Worksheet #1 Answers
Math 221, Lecture EL1
Wednesday, August 26th, 2015

Instructions. Put your first and last name at the top of your paper. Everyone is to do their own worksheet but only one from each group is graded with the score shared. Be sure to show your work and explain your reasoning, present your solutions in an intelligible fashion, and circle your answer. Staple all of your group’s work together, and give it to your TA at the end of the Discussion Section.

1. Find the equations for the following lines in \( y = mx + b \) form and sketch their graphs. Label the \( x- \) and \( y- \) intercepts with their coordinates.

   (a) The line with slope 3 and \( y \)-intercept -3.
   Answer: \( y = 3x - 3 \) (The \( y \)-intercept should be labeled as \((0, 3)\) and the \( x \)-intercept should be labeled as \((1, 0)\).)

   (b) The line which contains the points \((-1, -1)\) and \((2, 2)\).
   Answer: \( y = x \) (The point \((0, 0)\) should be labeled as the \( y- \) and \( x- \) intercepts)

2. If \( f(3) = 3 \) and the tangent line to the graph of \( f \) at \( x = 3 \) has \( y \)-intercept 6, what is \( f'(3) \)?
Answer: $f'(3) = -1$.

3. (For this question, include units in your answers.)
The height (position) and velocity of a projectile (in feet) at time $t$ (in seconds) is given by

$$p(t) = -20t^2 + 20t + 40, \quad v(t) = p'(t) = -40t + 20$$

Shown is the graph of $p(t)$.

(a) How high was the projectile when it was fired?
Answer: 40 feet

(b) How fast was the projectile fired?
Answer: 20 feet/second

(c) When is the projectile at its highest point? What is the highest point?
Answer: $t = 0.5$ seconds, height = 45 feet.

(d) When does the projectile hit the ground?
Answer: $t = 2$ seconds

4. Determine the point of intersection of the two lines determined by $2y - 14x = -14$ and $y + 2x = 2$.
Answer: $(1, 0)$. 