

Pre Calc Review.

Greeks: under food:

Geometry



Algebra

$$y^2 + x^2 - 7x = 7$$

$$x^2 + y^2 = 1$$

"graph"

Cartesian plane

1630s: Descartes

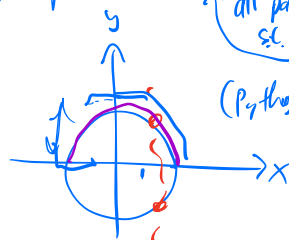


graph

$$x^2 + y^2 = 1$$

all pairs (x,y) s.t.

(Pythagorean thm)



Can't have  $f(2)=3$  &  $f(2)=7$ .

Not a function,  $y=f(x)$

$$y = \sqrt{1-x^2}$$

Domain:  $[-1,1]$

Why? Need  $|x^2| \geq 0 \Rightarrow$

$$|x^2| \geq 0 \Rightarrow |x| \geq x$$



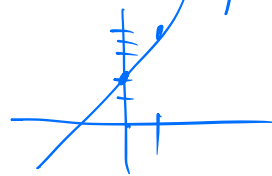
Line

$$y = 3x + 2$$

Slope  
(y) intercept

$$y = mx + b$$

i.e. set  $x=0$ ,  $y=2$



$y = \sqrt{1-x^2}$  Range?

~~$[-1,1]$~~   $[0,1]$

point slope form

$$y - 3 = 2(x - 4)$$

$$y - y_1 = m(x - x_1)$$



$$ax + by = c, \quad 2x + 6y = 8$$

If  $x=0, y = \frac{4}{3}$   
If  $y=0, x=4$



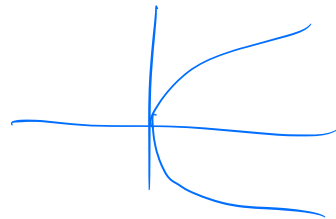
$$(x+3)^2 + (y-2)^2 = 4 = 2^2$$

$$x = y^2$$



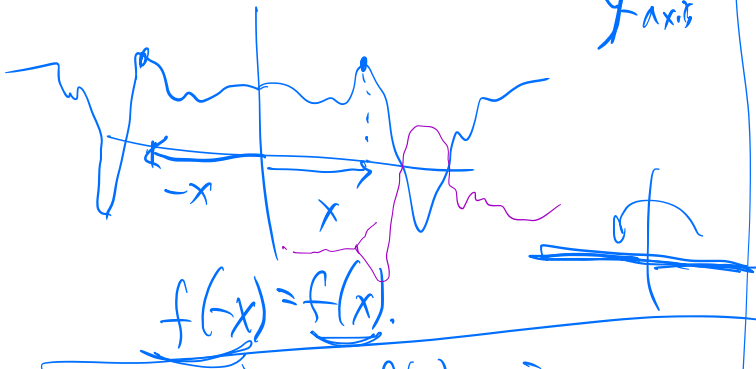
$$x^2 + 2x + y^2 - 4y = 7$$

$$(x+1)^2 + (y-2)^2 = 12 \quad \text{radius } \sqrt{12}$$



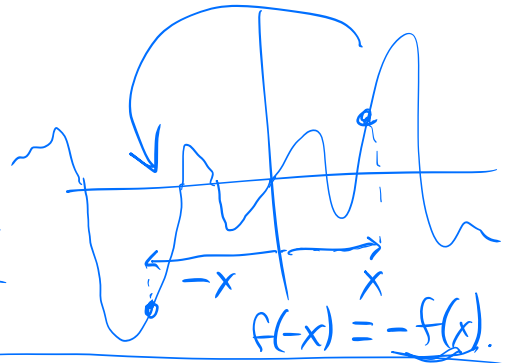
## Symmetry:

Even. = mirror across  
Y axis

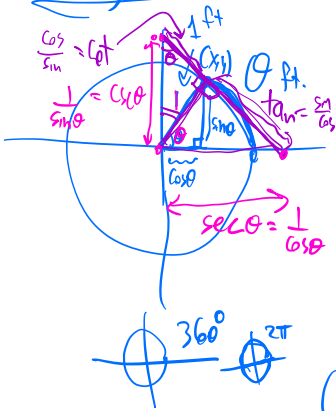


even & odd  $\Rightarrow f(x)=0 = y$

odd = 180° degree rotation  
on origin



## Trig Review:



$$x^2 + y^2 = 1$$

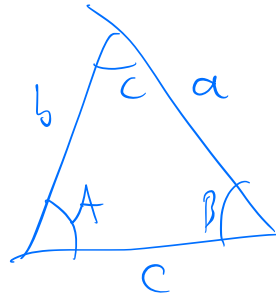
$$x = \cos \theta$$

$$y = \sin \theta$$

$$\cos^2 \theta + \sin^2 \theta = 1$$

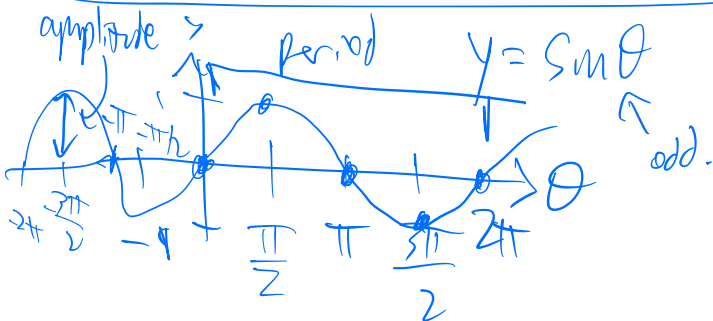
$$1 + \tan^2 \theta = \sec^2 \theta$$

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

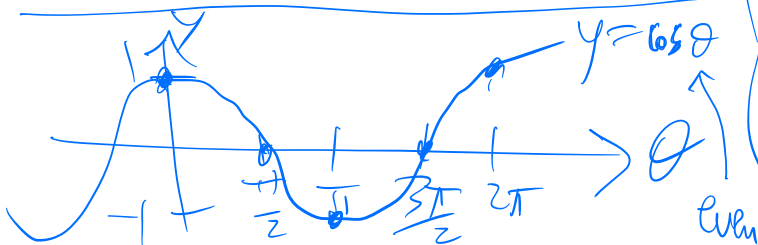
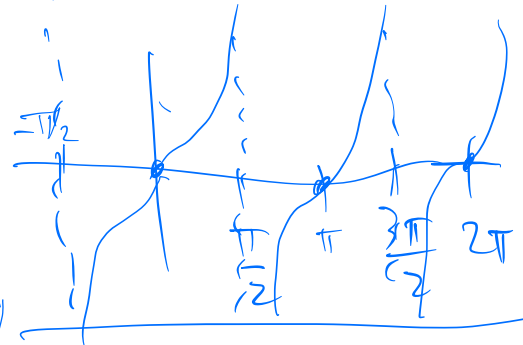


Cosine Law:

$$a^2 + b^2 = c^2 - 2ab \cos C$$



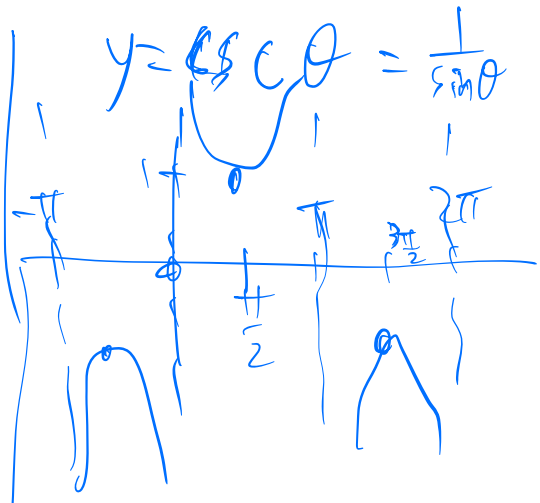
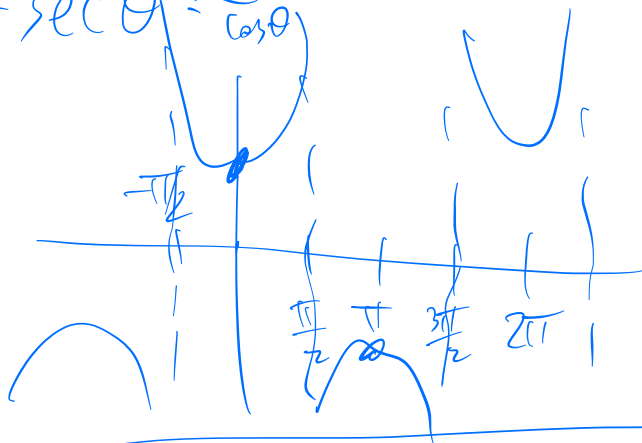
$$y = \tan \theta = \frac{\sin \theta}{\cos \theta}$$



