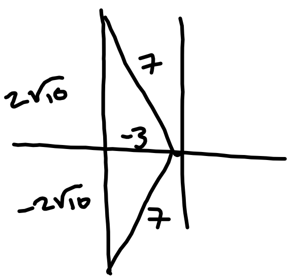
$\cos\theta = -\frac{3}{7}$

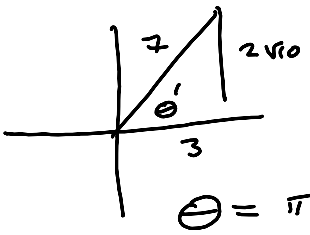
Draw 2 triangles describing this problem situation.



$7^2 - 3^2 = 40$

$\sqrt{40} = 2\sqrt{10}$

Find all solutions to the equation in $[0, 2\pi)$.



θ' = reference angle

$\theta' = \arccos\left(\frac{3}{7}\right)$

$\theta = \pi - \theta', \pi + \theta'$

Approximate your answers in degrees and radians, to 4 decimal places

$\pi - \arccos\left(\frac{3}{7}\right) \approx$ 2.01370737087 $\approx \boxed{2.0137 \approx \theta}$

$\pi + \arccos\left(\frac{3}{7}\right) \approx$ 4.26947793631 $\approx \boxed{4.2695 \approx \theta}$

Degrees Answers:

$(\theta)\left(\frac{180^\circ}{\pi}\right) \approx$ 115.376933525 $\approx \boxed{115.3769^\circ \approx \theta}$

$(\theta)\left(\frac{180^\circ}{\pi}\right) \approx$ 244.623066475 $\approx \boxed{244.6231^\circ \approx \theta}$

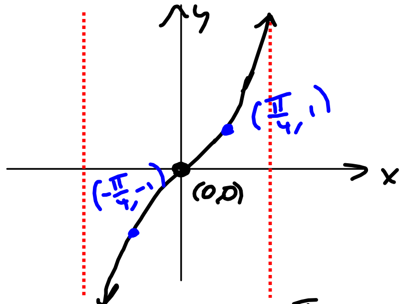
11. (5 pts) Sketch the graph of $y=10\tan\left(\frac{\pi}{6}x+\frac{11\pi}{3}\right)+3$

$$\frac{\pi}{6}\left(x+\frac{11\pi}{3}\cdot\frac{6}{\pi}\right)=\frac{\pi}{6}(x+22)$$

Period of tangent is π

$$\frac{\pi}{6}x=\pi \longrightarrow$$

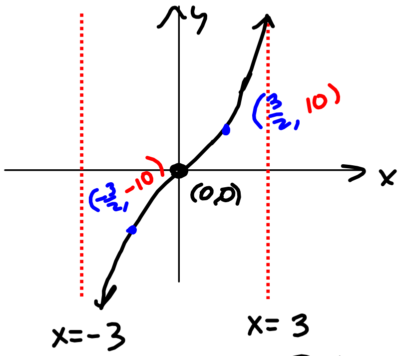
$$x=\pi\cdot\frac{6}{\pi}=6=\text{period}$$



$$y=10\tan\left(\frac{\pi}{6}(x+22)\right)+3$$

Left 22 up 3

Period = 6



$x=-3$ $x=3$

$(-\frac{\pi}{2})(\frac{6}{\pi})$ $(\frac{\pi}{2}\cdot\frac{6}{\pi})$

$$y=\tan\left(\frac{\pi}{6}x\right)$$

$$\boxed{y=10\tan\left(\frac{\pi}{6}x\right)}$$

if we're only tracking the "vertex" @ (0,0)

