

$$\textcircled{1} \quad \frac{33\pi}{8} = \frac{32\pi}{8} + \frac{\pi}{8} = 4\pi + \frac{\pi}{8}$$

$$s_0 \left[\frac{\pi}{8} \right] \downarrow \quad \frac{\pi}{8} - \frac{2\pi}{1} \cdot \frac{8}{8} = \frac{\pi - 16\pi}{8} = \frac{-15\pi}{8}$$

$$\left(\frac{\pi}{8} \right) \left(\frac{-15\pi}{8} \right) = \left(\frac{45}{2} \right)^\circ = 22.5^\circ$$

$$22.5^\circ - 360^\circ = -337.5^\circ$$

$$\textcircled{2} \quad r = 8, s = 50 \text{ ft}$$

$$r = 8 \text{ in} \quad 8 \text{ in} = (8 \text{ in}) \left(\frac{1 \text{ ft}}{12 \text{ in}} \right) = \frac{2}{3} \text{ ft}$$

$$s = r\theta$$

$$50 = \frac{2}{3}\theta$$

$$\frac{50 \cdot 3}{2} = \theta = (75 \text{ radians}) \left(\frac{1 \text{ revolution}}{2\pi \text{ radians}} \right)$$

$$= \frac{75}{2\pi} \approx 11.9 \text{ revs}$$

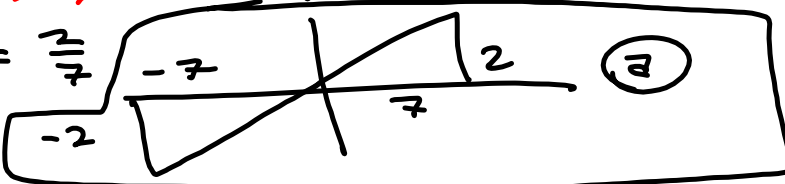
Need to have same units

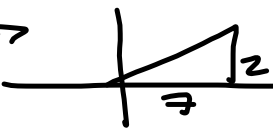
75/2/π	11.93662073
75/(2π)	11.93662073

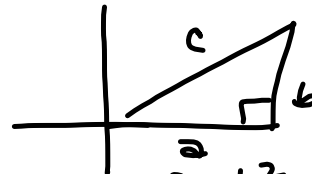
$$\textcircled{3} \quad \Theta = \frac{3\pi}{8}, \quad r = 40 \text{ cm}$$

$$\rightarrow A = \frac{1}{2} r^2 \Theta = \frac{1}{2} (40^2) \left(\frac{3\pi}{8} \right)$$

$$= \frac{\cancel{40}^{\cancel{20}} \cancel{40}^{\cancel{5}}}{\cancel{1 \cdot 8}} \pi = 100\pi \text{ cm}^2$$

$$\textcircled{4} \quad \tan \Theta = \frac{2}{7}$$


$$\textcircled{5} \quad \cos \Theta > 0 \Rightarrow$$




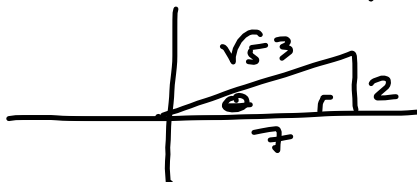
$$c^2 = 2^2 + 7^2 = 4 + 49 = 53$$

$$\Rightarrow c = \pm \sqrt{53}$$

TAKE POS. FOR
HYPOTENUSE, ALWAYS

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

$$a^2 = c^2 - b^2$$



$$\sin \Theta = \frac{2}{\sqrt{53}}$$

$$\csc \Theta = \frac{\sqrt{53}}{2}$$

$$\cos \Theta = \frac{7}{\sqrt{53}}$$

$$\sec \Theta = \frac{\sqrt{53}}{7}$$

$$\tan \Theta = \frac{2}{7}$$

$$\cot \Theta = \frac{7}{2}$$

(4c)

$$0 \leq \theta < 2\pi$$

$$\tan \theta = \frac{2}{7}, \quad \cos \theta > 0 \rightarrow \text{Q I}$$

$$\Rightarrow \theta = \arctan\left(\frac{2}{7}\right) \approx 15.945^\circ \approx .278 \text{ radian,}$$

