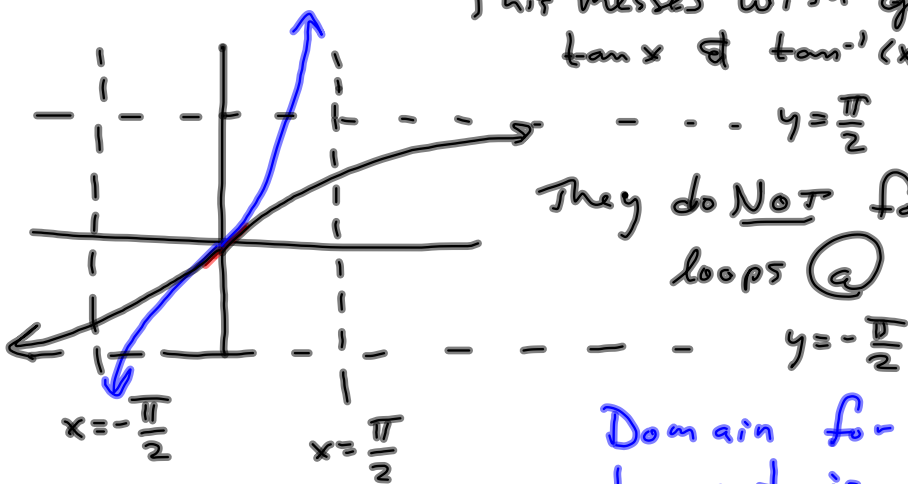


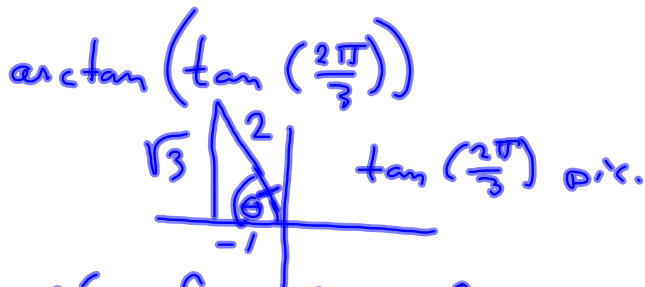
Erata : Slope of $\sin(x)$ at $x=0$ is 1
 I draw it almost vertical.
 This messes with graph of
 $\sin x$ & $\sin^{-1}(x)$ on same axes.

Slope of $\tan(x)$ @ $x=1$ is 1
 I draw it almost horizontal.
 This messes with graph of
 $\tan x$ & $\tan^{-1}(x)$ on same axes.



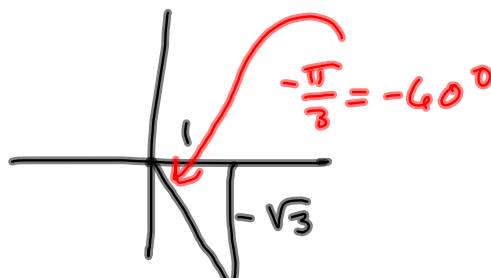
They do NOT form little loops @ $x=0$ region.

Domain for restricted tangent is $(-\frac{\pi}{2}, \frac{\pi}{2})$



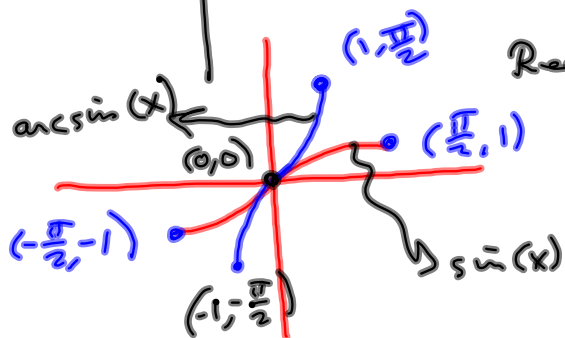
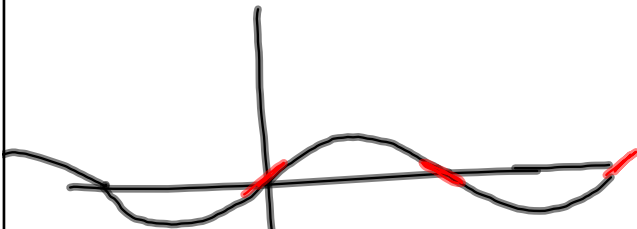
$\theta' = \text{ref angle} = 60^\circ$

$= \arctan(-\sqrt{3})$
 $= -60^\circ \text{ or } -\frac{\pi}{3}$



$\arctan(x)$
only returns values from this interval.