$$\boxed{x\longmapsto\frac{6}{\pi}x}$$

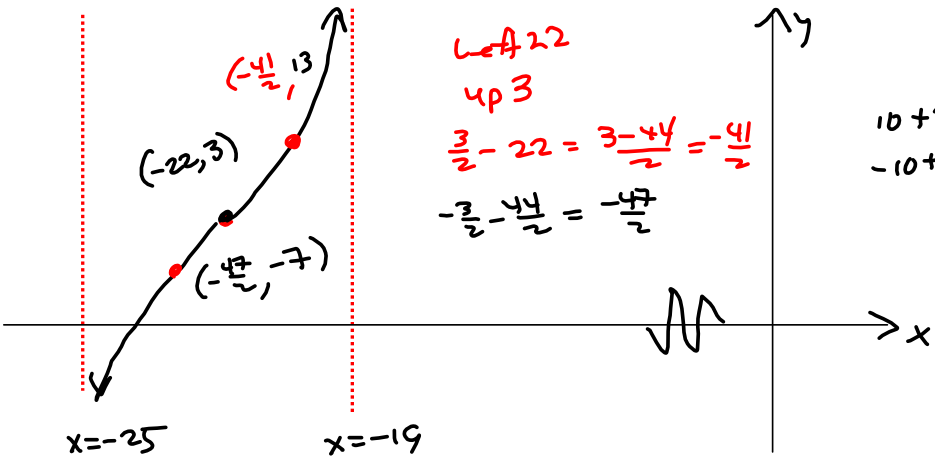
$$-\frac{\pi}{4}\cdot\frac{6}{\pi}=-\frac{3}{2}$$

For $10\tan\left(\frac{\pi}{6}x\right)$

That would mean

$$\boxed{y\longmapsto 10y}$$

$y = 10\tan\left(\frac{\pi}{6}(x+22)\right)+3$



left 22
up 3

$\frac{3}{2} - 22 = \frac{3-44}{2} = -\frac{41}{2}$

$-\frac{3}{2} - \frac{44}{2} = -\frac{47}{2}$

$10 + 3 = 13$

$-10 + 3 = -7$

Week 03 # 10b Convert to sine function

$$y = f(x) = 10\cos\left(\frac{2\pi}{365}(x-172)\right)+12$$

$$= 10\sin\left(\frac{\pi}{2} - \frac{2\pi}{365}(x-172)\right)+12$$

Using cofunction Identity.

A good follow-up to #8 on Week 3 Assignment:

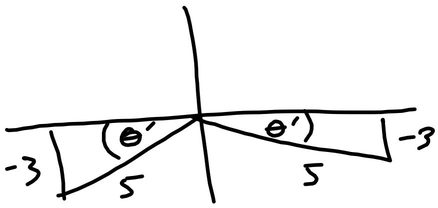
Find the *x*-intercepts of the function.

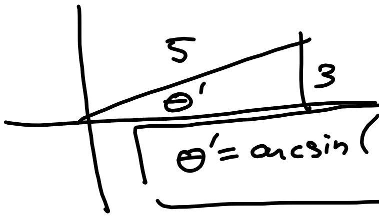
$$y = 5\sin\left(\frac{\pi}{3}x - \frac{11\pi}{3}\right)+3$$

$$= 5\sin\left(\frac{\pi}{3}(x-11)\right)+3 \quad \text{SET } 0 \Longrightarrow$$

$$5\sin(*) = -3 \longrightarrow$$

$$\sin(*) = -\frac{3}{5}$$





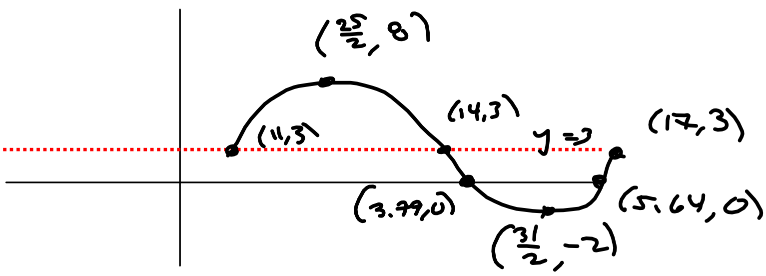
$$\boxed{\theta' = \arcsin\left(\frac{3}{5}\right)}$$

$$\boxed{\begin{array}{l}\theta = \pi + \theta' \\ \theta = 2\pi - \theta'\end{array}}$$

(5 pts) Bonus: Round previous answers to 2 decimal places & show those points on your graph in #8

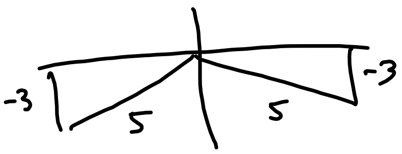
$$\pi + \arcsin\left(\frac{3}{5}\right) \approx 3.78509376238 \approx 3.79$$

$$2\pi - \arcsin\left(\frac{3}{5}\right) \approx 5.63968419839 \approx 5.64$$

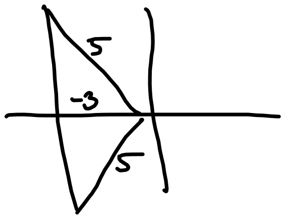


This assumes #8 was a previous question and you added the x-ints to it.

