14

Area of circle $= \pi r^2$, corresponds to

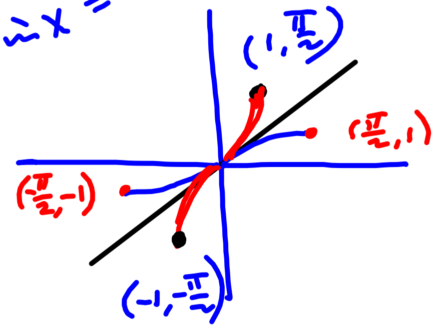
$\theta = 2\pi$ radians

$$\pi r^2 = \frac{1}{2}(2\pi) r^2 = \boxed{\frac{1}{2} r^2 \theta = A}$$

$2\pi r =$ perimeter $\longleftrightarrow \theta = 2\pi$, so

$$s = \theta r = \boxed{r\theta = s}$$

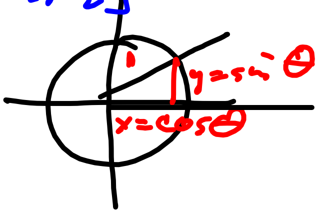
$\sin x$ & $\arcsin x = \sin^{-1}(x)$

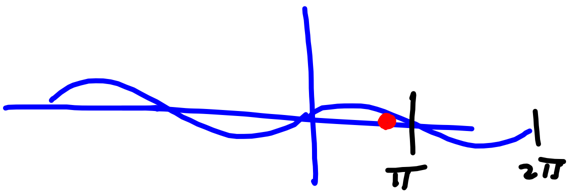


$\arcsin(\sin(x)) = x$

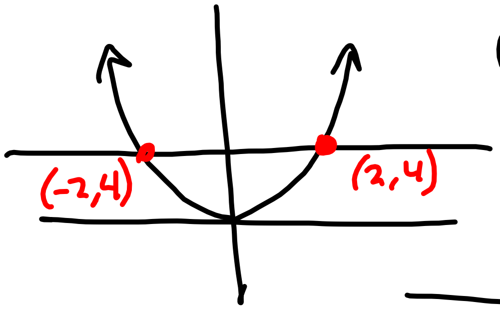
$\mathcal{D}(\sin^{-1}(x)^{*}) = [-\frac{\pi}{2}, \frac{\pi}{2}]$

