Week	Where We're At	WEEK OF
1	Startup Activities, Secs 1.1, 1.3	1/13
2	Secs 1.1, 1.3 due Tuesday Sec 1.4, 1.2 due Thursday	1/20
3	Secs 1.5, 1.6 due Tuesday Sec 1.7, Early-Bird 1.8, due Thursday	1/27
4	Sec 1.8 Due Tuesday	2/3
5	Test 1 over Chapter 1, is Thursday, 2/13 No Classes, Conversation Day, Tuesday, 2/11 Secs 2.1 - 2.3	2/10

Revision to schedule

This belongs in week 5. I had it in week 4, with the right date.

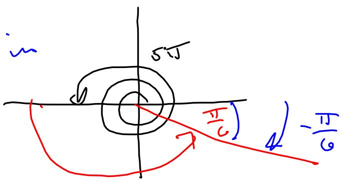
From Fall '16 Test 1:

1. (10 pts) Find two angles, between -2π and 2π (i.e., 0^0 and 360^0) that are coterminal with $\frac{35\pi}{6}$. Give exact answers in degrees and radians.

M1 Radians $\frac{35\pi}{6} = \frac{30}{6}\pi + \frac{5\pi}{6} = 5\pi + \frac{5\pi}{6}$

coterminal with π

You need to "think" in π radians for this method.



$\frac{5\pi}{6}$

$\frac{5\pi}{6} + \pi = \frac{(5+6)\pi}{6} = \boxed{\frac{11\pi}{6}} \boxed{= 330^0}$

OR $\boxed{-\frac{\pi}{6}} \boxed{= -30^0}$

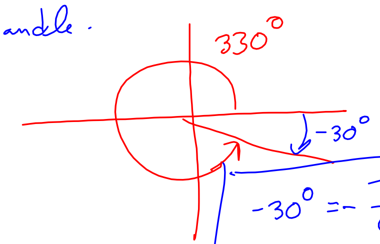
M2 Degrees!

$\left(\frac{35\cancel{\pi}}{\cancel{6}}\right)\left(\frac{\cancel{180^0}}{\cancel{\pi}}\right) = (35)(30)^0 = 1050^0$

Method 2 seems easier for students to handle.

$\frac{1050}{360} \approx 2.916666667$

$1050 - 2 \cdot 360 = 330^0$



$\boxed{\begin{array}{l} -30^0 = -\frac{\pi}{6} \\ 330^0 = \frac{11\pi}{6} \end{array}}$

$(-30^0)\left(\frac{\pi}{180^0}\right) = -\frac{\pi}{6}$

$(330^0)\left(\frac{\pi}{180^0}\right) = \frac{11\pi}{6}$

$\frac{33}{18} = \frac{11}{6}$

2. Arc Length and Area of Sector. Suppose we have a circle of radius $r = 6$.
   a. (5 pts) Find the arc length on the circle, that is intercepted by an angle of 2344^0. Round to 3 decimal places.
   b. (5 pts) Find the *exact* area of the sector that is intercepted (swept through) by an angle of $\theta = \frac{2\pi}{3}$

(a) $s = r\theta = (6)(2344^\circ)\left(\frac{\pi}{180^\circ}\right) = \frac{1172}{5}\pi \approx$ 245.4631060

$\boxed{s \approx 245.463 \text{ units}}$

Teacher didn't specify units, like an idiot.

(b) $A = \frac{1}{2}r^2\theta = \frac{1}{2}(6)^2\left(\frac{2\pi}{3}\right)$

$= \frac{36\pi}{3} = \boxed{12\pi \text{ units}^2}$

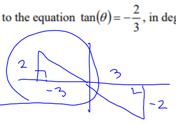
PERFECK!

3. Answer the questions about the equation $\tan(\theta) = \frac{-2}{3}$.
   a. (5 points) Sketch two triangles that satisfy $\tan(\theta) = \frac{-2}{3}$.
   b. (5 pts) Assume the terminal side of the angle θ lies in the 2nd quadrant. Find the other five trigonometric functions of θ.
   c. (5 pts) Again, assuming θ's terminal side lies in Q II, and $0 \le \theta < 2\pi$, find θ, in radians *and* degrees, rounded to 3 decimal places.

