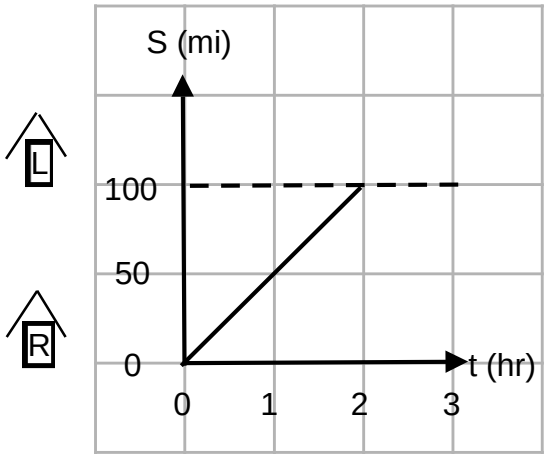
Graphs and Equations of Lines

February 28, 2016

1. Richemond visits Lola's house so that they can play chess together. The following graph displays how Richemond's distance from his house changes with time.

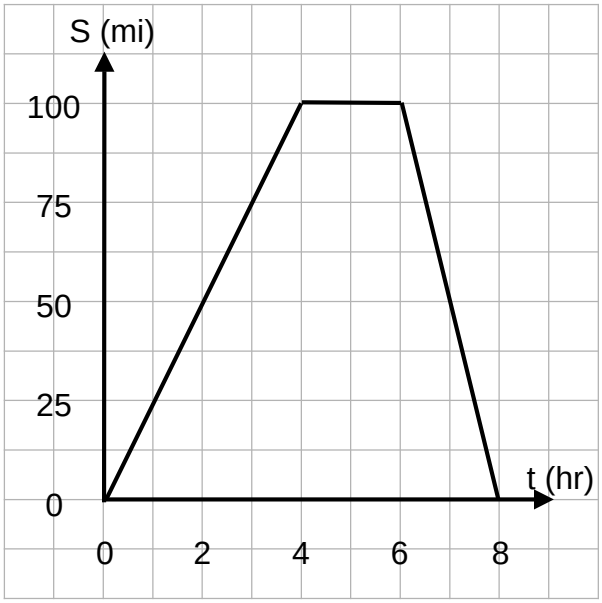


(a) How far apart do Richemond and Lola live?

(b) How long does it take Richemond to reach Lola's house?

(c) What is the speed at which Richemond travels?

2. The next weekend, Richemond and Lola agree to meet at Richemond's house this time. The following graph shows how Lola's distance from her house changes with time.



(a) How long does it take Lola to reach Richemond's house?

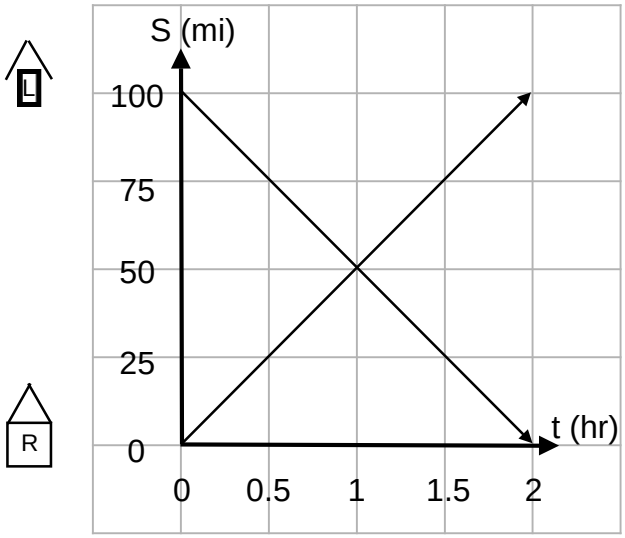
(b) What is the speed at which she travels to his house?

(c) Explain what is happening between the fourth and sixth hour.

(d) How long does it take Lola to go back to her house?

(e) What is her speed on the way back to her house? Is this speed positive or negative? (To determine this, consider whether the distance from her house is increasing or decreasing with time.)

3. Later that week, Richemond and Lola decided to meet each other, but did not communicate at which house they would be meeting. Richemond leaves his house at the same time Lola leaves hers, and Richemond arrives at Lola's house when Lola arrives at Richemond's house. Below is a graph displaying Richemond and Lola's distance from Richemond's house.

