Runners Activity

1) Ms. Roy and Mr. Fandel are competing in a walking race. Ms. Roy walks at a pace of 2ft/sec and Mr. Fandel walks at pace of 5ft/sec. Mr. Fandel is giving Ms. Roy a 4yd head start because he knows he walks faster.

    a. When will Mr. Fandel catch up to Ms. Roy?
    b. How long (time and distance) should the race be so that Ms. Roy will win in a close race?
    c. The moment Mr. Fandel catches up to Ms. Roy, his shoe becomes untied. Define an amount of time it takes Mr. Fandel to tie his shoe and find the amount of time it takes him to catch up to Ms. Roy.
    d. (Extension) Once Mr. Fandel is 15 ft ahead of Ms. Roy he walks backwards at a pace of 3ft/sec, Ms. Roy gets mad and starts to run at a pace of 6ft/sec. When will she catch up to Mr. Fandel?

2) For the sake of a class discussion, let us agree that the *x-axis* will represent *time*, and the *y-axis* will represent *distance*.

    a. Act out the race with a friend. (It helps to go into a room that has tiles that are 1 ft long…)
    b. Find equations for each runner, and graph them on an xy-plane.
    c. Can you connect acting out the race with the graph? What do you noctice?
    d. Look at the two equations: What role does slope play in this race? Explain in words.
    e. What are the y-intercepts for each runner? Describe how it affects each runner in this race.
    f. What are the x-intercepts for each runner? Describe how it affects each runner in this race.

3) Ms. Roy did not like leading the race with such a head start so decides to start at the same place as him. Mr. Fandel is considerate, and quietly lets her start 6 seconds early.

    a. Write a new equation for Ms. Roy, and graph it on the xy-plane.
    b. How long will it take for Mr. Fandel to catch up with her?
    c. How long should the race be for Mr. Fandel to win?
    d. What are the y-intercepts for each runner? Describe how it affects each runner in this race.
    e. What are the x-intercepts for each runner? Describe how it affects each runner in this race.

4) Notice that Ms. Roy's walking equation can also be written as

$$y = 2x + 12 = 2(x+6)$$

a. Explain in words why these equations are equal.
b. Graph the equation of the lines that represent Ms. Roy's running, once with a head start and once without a head start.
c. Notice that Ms. Roy's line with a head start is shifted to the left compared to her original line without head start. Why is this line shifted left even though a 6 was *added* to the x in the equation y= 2(x+6)?