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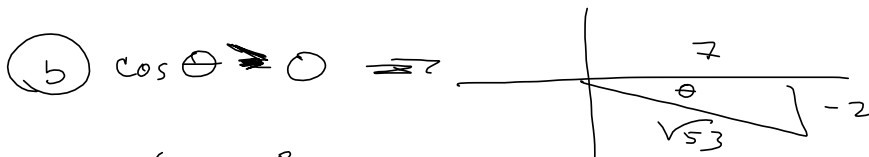
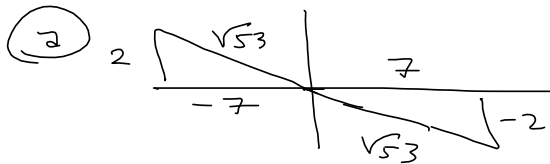
11.93662073
75/(2π)
11.93662073
tan⁻¹(2/7)
15.9453959
Ans*π/180
.278299659

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Messed-up $\neq 4$

$$\tan \theta = -\frac{2}{7}, \text{ not } +\frac{2}{7}!$$

(4) $\tan \theta = -\frac{2}{7}$, idiot



$\sin \theta = -\frac{2}{\sqrt{53}}$ $\csc \theta = -\frac{2}{\sqrt{53}}$

$\cos \theta = \frac{7}{\sqrt{53}}$ $\sec \theta = \frac{7}{\sqrt{53}}$

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

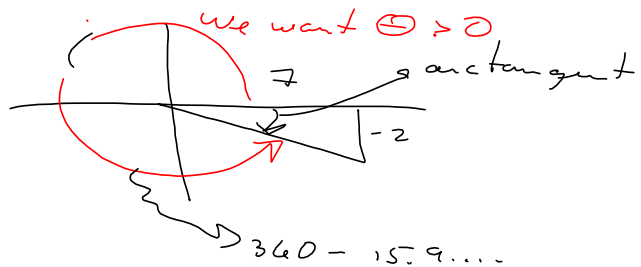
(c) Find $\theta \in [0, 2\pi]$ to 3 digits decimal places

$\arctan\left(-\frac{2}{7}\right) \approx -15.9453959^\circ$

So $\theta \approx 360^\circ - 15.9453959^\circ$

```

15.9453959
Ans*π/180
.278299659
tan-1(-2/7)
-15.9453959
Ans*π/180
-.278299659
    
```



```

-.278299659
tan-1(-2/7)
-15.9453959
Ans+360
344.0546041
Ans*π/180
6.004885648
    
```

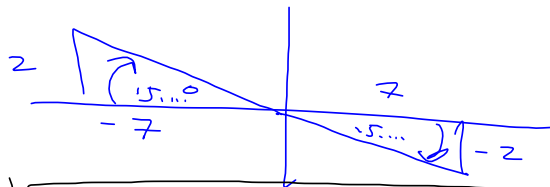
$360^\circ - 15.9453959^\circ \approx 344.0546041^\circ$

$\theta \approx 344.055^\circ$

≈ 6.004885648 radians

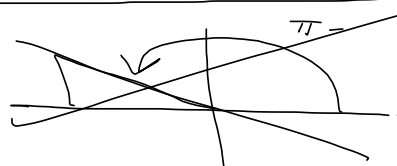
≈ 6.005 radians $\approx \theta$

(d) $\sin \theta = -\frac{2}{7} \Rightarrow$
 $\theta =$



So $344.055^\circ + 360^\circ n, n = 0, \pm 1, \pm 2, \dots$
 $180^\circ - 15.1^\circ \approx 164.055^\circ + 360^\circ n, n \in \mathbb{Z}$

```
344.0546041
Ans*π/180
6.004885648
tan-1(-2/7)
-15.9453959
Ans+180
164.0546041
```

