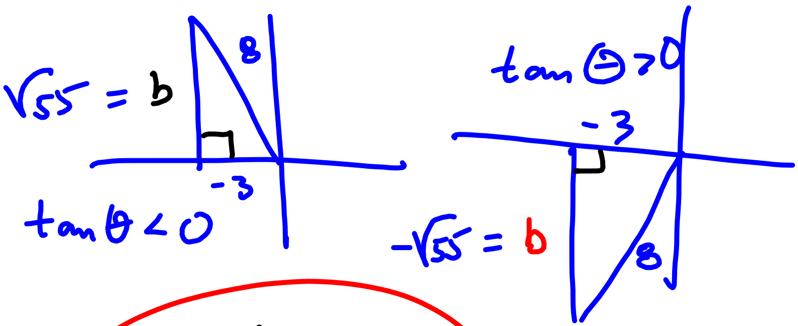
$\sin\theta = -\frac{4}{5}$

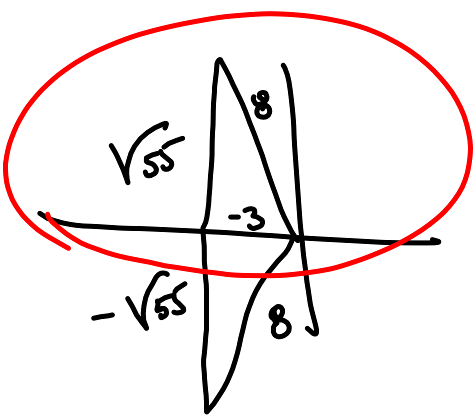


Find all 6 trigs, given $\cos\theta = -\frac{3}{8}$ and $\tan\theta < 0$.

Pythagorus sez:

$$b^2 = 8^2 - (-3)^2$$
$$= 64 - 9$$
$$= 55$$
$$\Longrightarrow b = \pm\sqrt{55}$$





$\rightarrow \tan\theta < 0$

$\sin\theta = \frac{8}{\sqrt{55}}$ $\quad \csc\theta = \frac{\sqrt{55}}{8}$

$\cos\theta = \frac{-3}{\sqrt{55}}$ $\quad \sec\theta = -\frac{\sqrt{55}}{3}$

$\tan\theta = \frac{\sqrt{55}}{-3}$ $\quad \cot\theta = -\frac{3}{\sqrt{55}}$

$\sqrt{x^2} =$

$\sqrt{16} = \pm 4$

"$\sqrt{}$" means Principle square root.

$\sqrt{3^2} = 3$

$\sqrt{(-3)^2} = 3 \neq -3$

It acts like $|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$

$b^2 = 55$

$\sqrt{b^2} = \sqrt{55}$

$|b| = \sqrt{55}$

$b = \sqrt{55}$ OR $-\sqrt{55}$

§ 1.4

#s 55-68 Find sine, cosine & tangent for the given angle.

67 $-\frac{17\pi}{6} =$

$6\overline{)17}$ 2 r 5

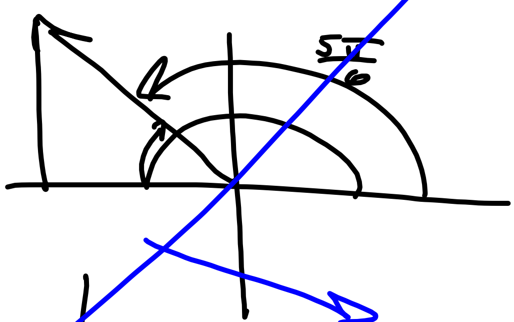
$17 = 6 \cdot 2 + 5$

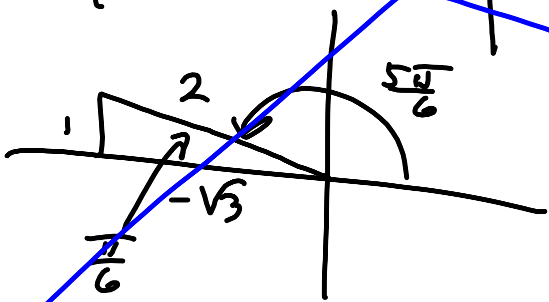
$\frac{17}{6} = \frac{6 \cdot 2}{6} + \frac{5}{6}$

