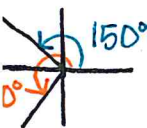


#1 $2 \cos(\theta + 40^\circ) = -\sqrt{3}$, $\theta \in [0^\circ, 720^\circ]$

$\cos(\theta + 40^\circ) = -\frac{\sqrt{3}}{2}$

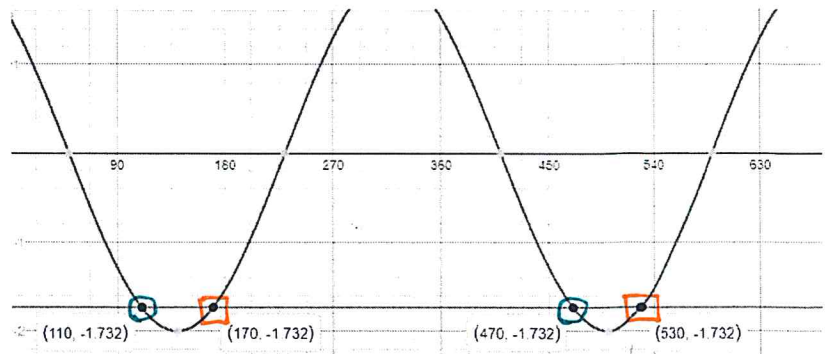


$\theta + 40^\circ = 150^\circ + 360^\circ n$

$\theta = 110^\circ + 360^\circ n$

$\theta + 40^\circ = 210^\circ + 360^\circ n$

$\theta = 170^\circ + 360^\circ n$



#2 $\tan^2 x + 5 \tan x - 6 = 0$, $x \in [0, 2\pi]$

$(\tan x + 6)(\tan x - 1) = 0$

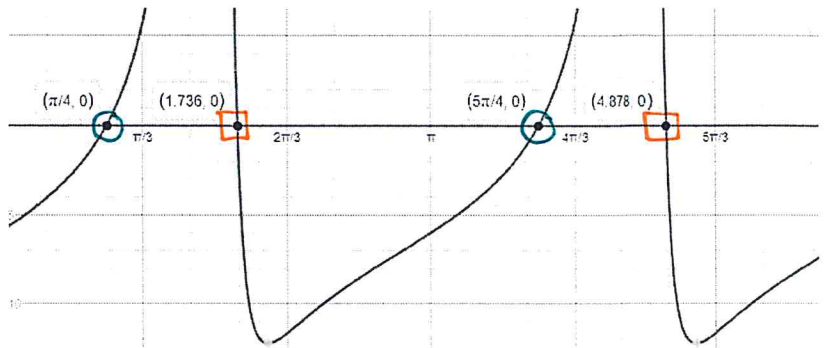
$\tan x = -6$ $\tan x = 1$



$x = \tan^{-1}(-6) + \pi n$
 $x \approx -1.406 + \pi n$



$x = \pi/4 + \pi n$



#3 $-13 \sin \theta - 5 = 2 \cos^2 \theta$, $\theta \in [-360^\circ, 450^\circ]$

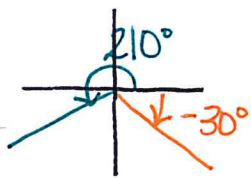
$-13 \sin \theta - 5 = 2(1 - \sin^2 \theta)$

$-13 \sin \theta - 5 = 2 - 2 \sin^2 \theta$

$2 \sin^2 \theta - 13 \sin \theta - 7 = 0$

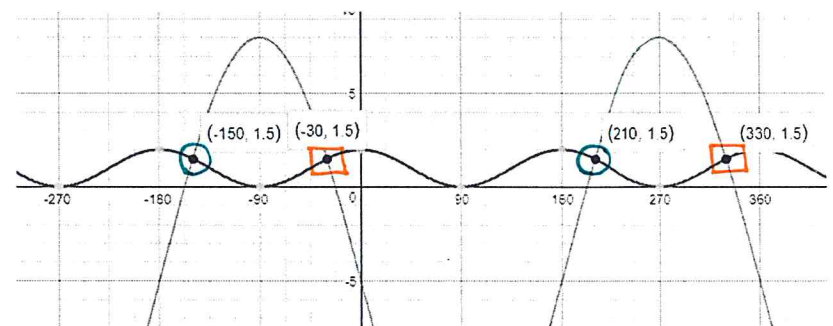
$(2 \sin \theta + 1)(\sin \theta - 7) = 0$