$y = \sin(x)$ Slope

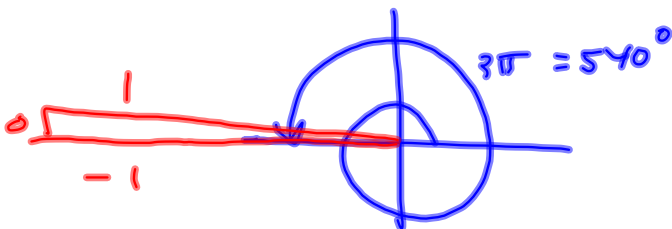


Restriction of sine to $[-\frac{\pi}{2}, \frac{\pi}{2}] = \text{range of } \sin^{-1}(x)$

$\arcsin(\sin(3\pi))$

=

$\sin(3\pi)$ p/r



$\arcsin(0) = 0!$

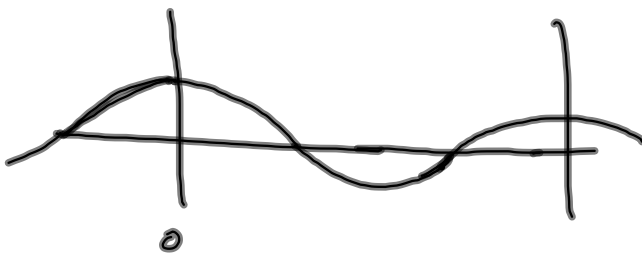
THE p/r for $\arcsin(0) =$
angle whose
sine is 0.



$\arcsin(\sin(3\pi)) = 0$

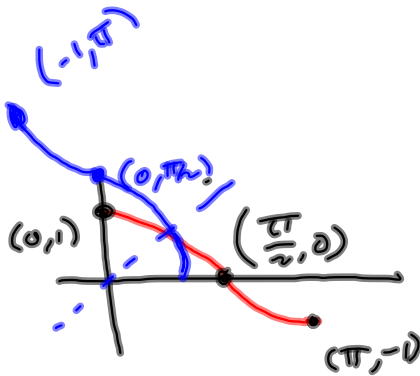
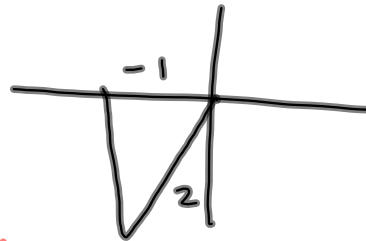
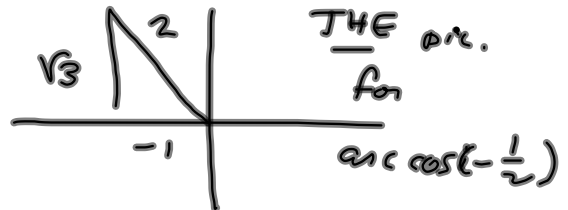
1.7

#15 $\arccos(-\frac{1}{2})$

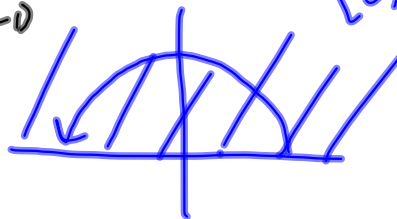


Restrict domain, 2π

So $\cos^{-1}(x) = \arccos(x)$ is $1 \rightarrow -1$



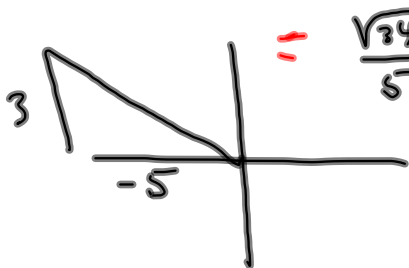
This means
arccosine only
returns angles
between 0 & π
[0, π]