$\frac{17}{6} \approx 2.833333\ldots$

$-2\pi - .8\overline{33}\,\pi$

$.8\overline{3}\,\pi = \frac{5\pi}{6}$

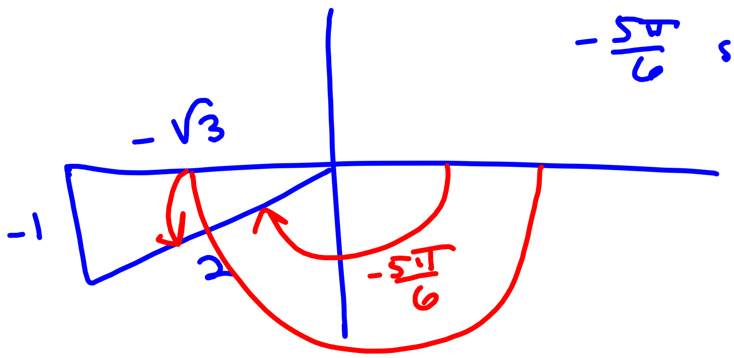




Went wrong direction $-\frac{17\pi}{6}$, NOT $+\frac{17\pi}{6}$, you idiot.

Go clockwise! Negative angle

$-\frac{5\pi}{6}$ situation



Note: I divide out all the multiples of π & used the remainder to draw the picture

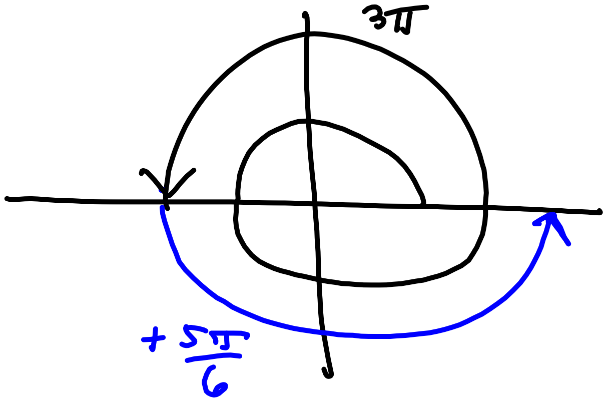
$$\frac{17\pi}{6} = 2.8\overline{3}\,\pi = \boxed{2\pi} + .8\overline{3}\,\pi$$

once around. picture

$$\frac{23\pi}{6} = \frac{18\pi}{6} + \boxed{\frac{5\pi}{6}}$$

picture

$3\pi = 2\pi + \pi$



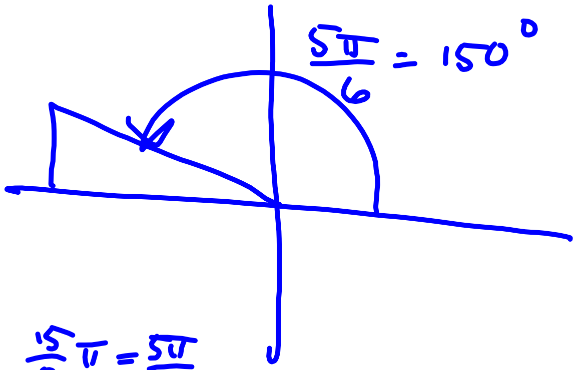
$$\frac{17\pi}{6} = \frac{17\pi}{6} \cdot \frac{180^\circ}{\pi} = 17 \cdot 30 = 510^\circ$$

$$\frac{510}{360} = 1.\ldots$$

$$1 \cdot 360 = 360$$

$$\begin{array}{r} 510 \\ -\ 360 \\ \hline 150^\circ \end{array}$$

$$150^\circ \cdot \frac{\pi}{180^\circ} = \frac{15}{18}\pi = \frac{5\pi}{6}$$



1700°

$$\frac{1700}{360} = 4.\sim$$

$$\begin{array}{r} {}^{2}360 \\ 4 \\ \hline 1440 \end{array}$$

$$1440 \rightarrow 1700 - 1440 = 260$$