§1.5 Webassign #30

The table shows the maximum daily high temperatures in Las Vegas L and International Falls I (in degrees Fahrenheit) for month t, with $t = 1$ corresponding to January.†

Month, t	Las Vegas, L	International Falls, I
1	57.1	13.8
2	63.0	22.4
3	69.5	34.9
4	78.1	51.5
5	87.8	66.6
6	98.9	74.2
7	104.1	78.6
8	101.8	76.3
9	93.8	64.7
10	80.8	51.7
11	66.0	32.5
12	57.3	18.1

t = # of months.

Vegas: 104.1 is high t=7

− 57.1 is low t=1

47.0

Amplitude $= \frac{47}{2} = 23.5 = \frac{\text{HIGH}-\text{LOW}}{2}$ $23.5\cos(*)$

$y = \frac{\text{HIGH}+\text{LOW}}{2} = \text{midline} = \frac{104.1+57.1}{2} = \frac{161.2}{2} = 80.6$

y = 80.6 midline

(a) A model for the temperature in Las Vegas is given by $L(t) = 80.60 + 23.50\cos\left(\frac{\pi t}{6} - 3.67\right)$.

starts @ its high pt.

cos(t)

(0,1) $y = 0$ 2π

0

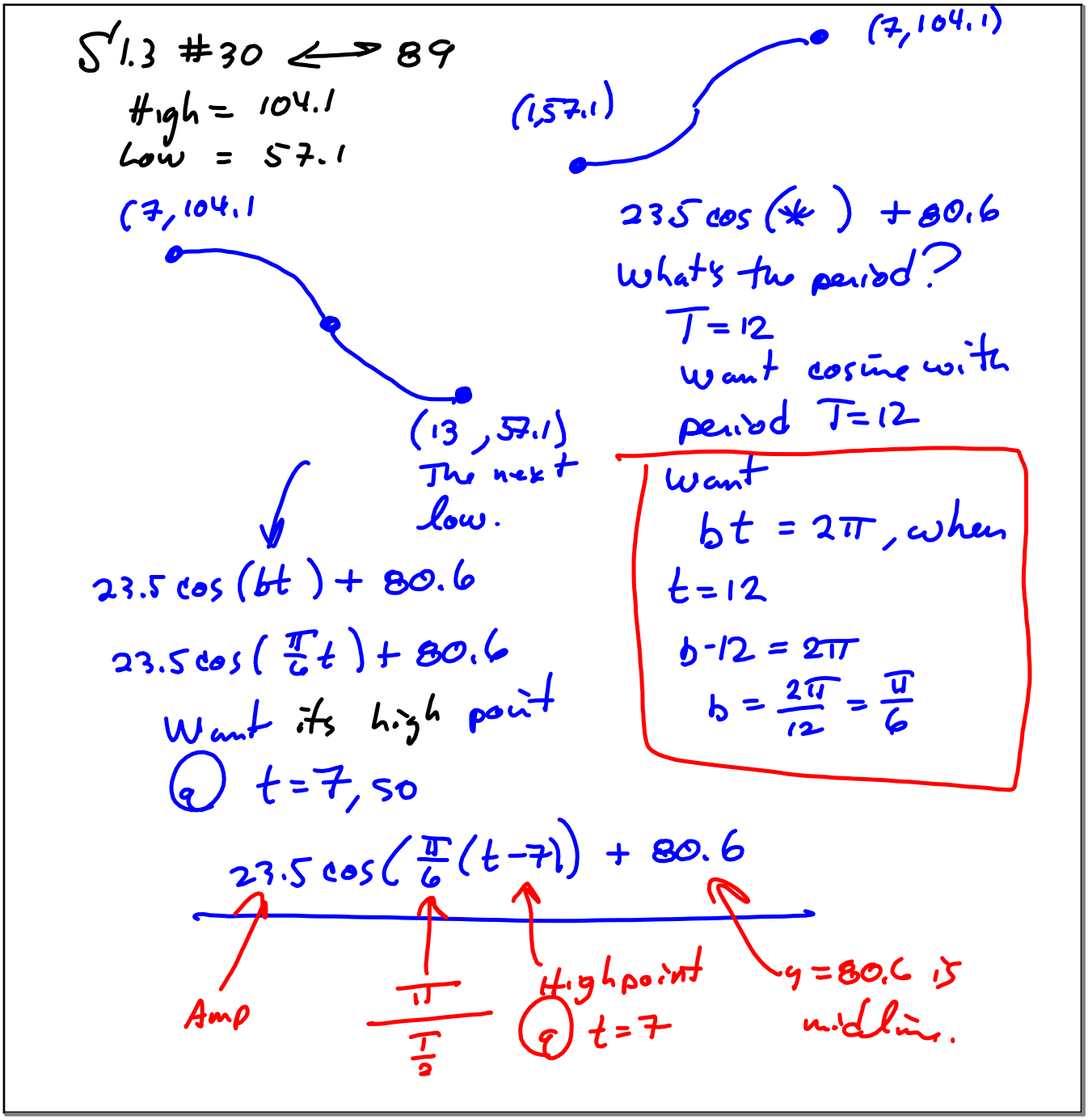
17cos(t)