$\sin \theta = -1/2$ ~~$\sin \theta = 7$~~



$\theta = -30^\circ + 360^\circ n$

$\theta = 210^\circ + 360^\circ n$



#4 $(\sin x - 1)(12 \sin x - 6) = 0$ $x \in [-\pi/2, 3\pi/2]$

$\sin x = 1$



$\sin x = 1/2$

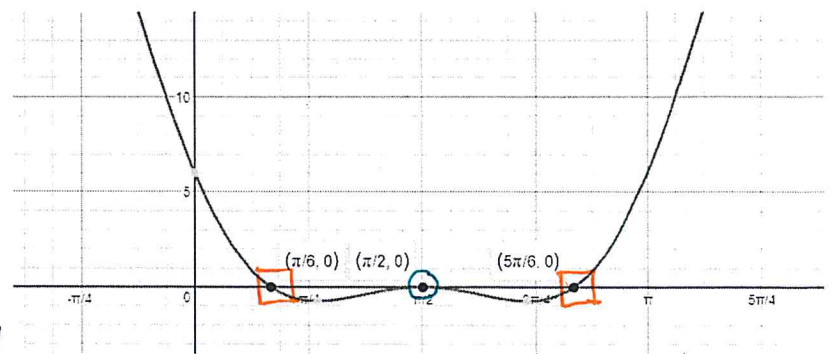
$\sin x = 1/2$



$x = \pi/2 + 2\pi n$

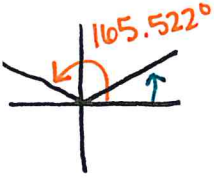
$x = \pi/6 + 2\pi n$

$x = 5\pi/6 + 2\pi n$



#5 $4 \sin(2\theta) = 1, \theta \in [-180^\circ, 225^\circ]$

$\sin(2\theta) = \frac{1}{4}$

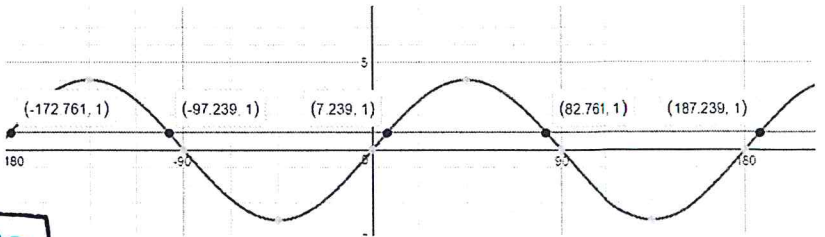


$2\theta \approx 14.478 + 360^\circ n$

$\theta \approx 7.239 + 180^\circ n$

$2\theta \approx 165.522 + 360^\circ n$

$\theta \approx 82.761 + 180^\circ n$



#6 $\cos^4 x - \sin^4 x = 1 - 2\sin^2 x$
 $(\cos^2 x + \sin^2 x)(\cos^2 x - \sin^2 x)$
 $= (1)(1 - \sin^2 x - \sin^2 x)$
 $= 1 - 2\sin^2 x$

#7 $\frac{\sec^2 x - 1}{\sin x} = \tan x \sec x$
 $= \frac{\tan^2 x}{\sin x}$

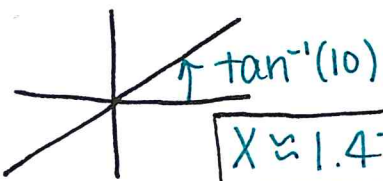
$= \tan x \cdot \frac{\tan x}{\sin x} = \tan x \cdot \frac{\sin x}{\cos x} \cdot \frac{1}{\sin x}$
 $= \tan x \cdot \frac{1}{\cos x} = \tan x \sec x$

#8 $\cos^2 x + \tan^2 x \cos^2 x = 1$
 $\cos^2 x (1 + \tan^2 x)$
 $= \cos^2 x (\sec^2 x)$
 $= 1$

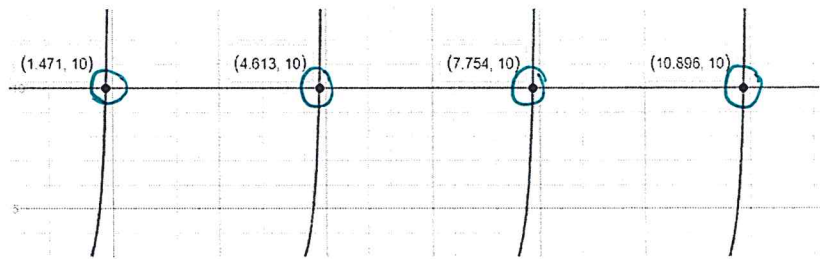
#9 $\frac{\tan^2 x - 6 \tan x + 8}{\tan^2 x - 4} = \frac{\tan x - 4}{\tan x + 2}$
 $= \frac{(\tan x - 4)(\tan x - 2)}{(\tan x - 2)(\tan x + 2)}$
 $= \frac{\tan x - 4}{\tan x + 2}$

#10 $\tan x (\cot x + \tan x) = \sec^2 x$
 $1 + \tan^2 x = \sec^2 x$

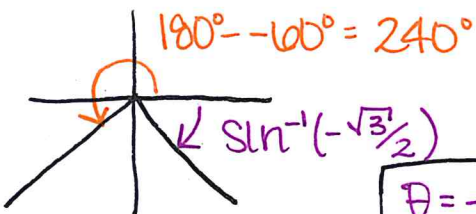
#11 $x = \arctan(10) \quad x \in [0, 4\pi]$



$x \approx 1.471 + \pi n$



#12 $\theta = \arcsin\left(-\frac{\sqrt{3}}{2}\right) \quad \theta \in [-360^\circ, 360^\circ]$



$\theta = -60^\circ + 360^\circ n$

$\theta = 240^\circ + 360^\circ n$