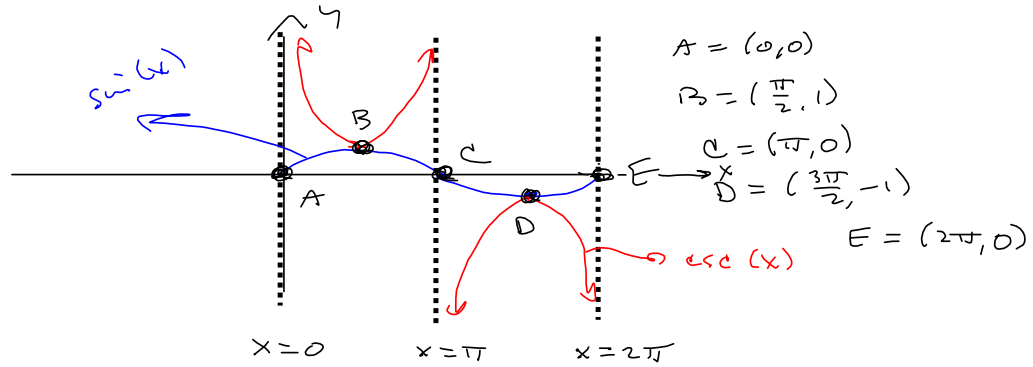


New Just Convert to radians

Radians: $6.005 + 2\pi n, n \in \mathbb{Z}$
 $2.863 + 2\pi n, n \in \mathbb{Z}$

```
164.0546041
tan-1(-2/7)
-15.9453959
Ans+180
164.0546041
Ans*π/180
2.863292995
```

(5)



(6)

$$\left(\frac{1.5 \text{ revs front}}{\text{sec}} \right) \left(\frac{5 \text{ revs back}}{3 \text{ revs front}} \right) \left(\frac{2\pi \text{ radians}}{1 \text{ rev Back}} \right)$$

Radians
sec

$s = r\omega$

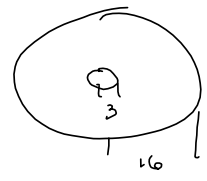
16 in back
now in in/sec

$$\left(\frac{1 \text{ ft}}{12 \text{ in}} \right) = \frac{(1.5)(5)(2\pi)(16)}{2 \cdot 3}$$

Now ft/sec = $\frac{40\pi}{6} = \frac{20\pi}{3} \frac{\text{ft}}{\text{sec}}$

$$\approx 20.9 \frac{\text{ft}}{\text{s}}$$

(7)



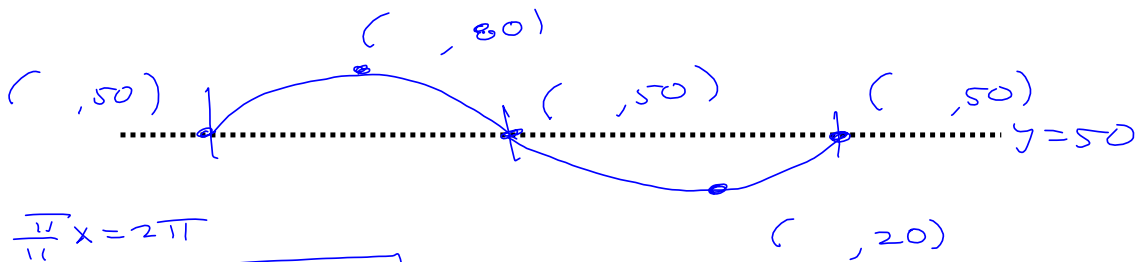
$$\frac{\text{ft}}{\text{s}} \left(\frac{20\pi}{3} \right) \left(\frac{1 \text{ mi}}{5280 \text{ ft}} \right) \left(\frac{3600 \text{ s}}{1 \text{ hour}} \right)$$

