Race to Tie 2: Twists

Groups that finish early have the following twists available:

1) Keeping bot 1 at a 10 inches up the track, move bot 2 forward 10 inches to a start at 50 inches up the track. Will the bots take less or more time to tie? Make a prediction. Redesign your equations and calculate where the bots will tie. Once your calculations are complete, test your hypothesis. What happened?

2) Start both bots at 10 inches and 40 inches as they are in the original lab. Now the speed of bot 1 must be 4 times the speed of bot 2. Make a prediction about what you think will happen. Pick two speeds that satisfy the parameters and write the two linear equations that model the speeds and starting places of the bots (remember that the slope must be the speed in inches, not degrees). Calculate where the bots will tie and test the hypothesis. What happened?

3) Your bots need to tie at a point where the y-coordinate (distance in inches) is double your x-coordinate (time in seconds). The x-coordinate must be greater than 4 (the race must be longer than 4 seconds). Pick speeds and determine the linear equations for both bots such that they satisfy the parameters. Test your hypothesis for accuracy.