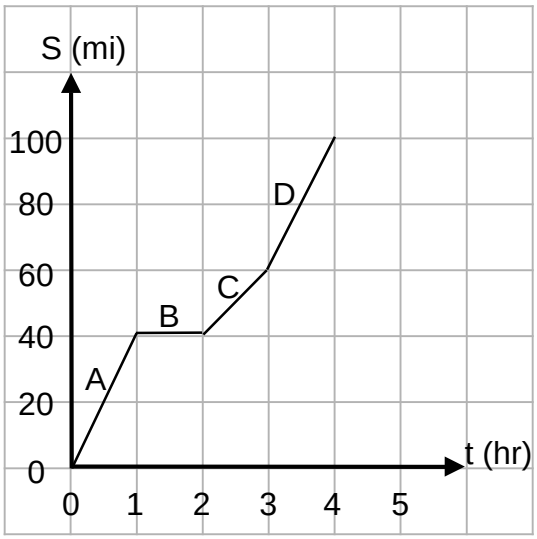


(a) At what time do they leave?

(b) What is the speed at which Richemond travels? What is Lola's speed? Remember to consider whether the speeds are positive or negative.

(c) At what time do they pass each other?

4. At another time, Richemond travels to Lola's house. At a certain point, Richemond stops to get lunch. After lunch, there is a lot of traffic and Richemond travels at a slower speed. Fortunately, after a certain amount of time, the traffic ends and Richemond is able to travel at a faster speed. The graph below shows how Richemond's distance from his house changes with time.



(a) How fast does Richemond travel in section A?

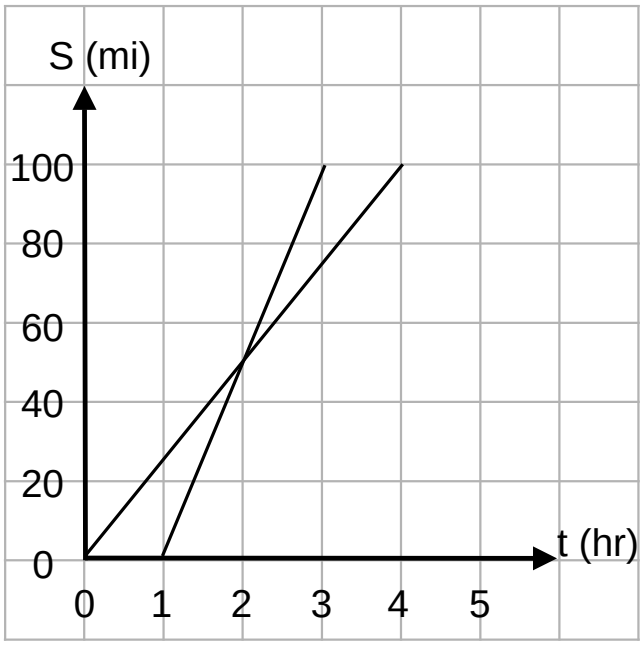
(b) How far is Richemond from his house when he eats lunch?

(c) How fast does Richemond travel in section B?

(d) How fast does Richemond travel in section C?

(e) What about section D?

5. After playing chess at Richemond's house, Richemond and Lola travel to Lola's house separately. Lola leaves Richemond's house first. The following graph shows how Richemond and Lola's distance from Richemond's house change with time.



(a) How fast does Lola travel?

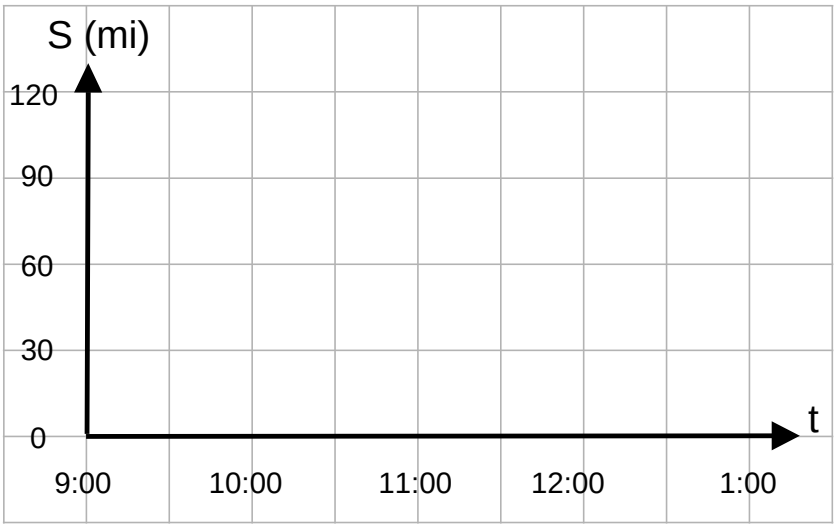
(b) At what time does Richemond leave?

(c) How fast does Richemond travel?

(d) At what time do they meet?