* Restricted to be 1-to-1

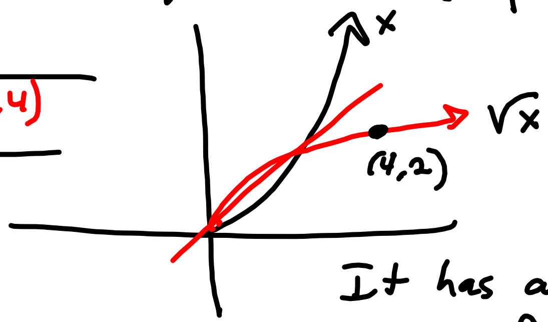




$f(x) = x^2$



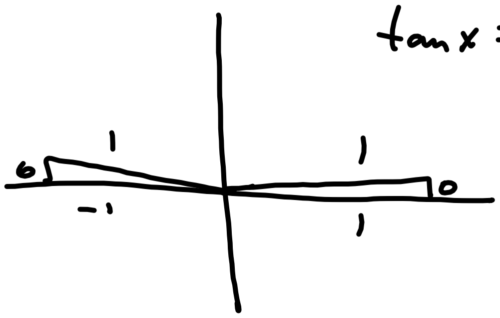
Restrict to $\{x \mid x \geq 0\}$

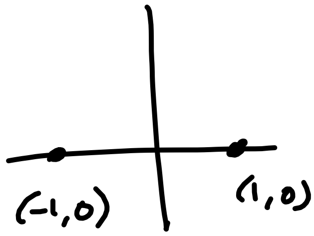


It has an inverse function

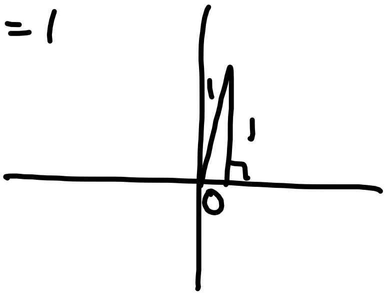
$\sqrt{x}$

$\tan x = 0$

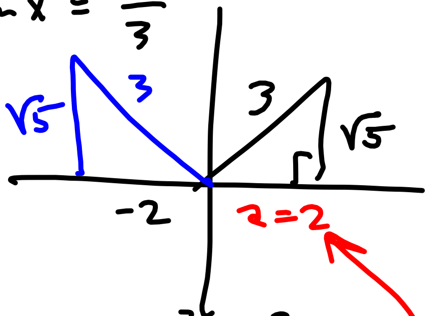




(b) $\sin x = 1$



$\sin x = \frac{\sqrt{5}}{3}$



$z^2 + \sqrt{5}^2 = 3^2$

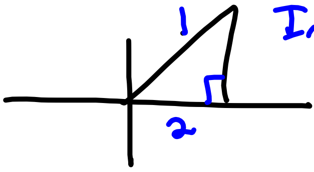
$z^2 + 5 = 9$

$z^2 = 4$

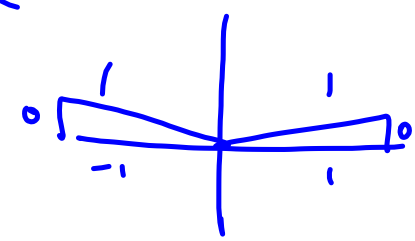
$z = \pm 2 \longrightarrow +2$

(d) $\sec x = \frac{1}{2}$ $\not\exists$

Impossible

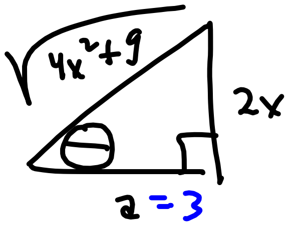


(e) $\sin x = 0$



11

$$\tan\Big(\underbrace{\arcsin\Big(\frac{2x}{\sqrt{4x^2+9}}\Big)}_{\theta}\Big) = \tan\theta = \frac{2x}{3}$$



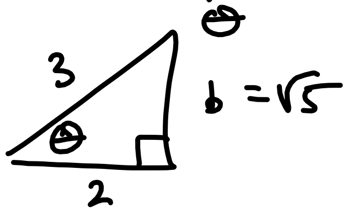
$$a^2 + (2x)^2 = \left(\sqrt{4x^2+9}\right)^2$$

$$a^2 + 4x^2 = 4x^2 + 9$$

$$a^2 = 9$$

$$a = \pm 3$$ take the positive

10a $\tan(\underbrace{\arccos(\tfrac{2}{3})}_{\theta}) = \tan\theta = \frac{\sqrt{5}}{2}$



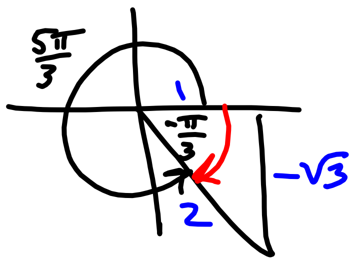
$2^2 + b^2 = 3^2$

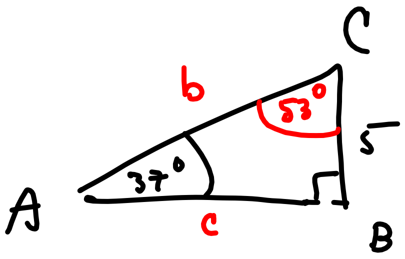
$b^2 = 5$

$b = \sqrt{5}$

10b $\arcsin(\sin(\frac{5\pi}{3}))$

$= \arcsin(-\frac{\sqrt{3}}{2}) = -\frac{\pi}{3}$





$$\frac{5}{c} = \tan 37^\circ$$

$$5 = (\tan 37^\circ)c$$

$$\boxed{c \approx 6.64} \approx 6.63522408 \approx \frac{5}{\tan 37^\circ} = c$$

$$\frac{5}{b} = \sin 37^\circ$$

$$5 = (\sin 37^\circ)b$$

$$\frac{5}{\sin 37^\circ} = b \approx 8.308200706 \approx \boxed{8.31 \approx b}$$

