MATH 190, Lab 2: Sept 18 and 20, 2018

Work through the following problems while the TAs circulate. When you have completed the problems (to the satisfactory of the facilitators) you can spend the rest of the lab working on the trigonometry practice problems given in the class worksheet. (The worksheet is posted on Canvas.)

Warm up

1. (a) Using the unit circle, identify the terminal side of the following angles.

$$\frac{14\pi}{3}, \quad \frac{11\pi}{2}, \quad -\frac{3\pi}{4}$$

(b) Evaluate

i. $\sin\left(\frac{14\pi}{3}\right)$

ii. $\cos\left(\frac{11\pi}{2}\right)$

iii. $\tan\left(-\frac{3\pi}{4}\right)$

Problems

1. (a) Show that for any angle θ, the following identity is always true.

$$\sin^2\theta + \cos^2\theta = 1.$$

(b) Let

$$f(x) = 3\sin^2 x + 2, \qquad g(x) = -(\cos^2 x + 5\sin x).$$

Find the point(s) where the graphs of f and g intersect. (Consider only the x coordinates in $[0, 2\pi]$.)

How to get started:
* How to formulate "*two functions intersect at some point*"?

* How to solve the resulting equation? Can I apply factoring? why/why not?

* Can I first simplify the resulting equation then apply factoring? Think about using part (a) to simplify.

2. Suppose you need to find the height of a tall building. Standing 20 meters from the base of the building, you aim a laser pointer at the closest part of the top of the building. The laser pointer is held 2 meters above the ground. You measure that the laser pointer is 15° tilted from pointing straight up. How tall is the building? (Leave your answer in a calculator-ready form.)

How to get started:
* Read the question carefully and draw a picture of the scenario.

* Assign the given values to your picture and label the unknown value in the picture.

* Based on the picture, what mathematical formula can be used to find the unknown value? Any trig ratio?

Reflection: (Individually) Think about the initial strategies that you usually apply to start solving a math problem and write them down. You may choose from the following list:

- Reading the problem carefully.
- Sketching a diagram or picture if possible.
- Looking for any clue words.
- Using basic known formulas.
- Translating words into mathematical concepts.
- Relating the problem to a topic in the course.