Lesson Plan 3 - Numbers and Angular Speed

1) Take attendance - record any new students
2) Announce situation with Add-Codes
3) Remind everyone to sign up for WebAssign Code 6603 4099
4) Question about homework?
5) Collect Homework
6) Announce Quiz on Thursday 8.1, 8.2 6.1(What we do today)
7) Hand out in-class and explain the problem

All of you did show you understand the lesson, so you will all get full credit for this assignment.

I gave up trying to finish grading because you wore me out with number issues. Some of your issues were arithmetic.

This is not an arithmetic class so any deductions I make on a test or quiz for arithmetic errors will be minor.

Some errors were careless, eg. Writing down 40 instead of 45. Meticulousness is important in math and in many other areas of life.
This is not a class in meticulousness so any deductions I make on a test or quiz for careless errors will be minor.

You should try to reduce fractions to lowest terms when possible. This is not a class in fractions and so any deductions I make on a test or quiz for not reducing fractions will be minor.

You should try to simplify radicals, for example $\sqrt{48} = 4\sqrt{3}$

I don't care if a radical is in the denominator like some teachers. eg. $\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

This is not a class in radical simplification so .....

That is not to say that arithmetic, meticulousness and reducing fractions and simplifying radicals are not important skills. You should already have these skills, and if they are poor, you should seek help on your own. Not all teachers will have the same perspective on this.

Acceptable Numbers

1) Official policy is on the website now, take a look.

2) We will run into problems requiring two different types of answers in this class. Problems requiring exact answers and problems that will have inexact answers.

In mathematics we are interested in exact abstract quantities. An example is π. We use the Greek symbol π because we cannot write down an exact numerical description, such as with 0, or 1. Note that 0 and 1 are themselves abstract symbols.

When doing real world problems, we are dealing with measurements. Most measurements are inexact. The only exception is with counts.

In homework/in-class problems, quizzes, tests and the final, you will have to know which type of answer is expected. Sometimes the problem will tell you.

For example, if a problem says "Round to x decimal places", what is asked for is an inexact quantity. Please provide the stated number of decimal places. If a problem says, provide an exact answer, then you must provide an exact answer.

If a problem expects an inexact answer, then the answer will be a single number. If a problem expects an exact answer, the answer may be a single number or it may be an expression, for example: $\pi\sqrt{2}$ or $\cos(.123)$.
When providing an exact answer, decimals are frowned upon. Instead use a fraction. Not all decimals can be written exactly, eg. 1/3 although there is the repeating decimal notation. I will accept all exactly correct answers, but I recommend using fractions. Un reduced fractions are also frowned upon, but will be accepted.

If the problem description does not indicate what type of answer is expected you can use the following rules.

1) When in doubt, provide an exact answer.
2) If one or more of the numbers used to get the answer are written with a decimal point, an in-exact answer is expected
3) If a trig function result cannot be written symbolically, provide an in-exact answer.
4) If a problem clearly involves measurement, provide an in-exact answer.

Significant figures:

In science, when given a calculation involving measurements, it is important to provide an answer that does not change the implied accuracy of the answer. An approximation for accuracy is to use "Significant figures".
This is a convention used in most scientific and engineering environments.

How many significant figures are in a number.

In general, non-zero digits and embedded zeros are significant.

Leading zeros are never significant.

Example: .000000506 (3 significant figures

Trailing zeros to the left of a decimal point are usually not significant

Example 432000. (3 significant figures

Trailing zeros can be made significant buy using an under or over bar on the last one

Example $4320\underline{0}0$ (5 significant figures

Trailing zeros to the right of a decimal point are always significant.

Example 3.00 (3 significant figures

When using normalized scientific notation in standard form, all digits are always significant

Example 5.7431×10^{-27} (5 significant digits

Pass out Handout

Break!

Angles in Standard Position, Co-Terminal Angles

First a correction from last week

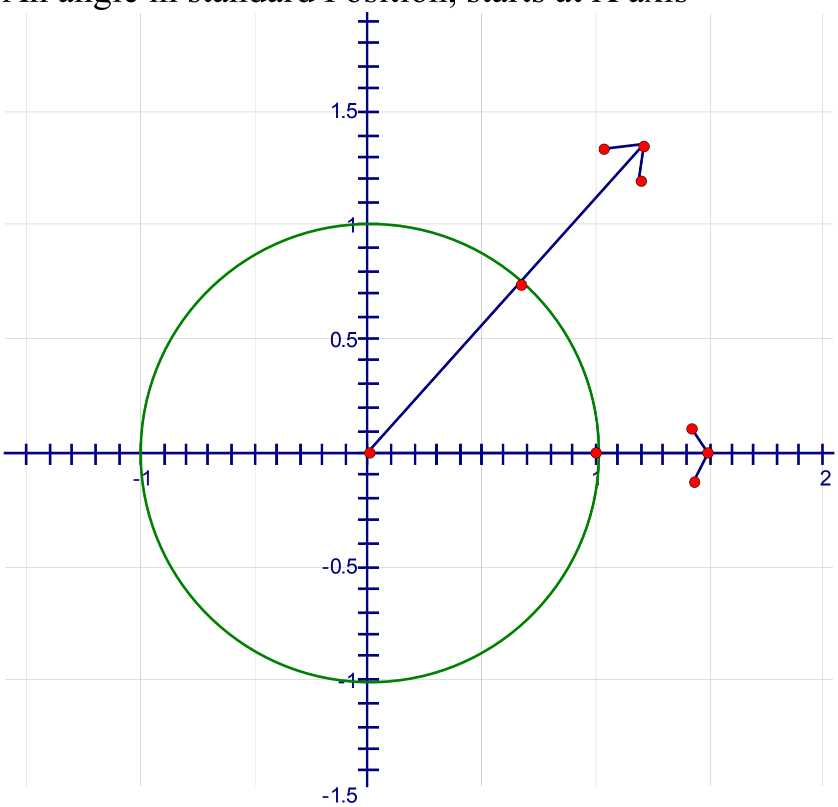
The correct way to show that two angles are equivalent would be:

$390^\circ \equiv 30^\circ$

or better yet:

$390^\circ \equiv 30^\circ \, Mod(360)$

An angle in standard Position, starts at X axis



Two angles that are co-terminal if their rays coincide.
So co-terminal angles are equivalent, though not equal

$390 \neq 30$

Angular Motion

If θ is an angle using radian measure, then

$s = r\theta$

Where r is the radius of a circle and s is the arc length subtended by the angle in the circle.

Consider this equation:

$$v = \frac{d}{t}$$

v is a linear velocity, and *d* is a linear distance.

if we think of *s* in the first equation as a distance *d* then we can divide both sides of that equation by *t* time.

$$v = \frac{d}{t} = \frac{s}{t} = r\frac{\theta}{t}$$

Let $\omega = \frac{\theta}{t}$ be called the angular velocity, Radian/Unit-time

Then we have $v = \omega r$

That is the linear velocity of a point on a circle is the angular velocity times the radius.

Example: The wheels on a tire are rotating 10 times a second. The radius of a tire is 14 inches. How fast is the car moving?

$$v = \omega r = \left[\left(\frac{10}{\sec}\right)\left(2\pi\langle Radians\rangle\right)\right]\left(14 inches\right) = ?$$

Homework

Read Section 6.1
Problems on page 441 69, 70, 71, 73, 76