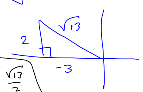
   must be positive, then.

   d. (5 pts) Give *all* solutions to the equation $\tan(\theta) = -\frac{2}{3}$, in degrees *and* radians, rounded to three (3) decimal places.

(a) $\tan\theta = -\frac{2}{3}$



(b) $\sqrt{2^2+3^2} = \sqrt{4+9} = \sqrt{13}$, so

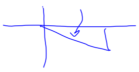


$\sin\theta = \frac{2}{\sqrt{13}}$	$\csc\theta = \frac{\sqrt{13}}{2}$
$\cos\theta = \frac{-3}{\sqrt{13}}$	$\sec\theta = -\frac{\sqrt{13}}{3}$
$\tan\theta = -\frac{2}{3}$	$\cot\theta = -\frac{3}{2}$

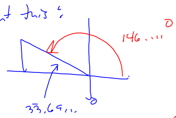
(c) $\arctan\left(-\frac{2}{3}\right) \approx$ -0.5880026036 $\approx$ -33.69006751°

Method 1.

gives us this:



We want this:



So, $180^\circ - 33....^\circ \approx$ 146.3099325

Method 2

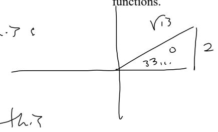
$\arccos\left(-\frac{3}{\sqrt{13}}\right) \approx 146.3099325^\circ$ in one step, straight from $\cos^{-1}$ key on calculator.

Method 3

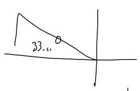
$\arcsin\left(\frac{2}{\sqrt{13}}\right) \approx$ 33.69006751

Ya gotta INTERPRET what your calculator is saying, when you use these inverse trig functions.

gives us this:



We want this



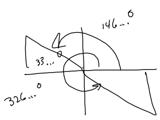
so subtract the 33.69006751° from 180° to get the 146.3099325°

Round to 3 places:

2.553590051

$\boxed{\theta \approx 146.310^\circ \approx 2.554 \text{ radians}}$

for the 2nd quadrant answer.



$360^\circ - 33...^\circ \approx$ 326.3099325°

$\approx$ 5.695182706 radians

So, ALL solutions:

$\theta \in \{ x + 2n\pi \mid x \approx 2.554 \text{ or } 5.695, n \in \mathbb{Z} \}$

OR $\{ x + 360^\circ \mid x \approx 146.310^\circ \text{ or } 326.310^\circ, n \in \mathbb{Z} \}$

OR observe that the 2 pi's are exactly 180° apart and write

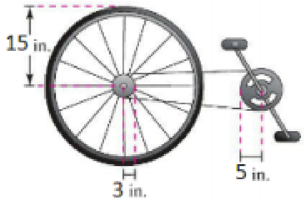
$\theta \in \{ x + 180^\circ n \mid x \approx 146.310^\circ, n \in \mathbb{Z} \}$

OR $\{ x + n\pi \mid x \approx 2.554, n \in \mathbb{Z} \}$

4. (10 pts) Sketch one period of the graphs of $y = \sin(x)$ and $y = \csc(x)$ on the same set of coordinate axes.

See Tuesday's notes.

5. (10 pts) The radii of the pedal sprocket, the wheel sprocket, and the wheel of the bicycle in the figure are 5 inches, 3 inches and 15 inches, respectively. A cyclist is pedaling at a rate of 1.4 revolutions per second. Find the speed of the bicycle in feet per second. Then convert that to miles per hour. Round final answers to 1 decimal place.