(0,17) $y = 0$ $(\pi, -17)$

$y = 80.6 + 23.5\cos(t)$

Homework - Context 2pts
Space 2pts
clarity 2pts
Margin 2pts
Format 2pts
Paper 0 pts

Late - 5 pts


§1.3 #30 ↔ 89
high = 104.1
low = 57.1
(7, 104.1)
(13, 57.1)
The next low.
23.5 cos(bt) + 80.6
23.5 cos(π/6 t) + 80.6
Want its high point
① t = 7, so
(7, 104.1)
(1, 57.1)
23.5 cos(*) + 80.6
What's the period?
T = 12
want cosine with period T = 12
Want
bt = 2π, when
t = 12
b·12 = 2π
b = 2π/12 = π/6
23.5 cos(π/6 (t − 7)) + 80.6
Amp
π
T/2
High point
① t = 7
y = 80.6 is midline.

International Falls, *I*	
13.8	1
22.4	2
34.9	3
51.5	4
66.6	5
74.2	6
78.6	7
76.3	8
64.7	9
51.7	10
32.5	11
18.1	12

Low

High

$T = 12$

$\frac{13.8 + 78.6}{2} = 46.2 = y = \text{mid}$

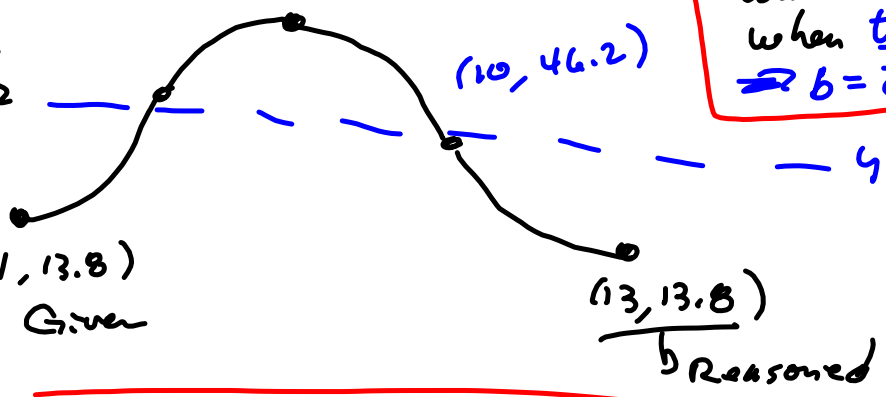
$\frac{78.6 - 13.8}{2} = 32.4 = \text{Amplitude}$

High @ $t = 7$

$32.4 \cos(b(t-7)) + 46.2$

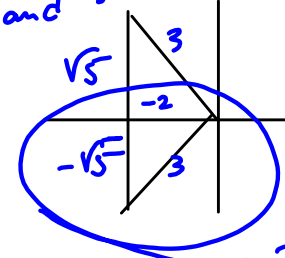
Want $bt = 2\pi$ when $t = 12$

$\Rightarrow b = \frac{\pi}{6}$



$y = 32.4 \cos\left(\frac{\pi}{6}(t-7)\right) + 46.2$

$\cos\theta = -\frac{2}{3}$, and $\sin\theta < 0$



Pics?

