

1. (10 pts) Find two angles, between -2π and 2π (i.e., 0° and 360°) that are coterminal with $\frac{43\pi}{4}$. Give exact answers in degrees and radians.

"Mod out by 2π "

$$\frac{43\pi}{4} = \frac{40\pi}{4} + \frac{3\pi}{4} = 10\pi + \frac{3\pi}{4} \approx \frac{3\pi}{4} \text{ for pic.}$$

$\approx 135^\circ$ using cian's

5 times around

2. (5 pts) Find the arc length on a circle of radius $r = 7$ that is intercepted by an angle of 1935° .

$$13 = 3 \pmod 5$$

$$= 3 \text{ modulo } 5$$

$\frac{3\pi}{4} = 135^\circ$

$(\frac{180^\circ}{\pi \text{ rads}})(\frac{3\pi}{4})$

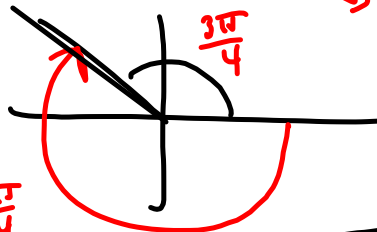
$\frac{3\pi}{4}, \frac{5\pi}{4}$

3. Suppose you know that $\cos(\theta) = \frac{5}{7}$.

- a. (5 pts) Assume the terminal side of the angle θ lies in the 1st quadrant. Find the other five trigonometric functions of θ .

$$135^\circ + 90^\circ = 225^\circ$$

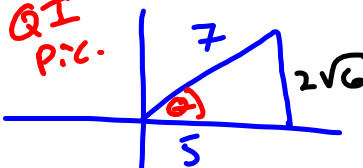
$$-225^\circ = -\frac{5\pi}{4}$$



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

$$b = \pm \sqrt{c^2 - a^2}$$

$$\cos \theta = \frac{5}{7}$$



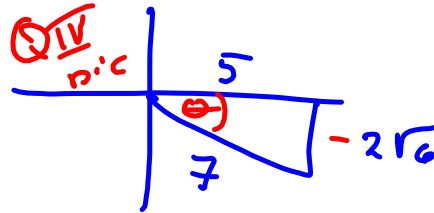
$$\sqrt{7^2 - 5^2} = \sqrt{49 - 25}$$

$$= \sqrt{24}$$

$$= 2\sqrt{6}$$

The other pic

No Q II pic possible.



Part c mixed-up degrees & radians, together

$$\pm 44.4153^\circ + 360n, \forall n \in \mathbb{Z}$$

Not $2\pi n$, silly!

6. (10 pts) Sketch the graph of $f(x) = 10 \sin\left(\frac{\pi}{8}x - \frac{\pi}{4}\right) + 15$

Amp: 10

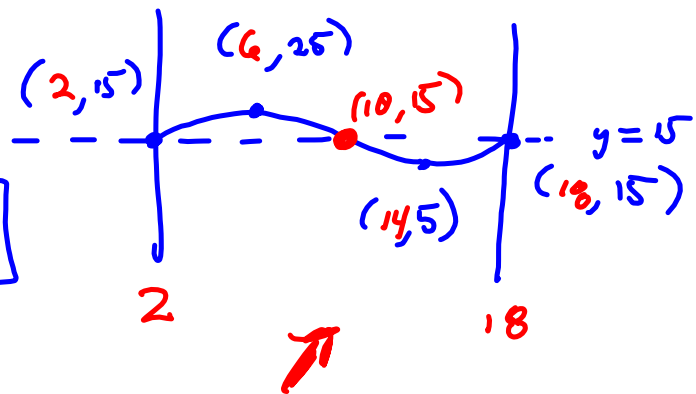
Period & Phase Shift
 $\frac{\pi}{8}x - \frac{\pi}{4}$ starting point.

up & down 10 from $y=15$
 $y=15$ is midline

T:
 $\frac{\pi}{8}x = 2\pi$

$$x = (2\pi) \left(\frac{8}{\pi}\right) = 16 = T$$

Start Point:



2

$$\frac{\pi}{8}x - \frac{\pi}{4} = \frac{\pi}{8}(x - 2)$$

$$\left(\frac{\pi}{4}\right) \left(\frac{8}{\pi}\right) = 2$$

$x=2$ is start.

36-hr day

1 -

⋮

36 -

High temp @

"3" and low temp

a) "21"

High is 57

Low is -11

Model w/
Cosine Funct.

High temp @ 3:

$$\cos(b(x-3))$$

Period is... 36

Want

$$bx = 2\pi, \text{ when } x = 36$$

$$36b = 2\pi$$

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

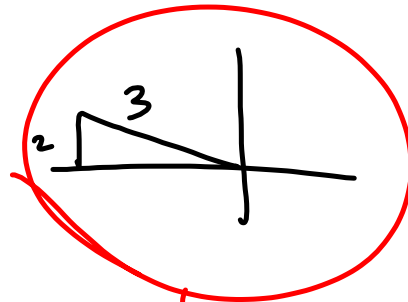
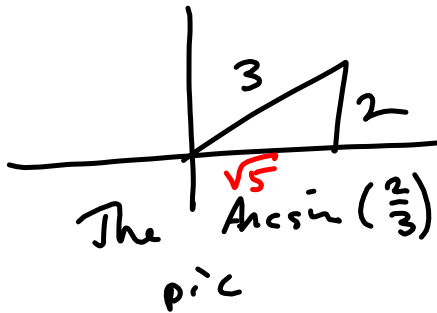
$$A \cos\left(\frac{\pi}{18}(x-3)\right) + C$$

$$\frac{\text{High} + \text{Low}}{2} = \text{midline} = \frac{57 + (-11)}{2} = \frac{46}{2} = 23$$

$$\frac{\text{High} - \text{Low}}{2} = \text{Ampl.} = \frac{57 - (-11)}{2} = 34 = A$$

$$34 \cos\left(\frac{\pi}{18}(x-3)\right) + 23$$

$$\sec\left(\sin^{-1}\left(\frac{2}{3}\right)\right) = \sec\left(\arcsin\left(\frac{2}{3}\right)\right)$$



↙ arcsine only
looks between
 $-\frac{\pi}{2}$ & $\frac{\pi}{2}$
 -90° & 90°

$$\begin{aligned} & \sec\left(\sin^{-1}\left(\frac{2}{3}\right)\right) \\ &= \frac{1}{\cos\left(\sin^{-1}\left(\frac{2}{3}\right)\right)} = \frac{1}{\frac{\sqrt{5}}{3}} = \frac{3}{\sqrt{5}} \end{aligned}$$