This is all about arc length.

$$\left(\frac{1.4 \text{ revs front}}{1 \text{ sec}}\right)\left(\frac{5 \text{ revs rear}}{3 \text{ revs front}}\right)\left(\frac{2\pi \text{ radians}}{1 \text{ rev rear}}\right)\left(\frac{15 \text{ inch radius}}{\text{rear}}\right)\left(\frac{1 \text{ ft}}{12 \text{ in}}\right)$$

$\frac{\text{Revs rear}}{\text{sec}}$

$\frac{\text{Radians rear}}{\text{sec}}$

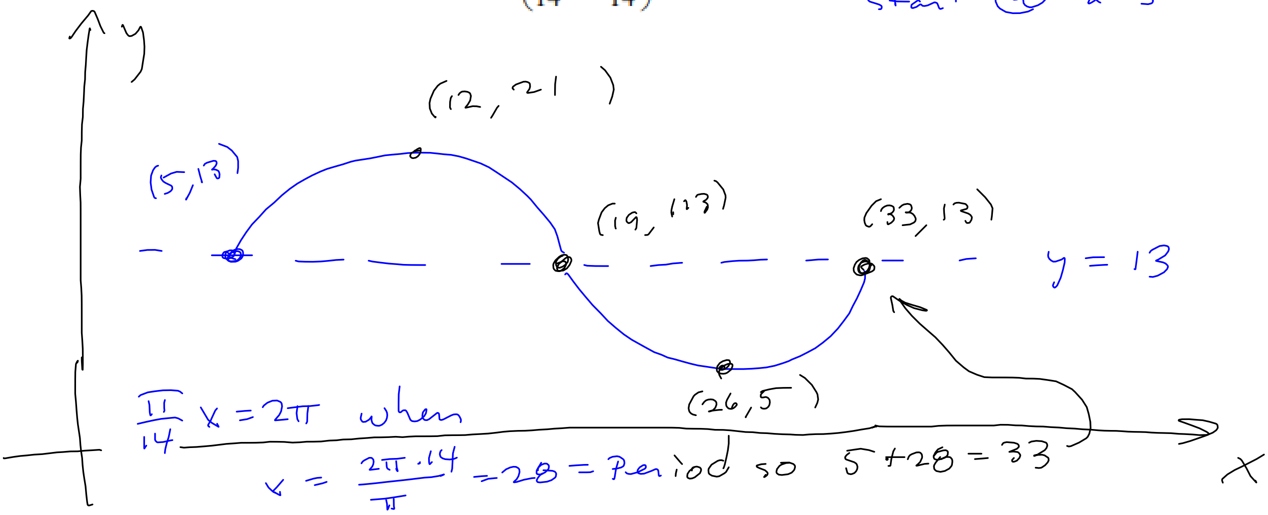
$\frac{\text{inches on ground}}{\text{sec}}$

$\frac{\text{miles}}{\text{hr}}$: Take previous & convert via

$$\left(\text{Previous } \frac{\text{ft}}{\text{sec}}\right)\left(\frac{60 \text{ mi/hr}}{88 \text{ ft/sec}}\right)$$

6. (10 pts) Sketch the graph of $f(x) = 8\sin\left(\frac{\pi}{14}x - \frac{5\pi}{14}\right) + 13$

$\frac{\pi}{14}(x-5)$
start @ $x=5$



$\frac{\pi}{14}x = 2\pi$ when
$x = \frac{2\pi \cdot 14}{\pi} = 28 = \text{Period}$ so $5+28=33$

$\frac{28}{4} = 7$ Add 7 each step

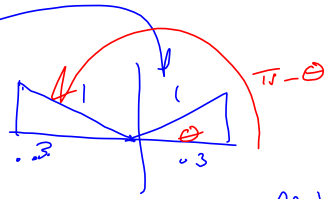
$5+7=12$
$12+7=19$
$19+7=26$

Now use amplitude $8\sin(\_\_) + \_\_$
$A=8$. Go up & down 8 from the
midline: $13+8=21$
$13-8=5$

S1.7 #14

arccos(.3)

arccos(−.3)



Mills got the final answer wrong.

1.875488981 ≈ arccos(−.3)

is in radians.