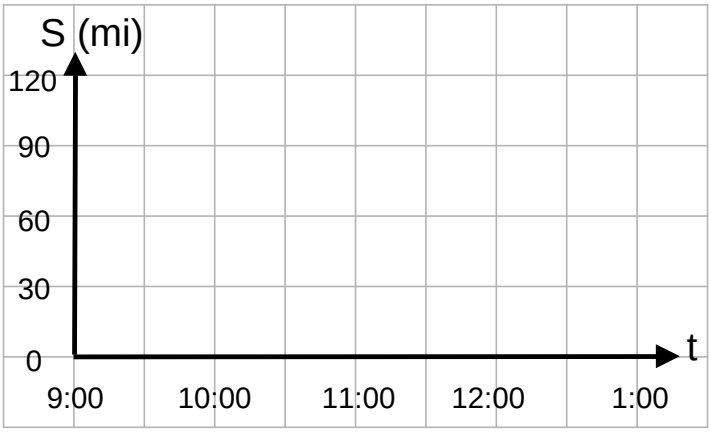
(e) How long does Richemond wait for Lola to arrive at her house?

6. Mark travels to Julia's house so they can play checkers. Mark starts traveling at 10:30 AM, and arrives at Julia's house at 12:30 PM. Julia lives 120 miles away from Mark. Using your ruler, graph how Mark's distance from his house changes with time.



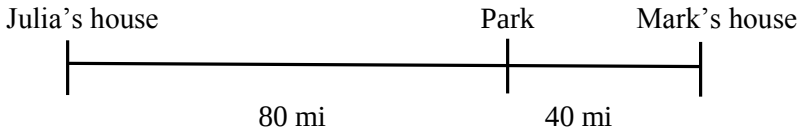
What is the speed at which Mark travels?

7. The following weekend, Julia travels to Mark's house for a rematch in checkers. Julia leaves at 9:30AM, and arrives at Mark's house at 12:30PM. Using the coordinate system below, graph how Julia's distance from Mark's house changes with time.



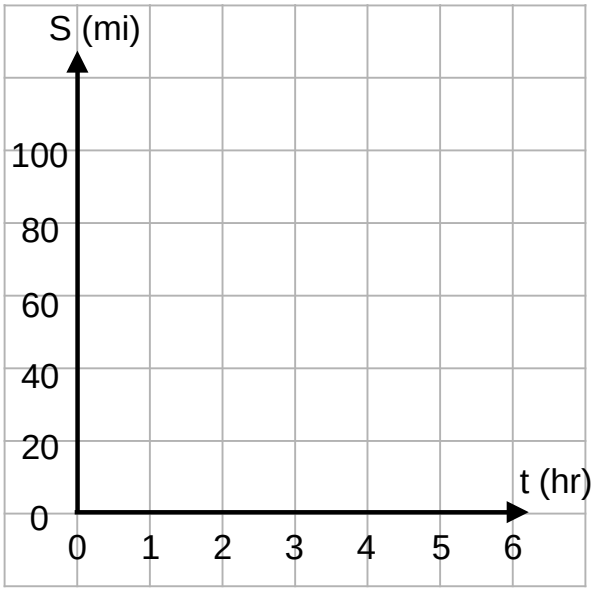
What is Julia's speed?

8. There is a park that is located in between Mark and Julia's house. The park is 80 miles from Julia's house, and 40 miles from Mark's house. The diagram below shows where the park is located in relation to their houses.



Julia leaves at time t =0 from her house, and it takes her 2 hours to get to the park. Mark leaves from his house an hour after Julia leaves hers, and arrives at the park at the same time. They stay at the park for two hours, and then they both go to Mark's house (which takes them 2 hours).

(a) Graph Julia and Mark's distances from Mark's house with respect to time on the following coordinate plane. Use your red colored pencil for Mark's distance and a blue colored pencil for Julia's distance.

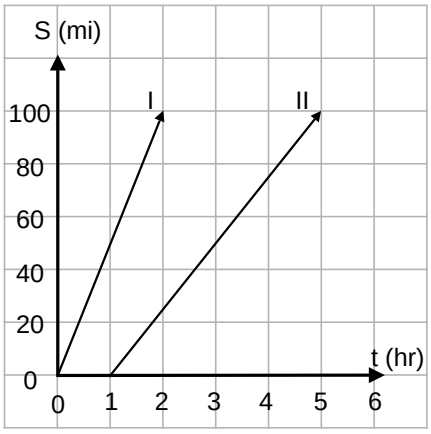


(b) What is the speed at which Julia travels to the park?

(c) What is Mark's speed when he goes to the park?