$$\approx 14.3 \frac{\text{mi}}{\text{hr}}$$

$20\pi/3$
 20.94395102
 Ans*3600/5280
 14.27996661

7 $30 \sin\left(\frac{\pi}{11}x - \frac{12\pi}{11}\right) + 50$

$50 + 30 = 80$
 $50 - 30 = 20$



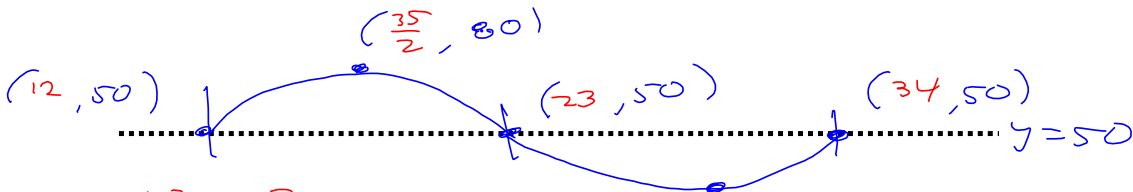
$\frac{\pi}{11}x = 2\pi$

$x = 22 = \text{Period}$

$\frac{\pi}{11}x - \frac{12\pi}{11} = \frac{\pi}{11}\left(x - \frac{12\pi}{\frac{\pi}{11}}\right)$

$\frac{12\pi}{11} \cdot \frac{11}{\pi} = 12 = \text{start}$

$12 + 22 = 34$



$\frac{23 + 12}{2} = \frac{35}{2}$

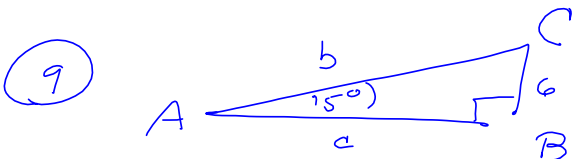
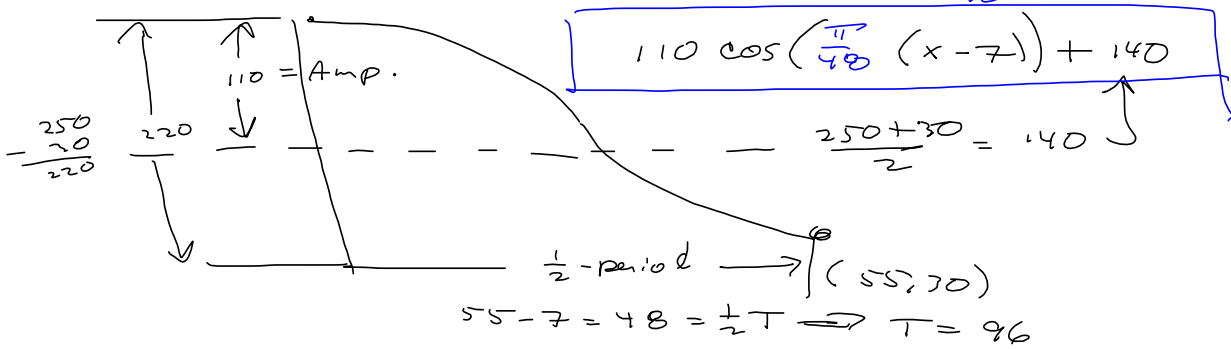
$\frac{34 + 12}{2} = \frac{46}{2} = 23$

$\frac{34 + 23}{2} = \frac{57}{2}$

$\left(\frac{57}{2}, 20\right)$

8
 MAX : (7, 250)
 MIN : (55, 30)
 (7, 250)

$b x = 2\pi$ when $x = 96$
 $b(96) = 2\pi$
 $b = \frac{2\pi}{96} = \frac{\pi}{48}$



4 places

$C = 90^\circ - 15^\circ = 75^\circ = C$

$B = 90^\circ$

$\frac{6}{b} = \sin 15^\circ$

$\frac{6}{\sin 15^\circ} = b \approx 23.1822$

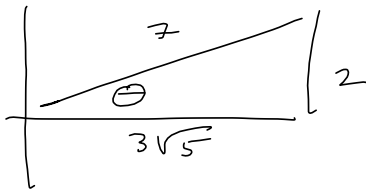
Not an angle!

