Wish I had worded Week 2 Assignment #4 differently.

I should have said "Sketch the angle" and *then* said

"Find the value of the 6 trig functions." The *idea* is to draw the picture and use the picture to answer the question. *sigh*

Some of the grading was a little harsh, to teach the lesson. Some of it was gentle, to allow for the learning curve. Learning what's expected and how to deliver it is the goal on the first couple-three assigments.

By Week 4, there will be no tolerance for formatting stuff, but a lot fewer formatting mistakes and mostly 4's and 4.5's for the work.

Out of 5 points:

.5 to 1.0 for final answer

.5 to 1 for context of the question (a complete report)

1 to 2 for lexicon on word problems.

2 to 4 for supporting work. The most you can get for unsupported work is 2 pts)

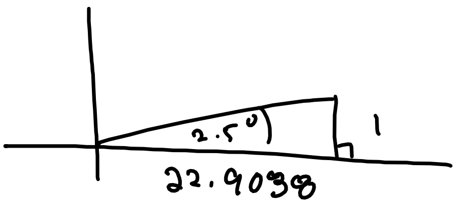
Formatting, clarity, problems in right order, etc., will be forgotten by me if remembered by you. When any of these aren't followed from Week 4 assignment, onward, will be 50% on down, depending on a quick assessment of how much math you appeared to get right.

You're learning some math *and* how to communicate in semi-formal writing.

#3 $\cot(2.5) \approx -1.3886$

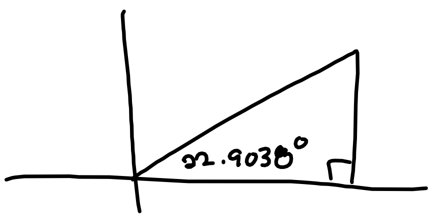
If you said 22.9038°, you're making 2 mistakes:

① you're in the wrong mode (Degrees)
② You interpreted this:



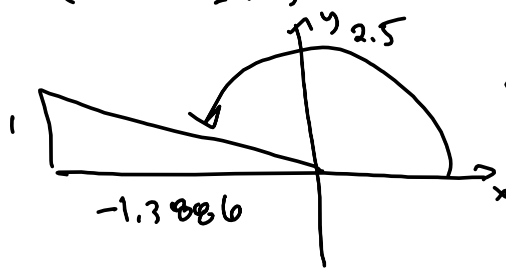
Yes, but wrong mode.

as this:



No

$$2.5 = (2.5)\left(\frac{180^\circ}{2\pi}\right) \approx 143^\circ$$



This is the picture for $\cot(2.5) \approx -1.3886$

Week 3 Notes

#3 - I simplified the square root of 58 incorrectly.

#7a - I didn't use degrees symbol.

There were one or two questions where multiple correct answers were possible because I didn't specify a range of values.

1. (5 pts) Evaluate $\sin\left(\frac{-11\pi}{3}\right)$ using its period as an aid.

2. (5 pts) Find the point on the unit circle corresponding to $t = \frac{7\pi}{6}$.

3. (5 pts) Use a calculator to find the value of $\cot(2.5)$ to 4 decimal places. Sketch this angle.

4. If possible, find the value of the 6 trigonometric functions at the real number t. Then sketch the angle

a. (5 pts) $t = \frac{5\pi}{3}$.