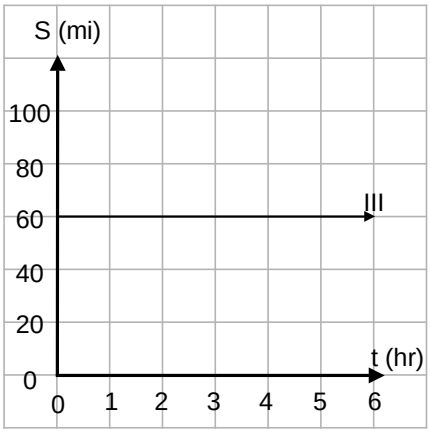
(d) What is their speed when they both leave the park to go to Mark's house?

9. Determine the speed for each graph of distance vs. time.

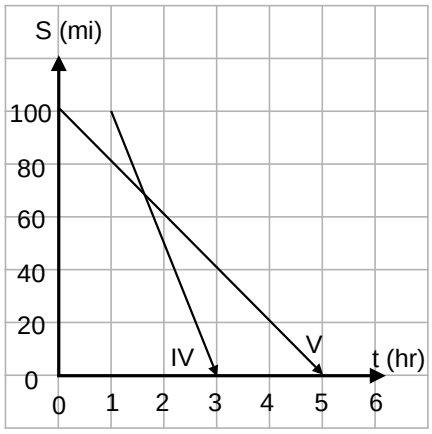


V_I =

V_{II} =



V_{III} =



V_{IV} =

V_V =

How do you determine the speed given a graph of distance as a function of time?

10. Consider the following function

$$y = x$$

(a) Fill out the following table:

x	0	1	2	3	4	5
y						

(b) Plot each point on the coordinate plane at the bottom of this page.

(c) Connect the points with a ruler to get a graph of the line.

11. You are given the following function

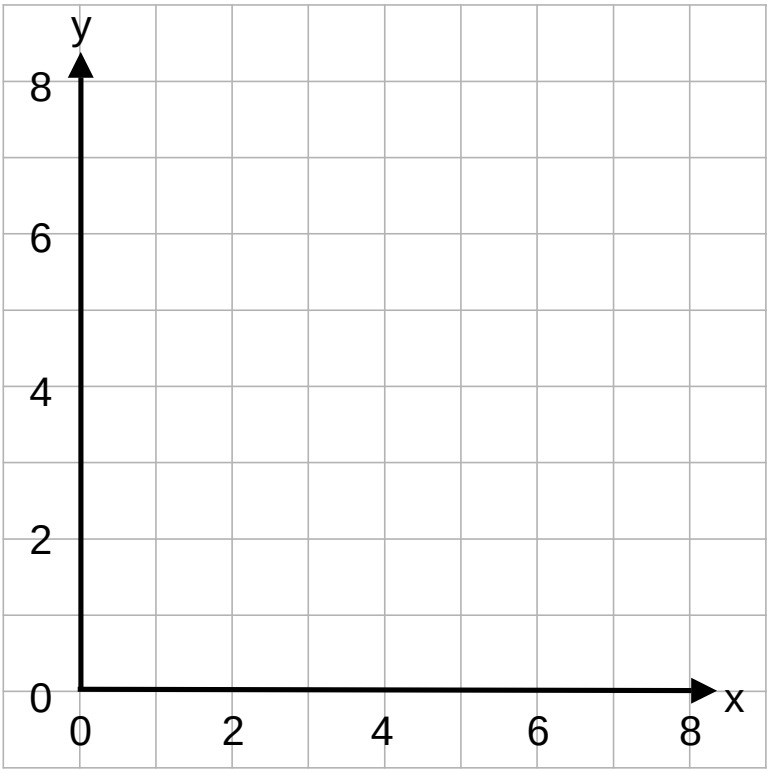
$$y = 2x$$

(a) Fill out the table:

x	0	1	2	3	4	5
y						

(b) Using same coordinate plane below, plot each point.

(c) Connect the points using a ruler to obtain a graph of the line.



