Name_____ Period_____ Date_____

Investigating Linear Systems with Distance, Time, and Speed Relationships

http://www.nctm.org/standards/content.aspx?id=25037

Getting familiar with the applet:

Click on the "boy" icon in the box to turn it off.

The girl starts at the house and moves toward the tree. Have her step size be 1. Run the simulation.
How many "seconds" did she take to get to the tree?_____ How many "steps" was it to the tree?_____ How do these two facts relate to her step size being 1?_____
_____ What is the speed with which she moves? (include units) _____ How does the speed affect the graph? _____
_____
What is the domain for this graph? _____
What is the range?_____

What would the graph look like if the girl moved 2 steps per second?
_____ Set up the applet for this scenario and run it. Where would the graph end if she started at the house (0,0)?
_____

What would the graph look like if the girl moved 3 steps per second?
_____ Where would the graph end if she started at the house (0,0)?
_____

What would the graph look like if the girl moved 4 steps per second?_____
Where would the graph end if she started at the house (0,0)? _____

Starting the systems…
Now, click on the "boy" icon in the box so he can enter our scenarios.

1. Have the boy and girl both start at the house and run toward the tree at the same speed. You determine what speed you would like them to move. What does the graph look like? _____
Explain._____
_____
_____
_____

2. Choose for either the boy or girl to move at a faster rate of speed than the other when they both start at the house.
Who reaches the tree first?_____
Explain how you know.
_____
_____
_____How is this fact shown on the graph?
_____How is the faster speed reflected on the graph?
_____ Is the domain different for the boy than for the girl? _____ Is the range different?_____

3. In this scenario, decide if the boy or the girl will move slower. Give the slower moving person a "head-start." Run the simulation to see who gets to the tree faster. Estimate how much of a head start the person needs at those same speeds in order to reach the tree first. Write down the details of this scenario based on the choices you made for the speeds.

_____
_____
_____
_____
_____
_____

4. New scenario:
The boy, who takes 7 steps per second, gives the girl, who takes 5 steps per second, a 25 step head-start. Who reaches the tree first? _____How do you know this fact? _____
What is the meaning of the point of intersection of the two lines on the graph?_____

_____
Write an equation for the distance the boy is from the house._____
Write an equation for the distance the girl is from the house._____

5. Another scenario:
The boy started moving to the tree first. He was 30 steps ahead when the girl decided to try to catch up. If the boy is moving at 6 steps per second, how fast does the girl have to move to beat him to the tree?_____

6. One more scenario:
The girl is moving toward the tree at a rate of 3 steps per second.
When she is 15 steps ahead, the boy moves toward the tree at a rate of 6 steps per second. When and where did he pass her?_____ How long did it take him to reach the tree? _____
How long did it take her? _____
Write a function that describes her path.
_____
Write another function that describes his path. _____

7. A change of pace (or rather, direction): The boy is at the tree and the girl is at the house. They run toward and then past each other moving at the same speed. (You choose the speed.) Write the equation for each of their paths.

_____
_____

8. Again:
The boy is 10 steps from the house and the girl is at the tree. If he moves toward the tree at 5 steps per second and she moves toward the house at 7 steps per second, estimate when and where they pass each other. _____Write the functions for each of their paths.

_____
_____

9. Once again:
The boy is 16 steps from the tree and moves toward the house at 1 step per second. The girl is 12 steps from the house and moves toward the tree at 2 steps per second. Write the functions for each of their paths.

_____
_____