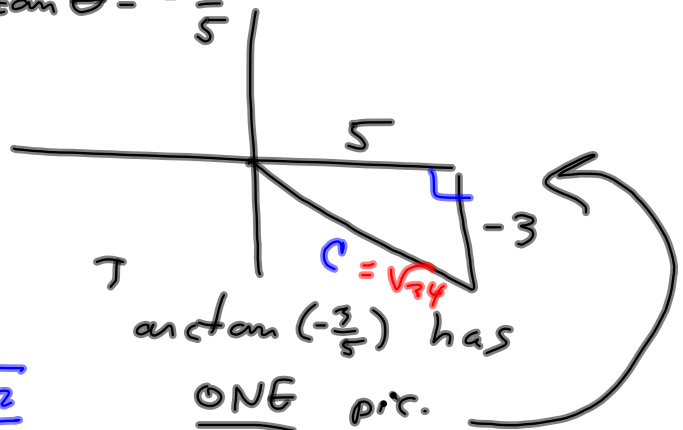
59

#5 15, 21, 36, 42, 51, 55,
59, 73

$\sec(\arctan(-\frac{3}{5}))$

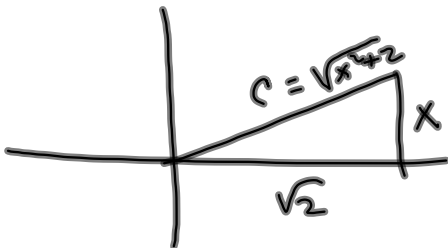


$\tan \theta = -\frac{3}{5}$



73 $\csc(\arctan(\frac{x}{\sqrt{2}}))$

$= \frac{\sqrt{x^2+2}}{x}$



$c = \sqrt{x^2 + (\sqrt{2})^2}$
 $= \sqrt{x^2 + 2}$

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

$5^2 + (-3)^2 = c^2$

$25 + 9 = c^2$

$34 = c^2$

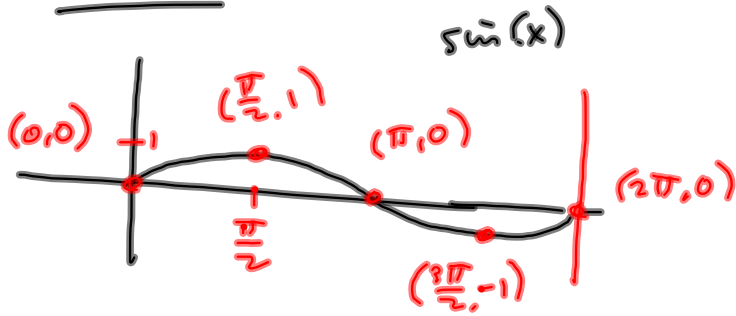
$\sqrt{34} = |c|$

$\pm \sqrt{34} = c$

$\sqrt{34} = c$

length is positive

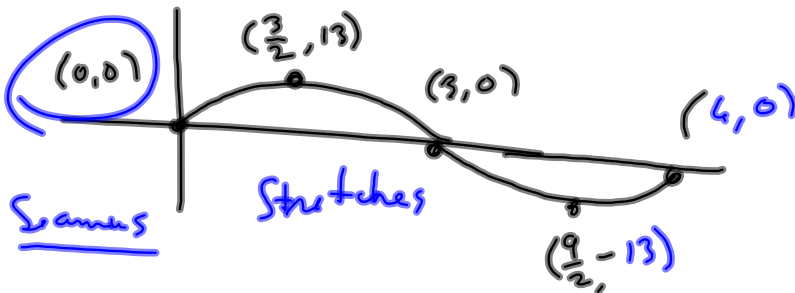
Graphs



$$13 \sin\left(\frac{\pi}{3}(x-5)\right) - 11$$

① $(x, y) \mapsto \left(\frac{3}{\pi}x, 13y\right)$ stretches

② $(x, y) \mapsto (x+5, y-11)$



$$\frac{3}{\pi} \cdot \frac{\pi}{2} = \frac{3}{2}$$