12. Now, consider the following function

$$y = x+3$$

(a) Fill out the table:

x	0	1	2	3	4	5
y						

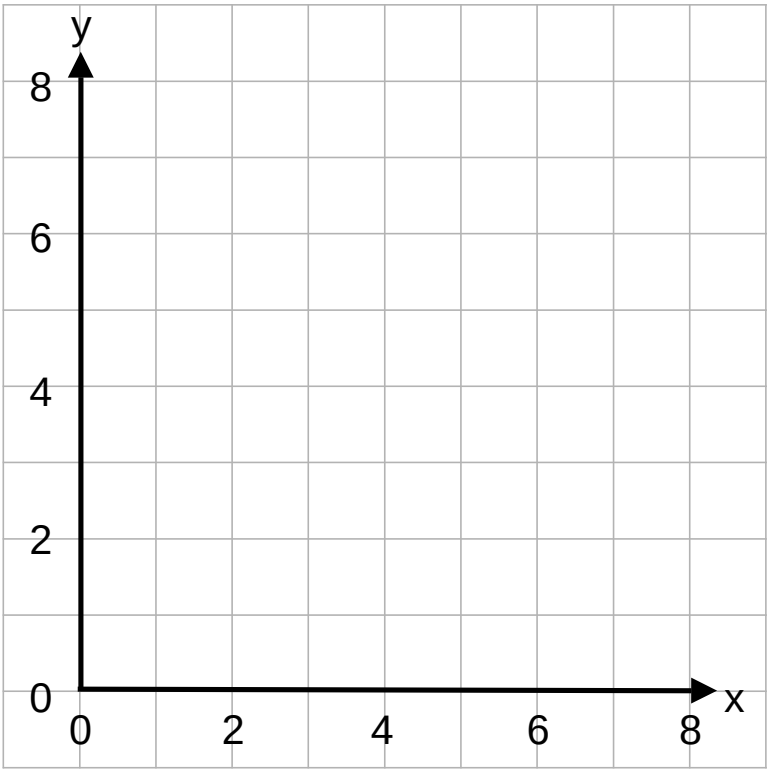
(b) Plot each point on the coordinate plane at the bottom of the page. Then, connect the points to obtain a graph of the line. 13. You are now given the following function

$$y = 2x+1$$

(a) Fill out the following table:

x	0	1	2	3	4	5
y						

(b) Graph the function on the coordinate plane above through plotting the points and connecting the points.



14. The following function is given to you:

$$y = 4x$$

(a) Fill out the table:

x	0	1	2	3	4
y					

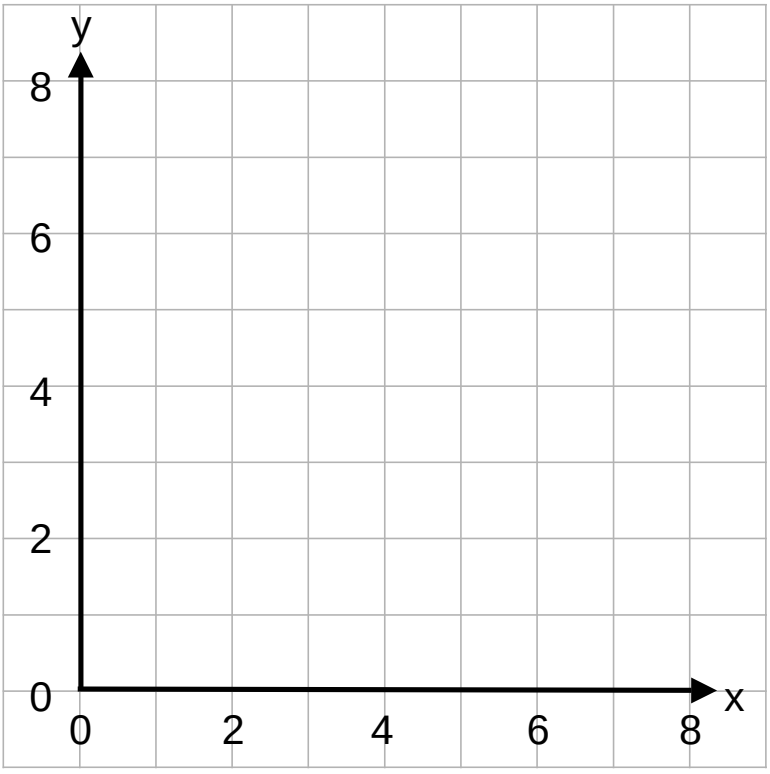
(b) Through plotting points on the grid at the bottom of the page, obtain a graph of the line on the following coordinate plane. 15. Consider the function

$$y = 8 - 2x$$

(a) Fill out the table:

x	0	1	2	3	4
y					

(b) Using the same methods as the previous problems, obtain a graph of the line on the following grid.



16. You are now given tables that show what the values of y are for inputted values of x. Write down the function of y in terms of x for the following tables:

(a)

x	0	1	2	3	4	5
y	0	3	6	9	12	15

(b)

x	0	1	2	3	4	5
y	-1	1	3	5	7	9

17. Homework: Come up with your own story and problem that involves graphing someone's distance over a certain time period. Write out the problem on a notecard, and write your solution on a separate notecard. Bring these notecards to Math Circle next week.