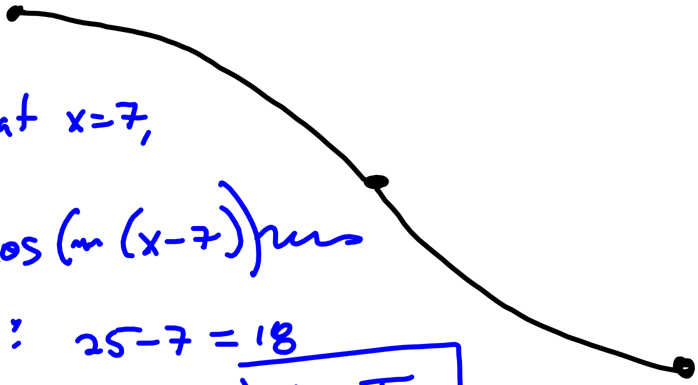
Pythagorus for 3rd side is fine

Don't use rounded answers in subsequent calculations

$\pi \neq 3.14$

8

(7,250)



(25,30)

starts at $x=7$,

so

$\_\_ \cos(\_\_(x-7)) \_\_$

Period: $25-7=18$

$18\cdot 2 = \boxed{36 = T}$

$bx = 2\pi$ when $x=36$

$b\cdot 36 = 2\pi$

$b = \frac{2\pi}{36} = \frac{\pi}{18}$

$\_\_ \cos\left(\frac{\pi}{18}(x-7)\right) \_\_$

Amplitude $=A$

250

$=A=110$

30

$\frac{250-30}{2} = \frac{220}{2} = 110$

$110\cos\left(\frac{\pi}{18}(x-7)\right) + \_\_$

Midline: $\frac{250+30}{2} = \frac{280}{2} = 140 = y$

$110\cos\left(\frac{\pi}{18}(x-7)\right) + 140$

$f(x) = 20\sin\left(\frac{\pi}{12}\left(x+14\right)\right) + 17$

phase shift: Left 14.