$$\frac{3}{\pi} \cdot \pi = 3$$

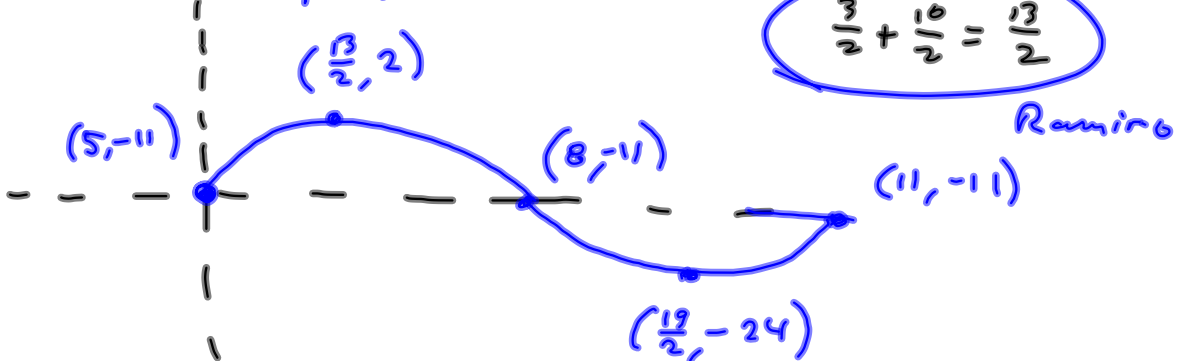
$$\frac{3}{\pi} \cdot \frac{3\pi}{2} = \frac{9}{2}$$

$$\frac{3}{\pi} \cdot 2\pi$$

Stretches

Stretches

rigid shifts



$$\frac{3}{2} + \frac{10}{2} = \frac{13}{2}$$

Rigid

$$13 \sin\left(\frac{\pi}{3}(x-5)\right) - 11$$

Period: $\frac{\pi}{3}x = 2\pi$ when?

$$x = 2\pi \cdot \frac{3}{\pi} = 6 = T$$

Amp: $a=13$

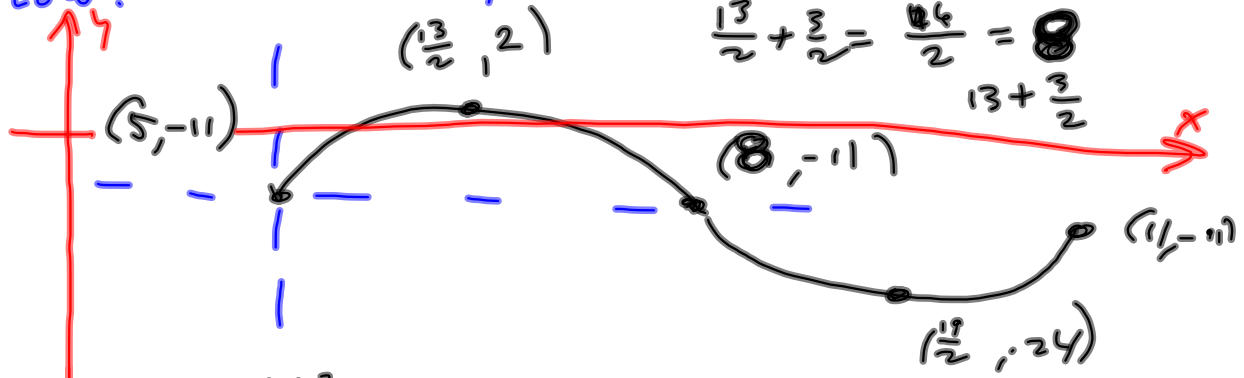
starts @ $x=5$

midline: $y=-11$

$x=5+6=11$
end

high: $-11+13 = 2$

low: $-11-13 = -24$



$$5 + \frac{3}{2} = \frac{13}{2}$$

$$\frac{13}{2} + \frac{3}{2} = \frac{16}{2} = 8$$

$$8 + \frac{3}{2} = \frac{17}{2}$$

$$\frac{16+3}{2} = \frac{19}{2}$$

$$\frac{19}{2} - \frac{16}{2} = \frac{3}{2} = \text{step-size}$$