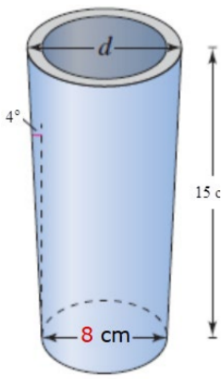
b. (5 pts) $t = -\frac{5\pi}{6}$

c. (5 pts) $t = \frac{3\pi}{2}$

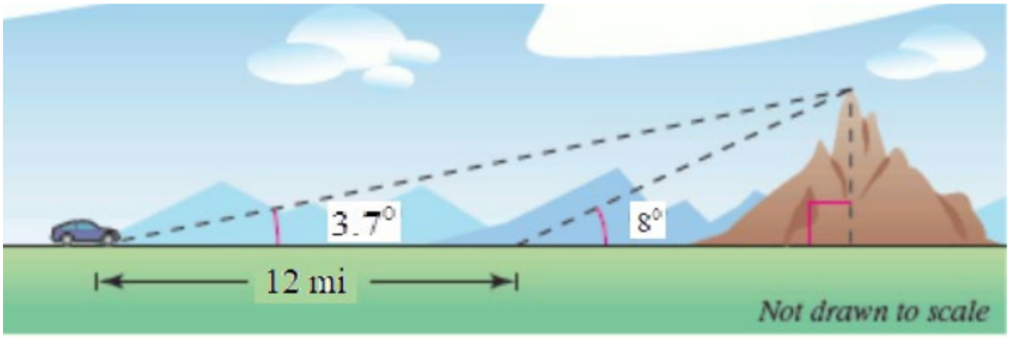
5. (5 pts) Find the *exact* value of the 6 trigonometric functions corresponding to the point $\left(\frac{5}{13},\frac{12}{13}\right)$ on the unit circle. Sketch this point.

6. (5 pts) If *f* is odd, then $f(-t)=$ and if *f* is even, then $f(-t)=$.

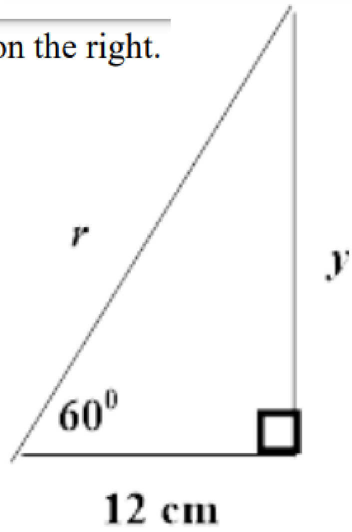
7. (5 pts) A tapered shaft has a bottom diameter of 8 cm at the small end, a height of 15 cm and a taper of 4^0. Find the diameter of the top of the shaft. See figure on the right.



8. (5 pts) In traveling across flat land, you see a mountain directly in front of you. Its angle of elevation (to the peack) is 3.7^0. After you drive 12 miles closer to the mountain, the angle of elevation is 8^0. Approximate the height of the mountain above the plain. Give your answer in feet, to the nearest foot. See figure, below:



9. (5 pts) Find the exact value of y and r from the figure on the right.



10. Find the *exact* values of θ in degrees $(0^0 < \theta < 90^0)$ and radians $(0 < \theta < \frac{\pi}{2})$, without using a calculator, given that... Also draw the triangles corresponding to each, as demonstrated in class.

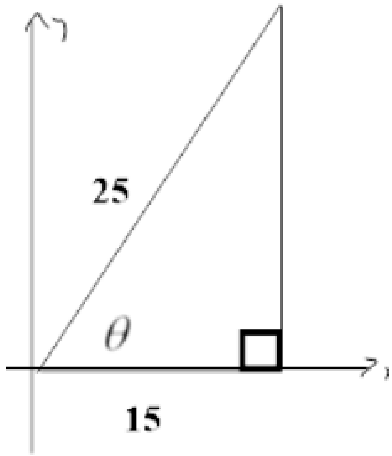
a. (5 pts) ... $\cos(\theta) = \frac{\sqrt{3}}{2}$

b. (5 pts) ... $\tan(\theta) = 1$

11. (5 pts) Use trig identities to transform the left side of the equation into the right side. Assume $(0 < \theta < \frac{\pi}{2})$:

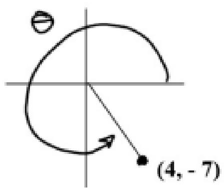
$\tan(\theta) + \cot(\theta) = \csc(\theta)\sec(\theta)$

12. (5 pts) Find the *exact* values of the six trigonometric functions of the angle θ shown in the figure on the right.



14. (5 pts) Use a calculator to evaluate $\sin\left(31^0\ 23'31''\right)$. Round your answer to 4 decimal places.

1. (5 pts) Find the exact values of the six trigonometric functions of the angle θ shown on the right.



