

$6\frac{1}{2} = 6 + \frac{1}{2}$  Convert minutes  
 & seconds to  
 decimal degrees.

$$59^{\circ} 32' 5''$$

$$= 59^{\circ} + (32')\left(\frac{1^{\circ}}{60'}\right) + (5'')\left(\frac{1^{\circ}}{3600''}\right)$$

Convert decimal degrees to minutes  
and seconds.

$$28.37^{\circ} = 28^{\circ} + \underline{.37^{\circ}}$$

$$(.37^{\circ})\left(\frac{60 \text{ min}}{1^{\circ}}\right) = 22.2 \text{ min} = 22 \text{ min} + \underline{\underline{.2 \text{ min}}}$$

$$(.2)\left(\frac{60 \text{ sec}}{1 \text{ min}}\right) = 12 \text{ sec}$$

$$28.37^{\circ} = 28^{\circ} 22' 12''$$

Today - Hand in Homework

~~Quiz Wednesday~~  
No class on Friday.

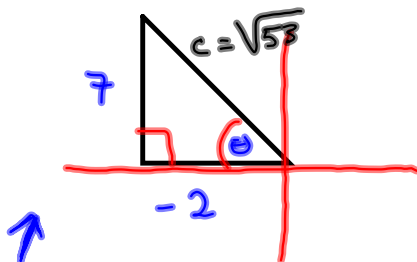
HYPERMODERN

Anon

Nimzowitsch

My System  
Blockade!

Find the 6 trig functions



$$\begin{aligned}\sin \theta &= \frac{7}{\sqrt{53}} \\ \cos \theta &= \frac{-2}{\sqrt{53}} \\ \tan \theta &= -\frac{7}{2}\end{aligned}$$

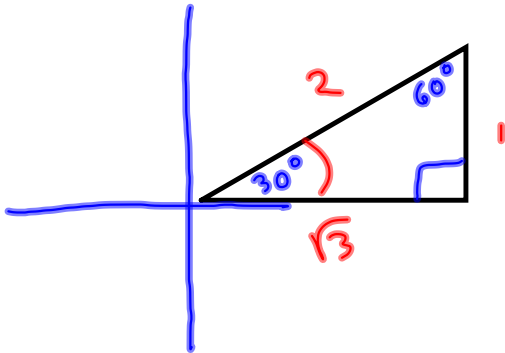
$$\begin{aligned}\csc \theta &= \frac{\sqrt{53}}{7} \\ \sec \theta &= \frac{-\sqrt{53}}{2}\end{aligned}$$

$$\cot \theta = -\frac{2}{7}$$

$$(-2)^2 + 7^2 = 4 + 49 = 53 = c^2$$


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co-functions -  $\cos(90^\circ - \theta) = \sin \theta$   
 $\sin(90^\circ - \theta) = \cos \theta$



$$\sin(30^\circ) = \frac{1}{2} = \cos(60^\circ)$$

$$30^\circ + 60^\circ = 90^\circ$$

Same with  $\tan \theta$  &  $\cot \theta$

S1.5 Graphs of Trig Functions.

Transforming Functions

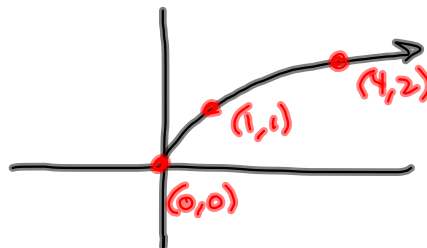
$f(x)$  is graphed Let  $(x, y)$  be a point on its graph.

$f(2x)$

How long does it take for the input of  $f(2x)$  to reach 10? 'Til  $x=5$

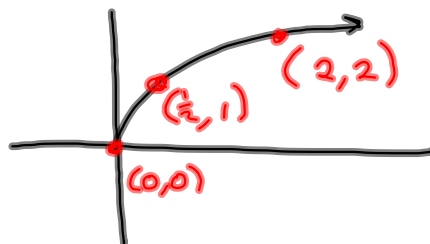
$$(x, y) \rightarrow \left(\frac{1}{2}x, y\right)$$

$\sqrt{x}$

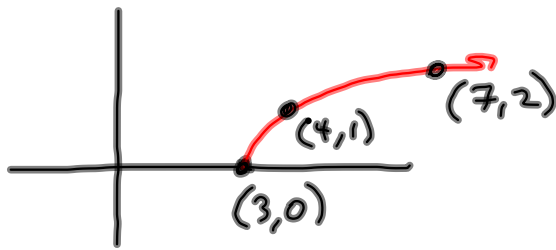


Horizontal  
Compression

$\sqrt{2x}$



$$f(x-3) = \sqrt{x-3}$$



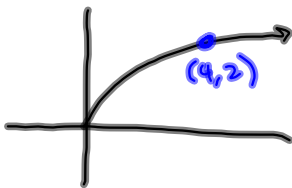
$(4,2)$   
↑

A Delay  
(Phase Change)  
Right Shift.