$\frac{6}{c} = \tan 15^\circ$

$\frac{6}{\tan 15^\circ} = c \approx 22.3923$

```
6/sin(15)
23.18221983
6/sin(15)
23.18221983
6/tan(15)
22.39230485
■
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102 $\cot(\arcsin(\frac{2}{7})) = \cot \theta = \frac{3\sqrt{5}}{2} =$



$$7^2 - 2^2 = 49 - 4 = 45$$

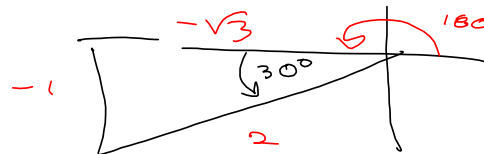
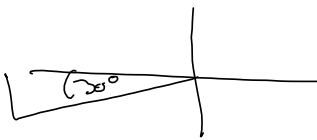
$$\sqrt{45} = 3\sqrt{5}$$

$$\begin{matrix} 3 \sqrt{45} \\ 3 \sqrt{15} \\ 5 \end{matrix}$$

$210 = 180 + 30$

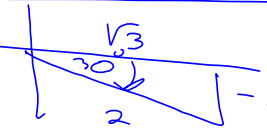
$$\frac{7\pi}{6} \cdot \frac{180}{\pi} = 210^\circ \rightarrow$$

b $\arcsin(\sin(\frac{7\pi}{6}))$



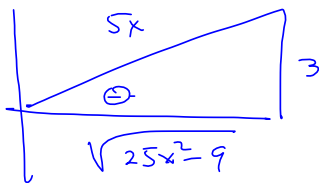
$\arcsin(\sin(\frac{7\pi}{6})) = \arcsin(-\frac{1}{2}) = -30^\circ$

What arcsine sees:

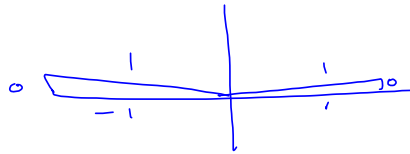


11 $\tan(\arcsin(\frac{3}{5x})) = \tan \theta = \frac{3}{\sqrt{25x^2 - 9}}$

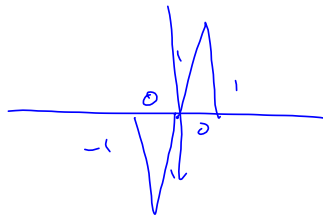
$$(5x)^2 - 3^2 = 25x^2 - 9$$



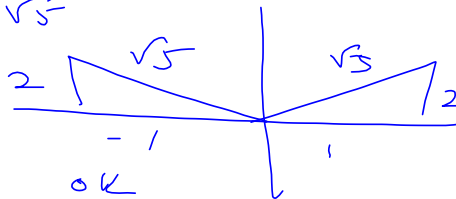
(B) (a) $\tan x = 0$



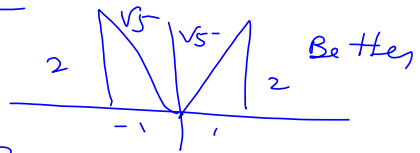
(b) $\cos x = 0$



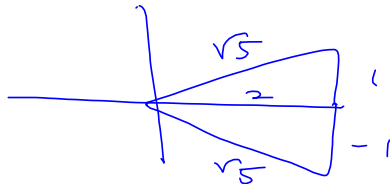
(c) $\sin x = \frac{2}{\sqrt{5}}$



$$(\sqrt{5})^2 - 2^2 = 5 - 4 = 1$$



(d) $\sec x = \frac{\sqrt{5}}{2}$ $\cos x = \frac{2}{\sqrt{5}}$



(e) $\sin x = 1$