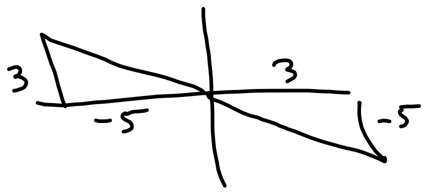
$\sin\theta = -\frac{3}{5}$



$\cos\theta = -\frac{3}{5}$



$\tan\theta = -\frac{3}{5} = \frac{y}{x}$



$\csc\theta = \frac{a}{b} \Rightarrow$

$\sin\theta = \frac{b}{a}$

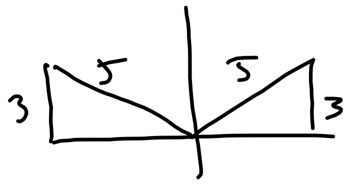
$\sec\theta = \frac{a}{b} \Rightarrow$

$\cos\theta = \frac{b}{a}$

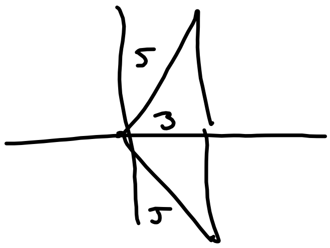
$\cot\theta = \frac{a}{b}$

$\tan\theta = \frac{b}{a}$

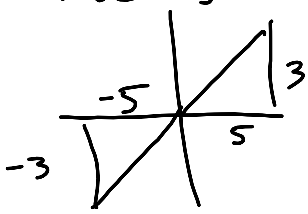
$\sin\theta = \frac{3}{5}$



$\cos\theta = \frac{3}{5}$



$\tan\theta = \frac{3}{5}$



Build a question:

$\boxed{(3x-5)(2x+3)} = 6x^2 - x - 15$

Find all solutions $\Theta \in [0, 2\pi)$ satisfying

$6\sin^2\Theta - \sin\Theta - 15 = 0$

let $u = \sin\Theta \longrightarrow$ Alice helped

$6u^2 - u - 15 = 0$

$a=6, b=-1, c=-15$

$b^2-4ac = 1^2 - 4(6)(-15) = 1 + 360 = 361$

$\sqrt{361} = 19^2$

$u = \dfrac{-b \pm \sqrt{b^2-4ac}}{2a} = \dfrac{1 \pm 19}{2(6)} = \begin{cases} \frac{20}{12} = \frac{5}{3} \\ -\frac{18}{12} = -\frac{3}{2} \end{cases}$

$240 + 120 = 360$

19×19: $171 + 190 = 361$

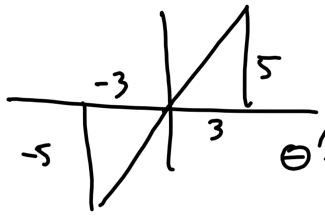
$u = \sin\Theta = \frac{5}{3}$ OR $u = -\frac{3}{2} = \sin\Theta$

$\longrightarrow$ NO SOLUTION!

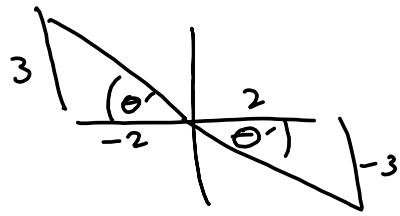
Same thing for $6\tan^2\Theta - \tan\Theta - 15 = 0$

$\vdots$

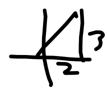
$\tan\Theta = \frac{5}{3}$ OR $\tan\Theta = -\frac{3}{2}$



$\Theta' = \arctan\left(\frac{5}{3}\right)$



$\Theta' = \arctan\left(\frac{3}{2}\right)$



EXACT ANS:

$\Theta = \arctan\left(\frac{5}{3}\right), \pi + \arctan\left(\frac{5}{3}\right), \pi - \arctan\left(\frac{3}{2}\right), 2\pi - \arctan\left(\frac{3}{2}\right)$