$f(x+7)$  Advance by 7  
Left Shift.

$$f(2(x-3)) = f(2x-6) \rightarrow \text{No help.}$$

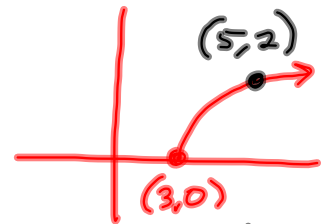
$$f(x) \rightarrow f(2x) \rightarrow f(2(x-3))$$



$f(x)$



$f(2x)$



$f(2(x-3))$

Stretch/Compress 1<sup>st</sup>  
Shift 2<sup>nd</sup>

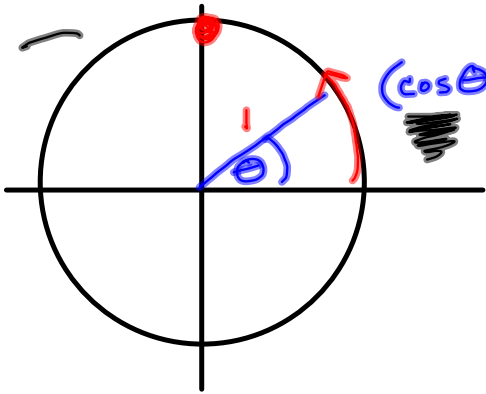
$$\begin{aligned} g(x) &= \sqrt{2(x-3)} \\ g(5) &= \sqrt{2(5-3)} \\ &= \sqrt{2(2)} \\ &= \sqrt{4} \\ &= 2 \end{aligned}$$

$$\begin{array}{l}
 f(2x-6) \\
 \text{wrong } f(x) \longrightarrow f(2x) \longrightarrow \begin{array}{l} f(2(x-3)) \\ f(2x-6) \end{array} \\
 \text{Right } 6? \text{ No!}
 \end{array}$$

$$\begin{array}{l}
 \text{Wrong } f(x-6) \longrightarrow f(2x-6) \\
 \text{Right } 6 \qquad \qquad \text{compress}
 \end{array}$$

Always factor out the  $a$  in  $ax+b$   
when dealing with  $f(ax+b)$

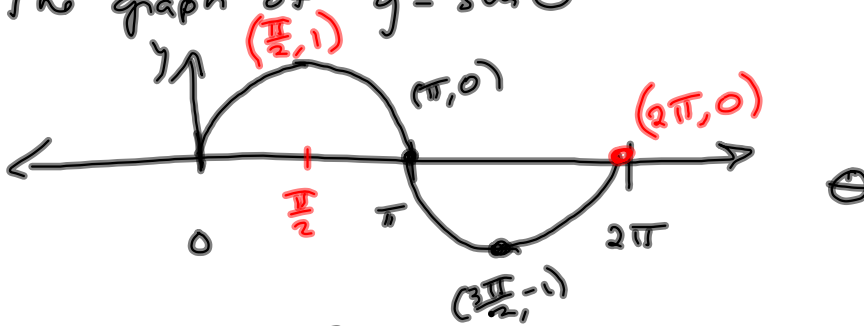
$$f(x) \longrightarrow f(ax) \longrightarrow f\left(a\left(x+\frac{b}{a}\right)\right)$$



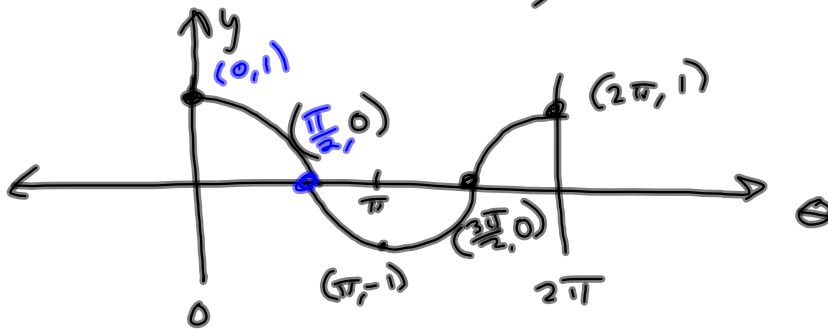
$(\cos \theta, \sin \theta)$

Notice how  $y$ -values go up, then down, and finally back up to 0, as  $\theta$  runs from 0 to  $2\pi$ .

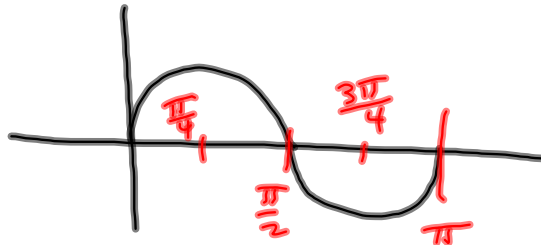
The graph of  $y = \sin \theta$



The graph of  $\cos \theta = y$



Graph  $y = \sin(2x)$



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

$$\sin(x) \longrightarrow \sin(2x) \longrightarrow \sin\left(2\left(x - \frac{\pi}{2}\right)\right)$$

$$(x, y) \longrightarrow \left(\frac{1}{2}x, y\right) \longrightarrow$$

$$(x, y) \longrightarrow \left(x + \frac{\pi}{2}, y\right)$$