2. (5 pts) Determine the quadrant in which the angle θ lies if $\sin(\theta) < 0, \cos(\theta) < 0$.

3. (5 pts) Find the *exact* values of the remaining trig functions if $\tan(\theta) = \frac{3}{7}, \cos(\theta) < 0$.

4. (5 pts) The terminal side of θ lies on the line $y = \frac{7}{3}x$ in Quadrant I. Find the value of the six trigonometric functions of θ, by using any point on the line (I suggest up 7, right 3 from (0, 0).).

5. (5 pts) Sketch the angle θ in standard position. Then find and label the reference angle θ' for $\theta = \frac{7\pi}{6}$.

6. (5 pts) Sketch the angle θ in standard position. Then find and label the reference angle θ' for $\theta = 207^0$.

7. Sketch the equation situation and find 2 solutions to each of the following. Give final answers in both radians and degrees, to 4 decimal places.

   a. (5 pts) $\sin(\theta) = -\frac{3}{5}$

   b. (5 pts) $\sec(\theta) = -\frac{7}{4}$

8. (5 pts) Sketch one period of the graph of $y = 5\sin\left(\frac{\pi}{3}x - \frac{11\pi}{3}\right) + 3$. If you followed along in class, then you know the easiest period to graph, and that's the period I most want to see. Label high points, low points and midline points. State the period, amplitude, horizontal shift, and vertical shift involved in the making of your graph.

9. (5 pts) In the 1.5 #4 on the WebAssign Homework, it says that $y = a\cos(bx - c) + d$ is a vertical translation of the basic function. Actually, it's a vertical stretch/shrink, horizontal stretch/shrink, a horizontal translation *and* a vertical translation of the basic curve. I just wanted to point that out. I'm not sure what WebAssign's thinking.

10. Suppose in some northerm clime, the hours of daylight on the longest day of the year is 22 hours and on the shortest day of the year is 2 hours.

    a. (5 pts) Build a cosine function that models this situation, where x gives the day of the year. The input will be the day (as a number) of the year, and the output will be the number of hours of daylight on that day.

Longest day is 22 hours. Shortest is 2 hours. Let *t* = the day of the year (as a number)

b. (5 pts) Assuming that there's a 12-hour day on the Spring and Fall equinoxes, and that all else remains the same. build a *sine* function that models this situation.

Facts to know: Winter Solstice is the shortest day. It falls on December 21st.
Spring Equinox falls on March 21st.
Summer Solstice falls on June 21st.
Fall Equinox falls on September 21st.

January 1st ⇒ $t = 1$
December 31st ⇒ $t = 365$
$= 0$

J	F	M	A	M	J
31	28	31	30	31	21st

6/21 ⇝ $t - 172$ in the argument.

$10\cos\left(\frac{2\pi}{365}(t-172)\right) + 12$

$bt = 2\pi$ when $t = 365$

$365b = 2\pi$

$b = \frac{2\pi}{365}$

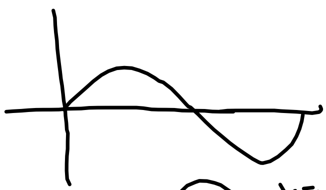
$\frac{365}{2}$ makes sense, but is a bit imprecise.

Using Sine:

$10\sin\left(\frac{2\pi}{365}(t-80)\right) + 12$

Equinox: 3/21 ⇝ $t = 80$

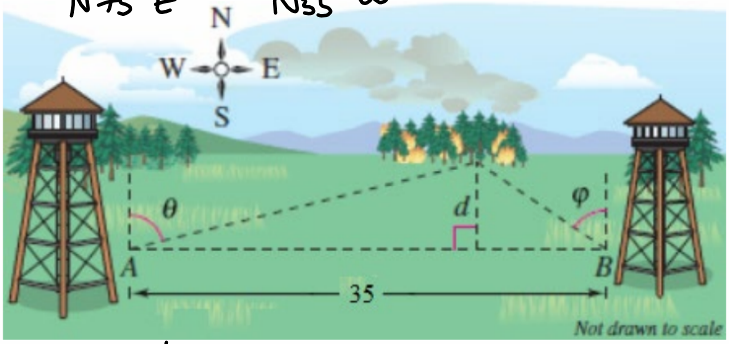
J	F	M
31	28	21



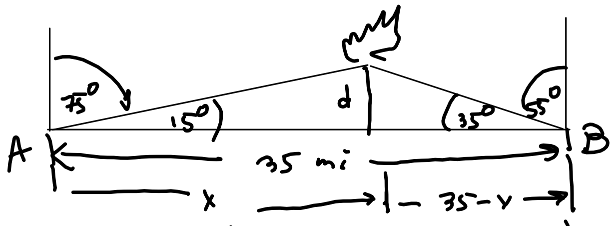
c. Confirm with a graphing utility that your answers to parts a and b are identical!

4. (5 pts) Fire tower *A* is 35 miles due west of fire tower *B*. A fire is spotted from the towers, and the bearings from *A* and *B* are $\theta = 75^0$ and $\phi = 55^0$, respectively. Find the distance *d* of the fire from the line segment *AB*.

N75°E N55°W



Lexicon:
d = distance from line between Station A & B and the fire (miles)



$\frac{1}{\sqrt{3}}$:

$1.732 \overline{)1.000}$

$\frac{\sqrt{3}}{3}$

$3 \overline{)1.732}$

$\tan 15^0 = \frac{d}{x}$ $\tan 35^0 = \frac{d}{35-x}$

$\Rightarrow x \tan 15^0 = d = (35-x)\tan 35^0$

$\rightarrow ax = (35-x)b$, where $a = \tan 15^0$, $b = \tan 35^0$

$\Rightarrow ax = 35b - bx \Rightarrow$

$ax + bx = 35b \Rightarrow$

$x(a+b) = 35b \Rightarrow$ ← I originally left this out.

$x = \frac{35b}{a+b} = \frac{35 \tan 35^0}{\tan 15^0 + \tan 35^0} \approx 25.3133227934$

$d = x \tan 15^0 \approx 25.3133227934 \tan 15^0$

$\approx$ **6.78268440024 mi ≈ d**

~~Seems like a short distance, but I don't see my mistake if I made one, which I almost NEVER do, unless I'm awake.~~

We got it fixed.
Thanks, Alexis!

$\left(\frac{3}{1+\sqrt{2}}\right)\left(\frac{1-\sqrt{2}}{1-\sqrt{2}}\right)$

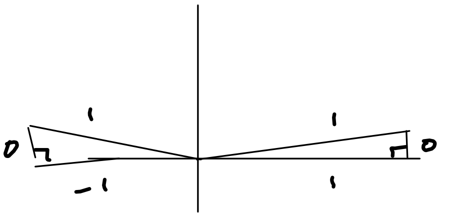
$= \frac{3-3\sqrt{2}}{1^2-\sqrt{2}^2} = \frac{3-3\sqrt{2}}{-1}$

$= \frac{3\sqrt{2}-3}{1} = 3\sqrt{2}-3$

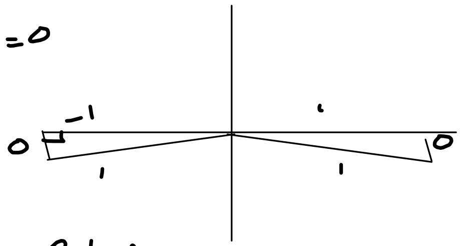
WebAssign Homework before Weekly Assignment

Quizzes on WebAssign optional.

Learn my 5 triangles

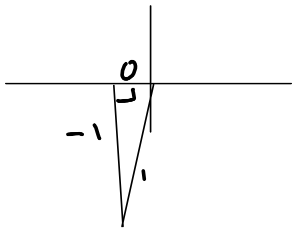


$\sin\theta = 0$

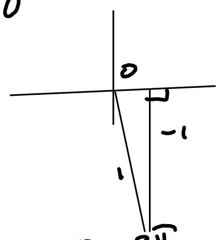


$\sin\theta = -1$

Two equivalent pics:



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



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

$\cos\theta = 1$