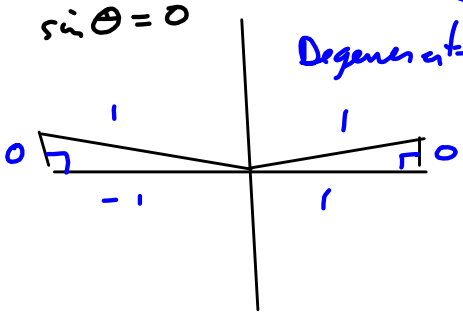
$\sqrt{3^2-(-2)^2}$

$=\sqrt{9-4} = \sqrt{5}$

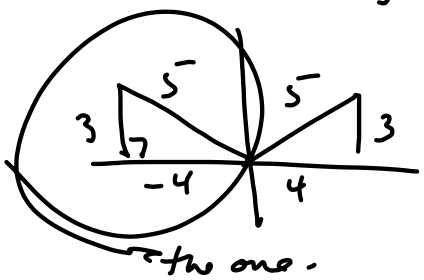
The one.

$\sin\theta = 0$

Degenerate (quadrant angle).



S.I.Y # $\sin\theta = \frac{3}{5}$, $\theta \in QII$



the one.

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

$3^2+b^2=5^2$

$\sqrt{5^2-3^2} = \sqrt{25-9} = \sqrt{16}$

$= 4$

$\notin QII$ makes $\neq -4$.

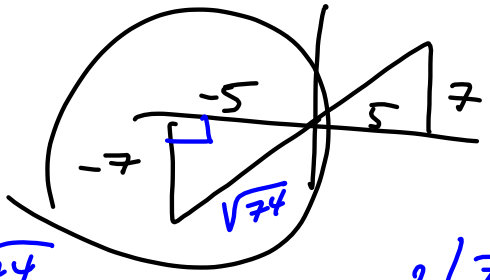
$\sin\theta = \frac{3}{5}$ $\quad \csc\theta = \frac{5}{3}$

$\cos\theta = -\frac{4}{5}$ $\quad \sec\theta = -\frac{5}{4}$

$\tan\theta = -\frac{3}{4}$ $\quad \cot\theta = -\frac{4}{3}$

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

$\{$ $\sin\theta < 0$



$\sqrt{5^2+7^2}$

$\sqrt{25+49} = \sqrt{74}$

$2\sqrt{74}$

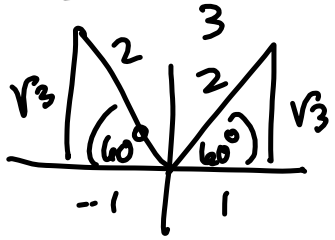
37

S 1.4 #93b

#s 91-96 Find the 2 solns of each eq'n. Give answers in degrees & radians
$\theta \in [0, 360^\circ)$ OR $[0, 2\pi)$
No tech!

(93) (a) $\csc\theta = \frac{2\sqrt{3}}{3} \Rightarrow \sin\theta = \frac{3}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

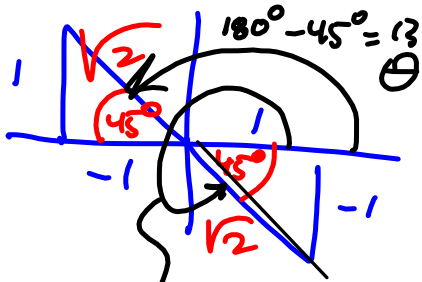
$= \frac{3\sqrt{3}}{2 \cdot 3} = \frac{\sqrt{3}}{2}$



$\Rightarrow \theta \in \{60^\circ, 120^\circ\}$

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

(b) $\cot\theta = -1 \Rightarrow \tan\theta = -1$ (Recip of $\cot\theta$)



$180^\circ - 45^\circ = 135^\circ$

$\theta \in \{135^\circ, 315^\circ\}$

$= \{\frac{3\pi}{4}, \frac{7\pi}{4}\}$

$360^\circ - 45^\circ = 315^\circ$

§1.6 #s 15-38 Sketch the graph of the function.

(22) $y = 3\csc(4x)$

$3y$ $\frac{x}{4}$

sin(x)

$(\frac{\pi}{2}, 1)$ $(0,0)$ $(\pi,0)$ $(2\pi,0)$ $(\frac{3\pi}{2}, -1)$

csc(x)

$(\frac{\pi}{2}, 1)$ $(\frac{2\pi}{2}, -1)$ $x=0$ $x=\pi$ $x=2\pi$

3csc(x)

3y

$(\frac{\pi}{2}, 3)$ $(\frac{3\pi}{2}, -3)$ $x=0$ $x=\pi$ $x=2\pi$

3csc(4x)

y x

$(\frac{\pi}{8}, 3)$ $(\frac{3\pi}{8}, -3)$ $x=0$ $x=\frac{\pi}{4}$ $x=\frac{\pi}{2}$