Amp = 20

Midline = y = 17

Start: $x + 14 = 0$

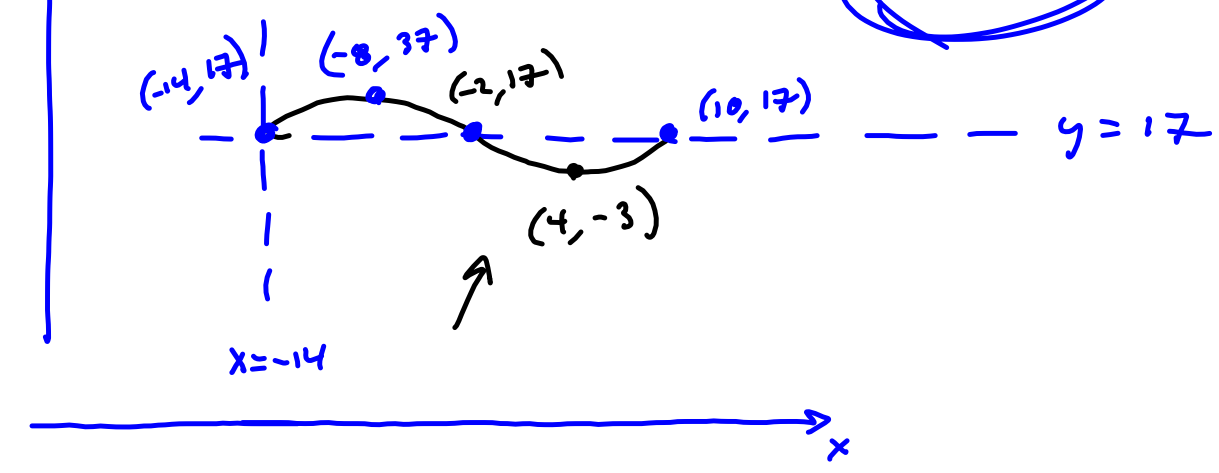
$x = -14$

$\frac{\pi}{12}x = 2\pi$

$x = \frac{2\pi \cdot 12}{\pi} = 24$ = Period

$-14 + 24 = 10$

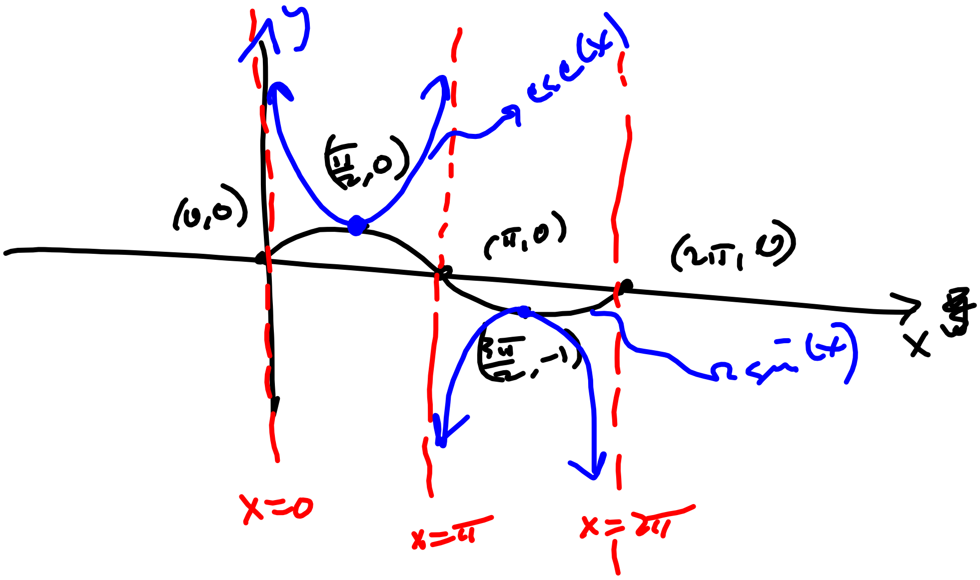
$\frac{24}{4} = 6$



$$\left(\frac{1.3\ \cancel{\text{rev front}}}{1\ \text{s}}\right)\left(\frac{5\ \text{rev back}}{2\ \cancel{\text{rev front}}}\right)\left(\frac{13\cdot 2\pi\ \text{in}}{1\ \cancel{\text{rev back}}}\right)\left(\frac{1\ \text{ft}}{12\ \text{in}}\right)$$

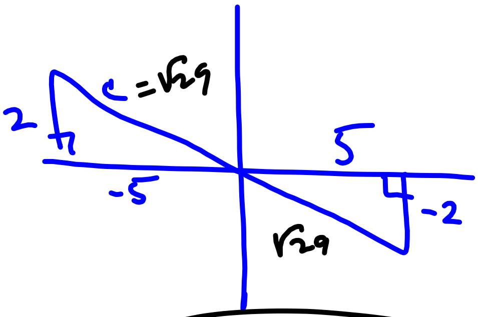
$$= \frac{169\pi}{24}\ \frac{\text{ft}}{\text{s}} \approx \boxed{22.1\ \frac{\text{ft}}{\text{s}}}$$

$$\left(\frac{169}{24}\pi\ \frac{\text{ft}}{\text{s}}\right)\left(\frac{60\ \frac{\text{mi}}{\text{hr}}}{88\ \frac{\text{ft}}{\text{s}}}\right) \approx \boxed{15.1\ \frac{\text{mi}}{\text{hr}}}$$



y
csc(x)
(π/2, 0)
(0,0)
(π, 0)
(2π, 0)
x
(3π/2, -1)
sin(x)
x=0
x=π
x=2π

$\cot\theta = -\frac{5}{2}$ $\tan\theta = -\frac{2}{5}$



$c = \sqrt{2^2+(-5)^2} = \sqrt{29}$

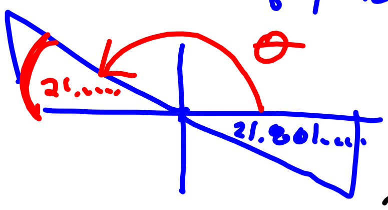
(b) $\cos\theta < 0 \Rightarrow$

$\sin\theta = \frac{2}{\sqrt{29}}$ $\csc\theta = \frac{\sqrt{29}}{2}$

$\cos\theta = -\frac{5}{\sqrt{29}}$ $\sec\theta = -\frac{\sqrt{29}}{5}$

$\tan\theta = -\frac{2}{5}$ $\cot\theta = -\frac{5}{2}$

(c) $\arctan\left(-\frac{2}{5}\right) \approx -21.80140949$



$\theta \approx 180° - 21.80140949$

$\approx 158.199° \approx 2.762$ radians

(d)
$$\begin{cases} 158.199° + 360°n & \forall n \in \mathbb{Z} \\ -21.801 + 360°n & \forall n \in \mathbb{Z} \end{cases}$$

$\cot\theta = -\frac{5}{2}$

$$\boxed{\begin{array}{l} 158.199° + 180°n \quad \forall n \in \mathbb{Z} \\ 2.762 + \pi n \quad \forall n \in \mathbb{Z} \end{array}}$$