$\cos\theta = \frac{5}{7}$

$a^2+b^2=c^2$

$5^2+b^2=7^2$

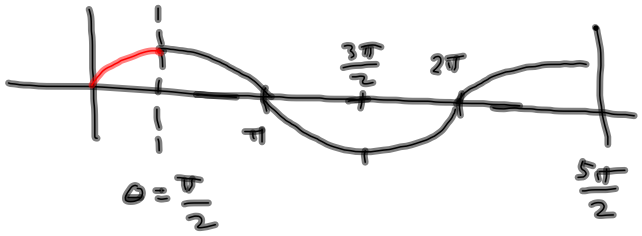
$b^2 = 49-25$

$b = \sqrt{24} = 2\sqrt{6}$

§2.1 #s 1-6 ALL, 7-49, 53-58 ALL, 69 Due Wednesday.

$\cos\left(\frac{\pi}{2}-\theta\right) = \sin\theta$ is 1st cofunction identity.

$= \cos\left(-\left(\theta-\frac{\pi}{2}\right)\right) = \cos\left(\theta-\frac{\pi}{2}\right)$



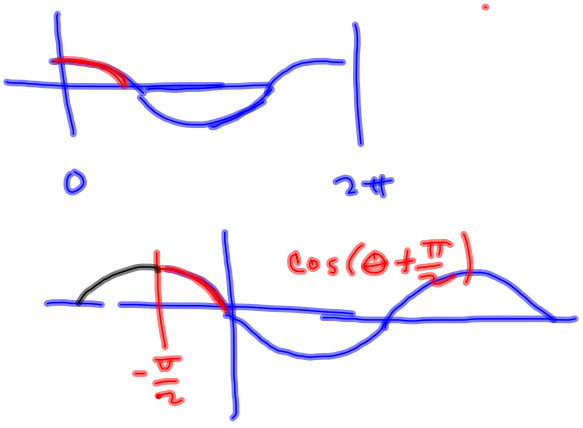
shift right $\frac{\pi}{2}$

$\cos\theta \longrightarrow \cos(-\theta) = \cos\theta \longrightarrow \cos\left(\theta-\frac{\pi}{2}\right)$

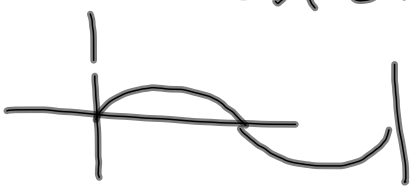
left $\frac{\pi}{2}$ flip.

* $\cos(\theta) \longrightarrow \cos\left(\theta+\frac{\pi}{2}\right) \longrightarrow \cos\left(-\theta+\frac{\pi}{2}\right)$

Both lead to same graph!

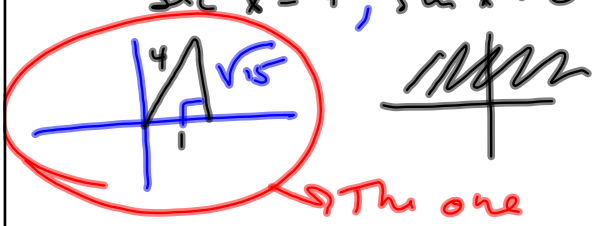


$\cos\left(-\theta+\frac{\pi}{2}\right) = \sin\theta = \cos\left(\frac{\pi}{2}-\theta\right)$

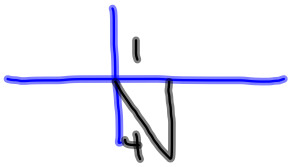


2.1 # 11

$\sec x = 4$, $\sin x > 0$



The one



$a^2 + b^2 = 4^2$

$b^2 = \sqrt{16 - 1}$

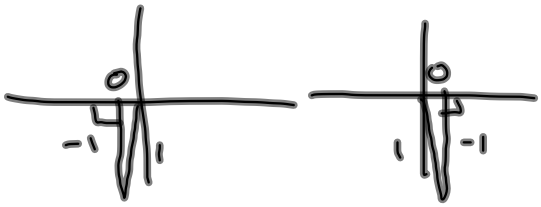
$= \sqrt{15}$

$\sin x = \frac{\sqrt{15}}{4}$ $\quad \csc x = \frac{4}{\sqrt{15}}$

$\cos x = \frac{1}{4}$ $\quad \sec x = 4$

$\tan x = \sqrt{15}$ $\quad \cot x = \frac{1}{\sqrt{15}} = \frac{\sqrt{15}}{15}$

(13) $\sin\theta = -1$ has but one p.i., so $\cot\theta = 0$ is redundant



#s 21-28 Factor & simplify

(21) $\tan^2 x - \tan^2 x \sin^2 x$

$\tan^2 x (1 - \sin^2 x) = \tan^2 x (\cos^2 x)$

$= \frac{\sin^2 x}{\cos^2 x} \cdot \cos^2 x = \boxed{\sin^2 x}$

$\boxed{\sin^2 x + \cos^2 x = 1}$

$\tan^2 x + 1 = \sec^2 x$

$\cot^2 x + 1 = \csc^2 x$

$\tan^2 x + 1 = \sec^2 x$?