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

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

$$y = \sec \theta = \frac{1}{\cos \theta}$$



$$\sin(a+b) = \sin a \cdot \cos b + \sin b \cdot \cos a$$

$$\cos(a+b) = \cos a \cdot \cos b - \sin a \cdot \sin b$$

$$\cos(a-b) = \cos a \cdot \cos b + \sin a \cdot \sin b$$

$$\sin(2a) = 2 \sin a \cos a$$

$$\cos(2a) = \cos^2 a - \sin^2 a = 1 - 2 \sin^2 a$$

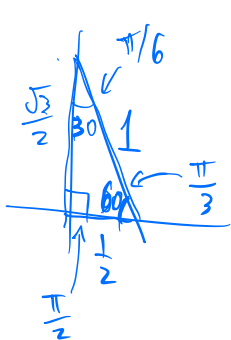
$$\begin{cases} \cos^2 + \sin^2 = 1 \\ \sin^2 = 1 - \cos^2 \end{cases}$$

$$\rightarrow \sin^2 a = \frac{1 - \cos(2a)}{2}$$

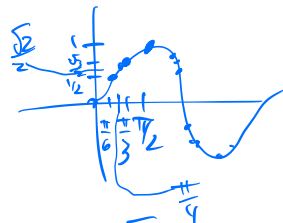
$$\sin\left(\frac{a}{2}\right) = \pm \sqrt{\frac{1 - \cos(a)}{2}}$$

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

$$\cos\left(\frac{a}{2}\right) = \frac{\cos(a) + 1}{2}$$



$$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}, \quad \sin \frac{\pi}{6} = \frac{1}{2}$$



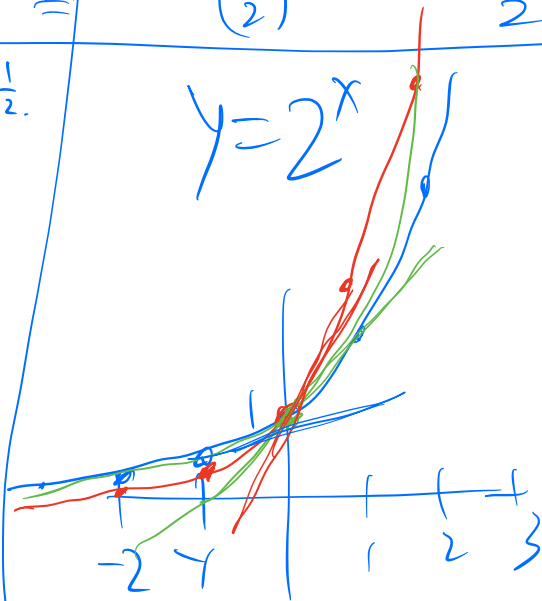
$$\sin \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

Get others from  $\frac{1}{2}$  angle formulas.

$$y = 2^x$$

$$y = 3^x$$

$$y = e^x$$



$$y = \log x = \ln x = \log_e x. \quad \textcircled{Q1} \quad \text{If } \log_2 x = 7, \text{ what is}$$

$$\log_2(x^3) = 3 \cdot \log_2 x = 21$$

$\textcircled{Q2}$  graph  $3x + 5y = -1$

