LESSON 4.1

A 100-Mile Trip

You will need:

graph paper

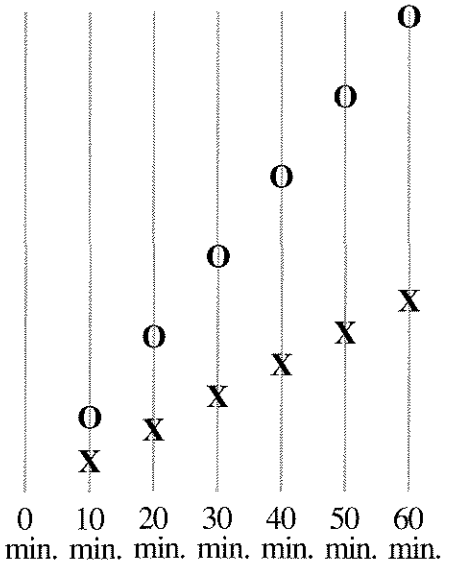
1. By which of these methods do you think a person could travel 100 miles in one day? Explain how you arrive at your guess.

   walking — running
   bicycling — ice skating
   riding a scooter — riding in a car
   riding in a helicopter

2. Ophelia and Xavier are traveling along a road. If you could view the road from above and make a sketch of what you saw every ten minutes, your sketches might look something like the figure below.

   a. Which person (O or X) is traveling faster?

   b. If the entire length of the road is six miles, can you figure out approximately how fast each person is traveling? Explain.

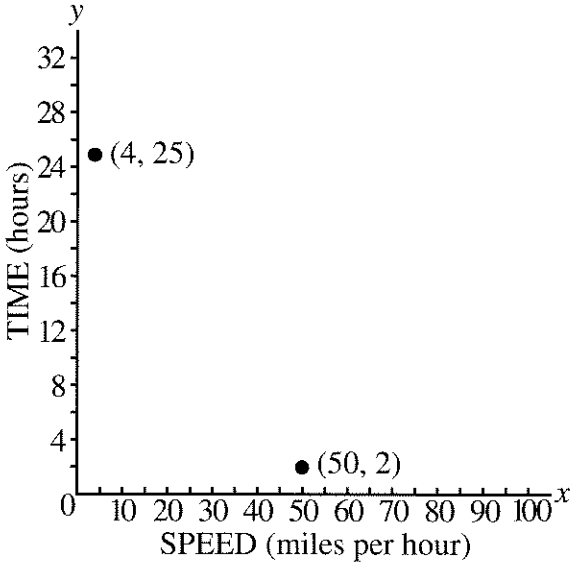


TIME VS. SPEED

3. Copy and complete this table showing how many hours it would take each person to travel 100 miles.

Person	Mode of Travel	Speed (mph)	Time (hours)
Abe	walking	4	25
Al	van	50	
Bea	skating	10	
Gabe	scooter	30	
Lara	helicopter	100	
Lea	bike	25	
Reg	running	8	

4. Copy and complete the graph that shows how long it would take for each person to make the 100-mile trip.

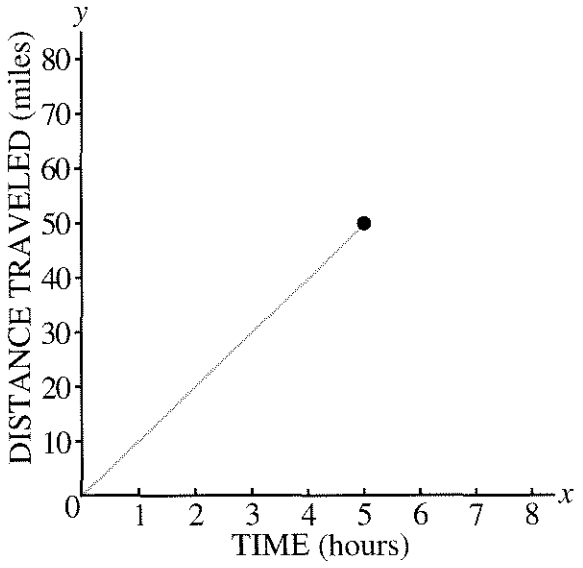


5. Generalization

a. What pattern do you notice in the table?

b. How long would it take for someone who travels at a constant speed of S miles per hour to cover 100 miles?

DISTANCE VS. TIME



6. The graph shows Bea's progress on the trip. It shows that after 5 hours of roller-skating she had traveled 50 miles.

a. Copy the graph onto graph paper. Use a whole piece of graph paper. You will be adding more to this graph.

b. One of the points on the graph is (5, 50). Mark and label three more points on the graph of Bea's progress.

7. In this lesson we are assuming everyone travels at a constant speed. How valid is this assumption? For each mode of travel what might make it impossible to travel at a constant speed? Explain.

The table shows how long it took for Abe to go certain distances.

Abe's Progress

Time (hours)	Distance (miles)
1	4
2	8

8. a. Copy and complete the table up to 20 miles.

b. For this problem, use the same axes you used for Bea. Plot and label the points from the table in part (a).

c. Connect the points with a straight line. Then find and label a point that is on the line but not in your table. Interpret the coordinates of the point in terms of this problem.

9. Make a table like the one you made for Abe showing Gabe's progress on his scooter and Al's progress in the van. Make graphs of their progress on the same axes you used to show Abe's and Bea's progress. Label the four different lines.

10. Use your graphs to help you answer these questions. If Bea and Abe start out at the same time,

a. how far apart will they be after one hour?

b. how far apart will they be after two hours?

11. Generalization Look for a pattern. How far apart will Abe and Bea be after H hours? Explain.

12. Mrs. Gral was traveling at a constant speed. She started at the same time as Abe, and was two miles ahead of him after one hour.

a. Add a graph of Mrs. Gral's progress to your axes.

b. How far ahead was Mrs. Gral after two hours?

c. After three hours, how far was Mrs. Gral behind Bea?

d. How fast was Mrs. Gral going? What mode of travel do you think she was using?

13. Summary

a. How does the mode of travel affect the steepness of the line? Explain.

b. What is the meaning of points on two of the graphs that have the same x-coordinate but different y-coordinates?

c. What is the meaning of the vertical distance between two lines for a given value of x?

DISTANCE VS. SPEED

14. Using the same speed data, figure out how far each person could travel in two-and-a-half hours. Make a table and a graph showing speed on the horizontal axis and distance on the vertical axis.

15. How would the graph be changed if the travel time was greater? Less? Explain.

SPEED BY GRAPHS AND FORMULAS

16. Summary Each graph in this lesson gives information on how fast people travel, but it does it in a different way. Explain.

17. Generalization If someone is traveling at a constant speed of S miles per hour, for a distance of D miles, and takes T hours, what is the relationship between S, D, and T? Write this relationship in more than one way.

DISCOVERY *FRAMING PHOTOGRAPHS*

A photograph is mounted on a background which sticks out one inch on each side. The width of the photo is two inches and the height is three inches.

18. a. Sketch the photo and its frame.

b. What are the dimensions of the frame?

c. Are the photo and frame similar rectangles? Explain.

19. The photo needs to be enlarged so it will fit in a frame having a height of 12 inches. Again, the width of the frame is to be one inch. Find the dimensions of the enlarged photo and its frame. Of course the photo cannot be distorted!

20. Is the frame for the enlarged picture similar to the picture? Is it similar to the original frame? Explain.