

**Math 132**  
**Homework 5**  
**due April 30**

**April 16**

Instructions: Do all of the problems fully. Make sure your name is on every sheet which you turn in. You must offer explanations/justifications for your answers in order to receive credit. Feel free to work with others, but you must turn in your own homework.

1. For this problem, we will use worksheet #8 as a reference. Suppose that Bret and Murray are going to race on a bike path that is 75 miles long, and that they will bike at the constant rate that they biked during the practice. Since Murray is faster, he will give Bret a head start.
  - (a) Suppose Murray starts an hour after Bret. Let  $t$  be the time in hours after Bret has started.
    - i. Create a graph depicting this situation.
    - ii. What is the formula for the distance Bret has traveled at a given time  $t$ ?
    - iii. How far has Murray traveled after 1 hour? 2 hours? 3 hours? Write a formula for the distance Murray has traveled after he starts biking, using these data. Is this formula in your graph anywhere?
    - iv. What is the physical interpretation of the  $y$ -intercept in your previous answer?
    - v. Will Murray catch up to Bret by the end of the race? If so, when, and at what mile?
  - (b) If Murray wanted to finish at the exact same time as Bret, how long of a head start would he have to give Bret? Answer this question both by drawing it on a graph, and by using equations (although you might want to start by drawing a graph).
2. Write and solve your own linearity word problem. It should feature two linear relationships, and you should solve for when the two “outputs” are equal. Solve your problem both graphically and by using equations. You are free to write make it whatever you want, with the following provisos:
  - (a) At least one of the relationships should have a negative  $y$ -intercept, and both should have a positive slope.
  - (b) It needs to be a word problem: don't just write down two equations and work on it, but give it some real world context.
  - (c) Don't just make another distance problem like we did in class. The relationship can be anything you want, just not distance as it relates to time.