$\frac{\sin^2 x}{\cos^2 x} + \frac{\cos^2 x}{\cos^2 x} =$

$\frac{\sin^2 x + \cos^2 x}{\cos^2 x} =$

$\frac{1}{\cos^2 x} = \sec^2 x$

(25) $1 - 2\cos^2 x + \cos^4 x$

$= \cos^4 x - 2\cos^2 x + 1$

Let $u = \cos x$

$= u^4 - 2u^2 + 1$

Let $v = u^2$

$a^2 - 2ab + b^2 = (a-b)^2$

$a^2 - b^2 = (a-b)(a+b)$

$= v^2 - 2v + 1$

$= (v-1)^2$

$= (u^2-1)^2$

$= ((u-1)(u+1))^2$

$= ((\cos x - 1)(\cos x + 1))^2$

$= (\cos x - 1)^2 (\cos x + 1)^2$

Bryan sez:

$((-1)(-\cos^2 x + 1))^2$

$= (-1)^2 (1 - \cos^2 x)^2$

$= (1 - \cos^2 x)^2$

$(\cos^2 x - 1)^2 =$

$(1 - \cos^2 x)^2$

$= (\sin^2 x)^2$

$= \sin^4 x$

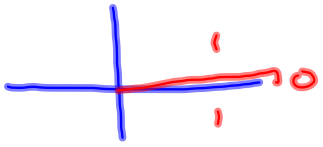
The Goal for all this factoring is to solve equations.

My final product:

$(\cos x - 1)^2(\cos x + 1)^2 = 0$

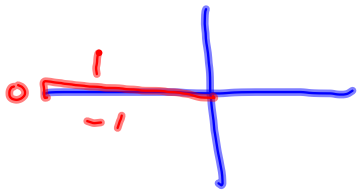
$\cos x - 1 = 0$

$\cos x = 1$



$\cos x + 1 = 0$

$\cos x = -1$

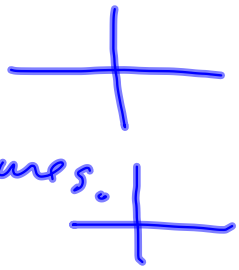


$\sin^4 x = 0$

$\Rightarrow \sqrt[4]{\sin^4 x} = \sqrt[4]{0}$

$|\sin x| = 0$

$\sin x = 0$



Same pictures.

57 $3 = \sqrt{9-x^2}$

$\Rightarrow 3 = \sqrt{9-(3\sin\theta)^2}$

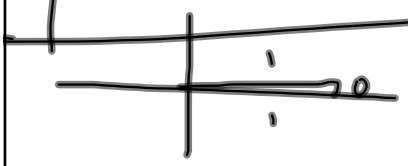
$\Rightarrow 3 = \sqrt{9-9\sin^2\theta}$

$\Rightarrow 3 = \sqrt{9}\sqrt{1-\sin^2\theta}$

$\Rightarrow 3 = 3\sqrt{\cos^2\theta}$

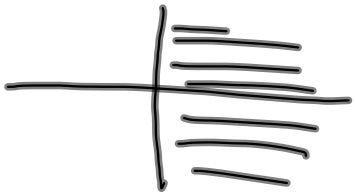
$\Rightarrow 1 = 1\,|\cos\theta|$

$1 = \cos\theta \Rightarrow \sin\theta = 0$



Let $x = 3\sin\theta$

Assume $-\frac{\pi}{2} < \theta < \frac{\pi}{2}$



so $\cos\theta \geq 0$

so $|\cos\theta| = \cos\theta$

This is trig substitution run-up. CALC II

$ax^2+bx+c=0 \Longrightarrow$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$x^2-9=0$

$(x-3)(x+3)=0$

$x^2+0x-9=0$

$a=1, b=0, c=-9$

$b^2-4ac = 0^2-4(1)(-9)=36$

$\sqrt{36}=6$

$$x=\frac{0\pm 6}{2(1)}=\pm 3$$

$x=\pm 3 \Rightarrow$

$(x-3)(x-(-3))$

is how it factors.