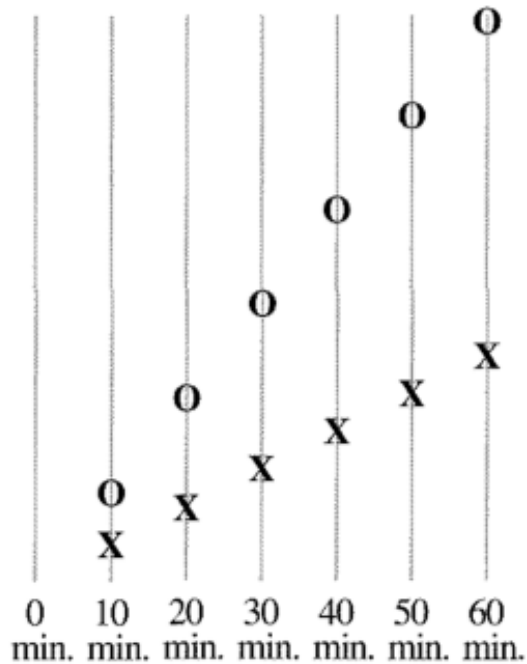
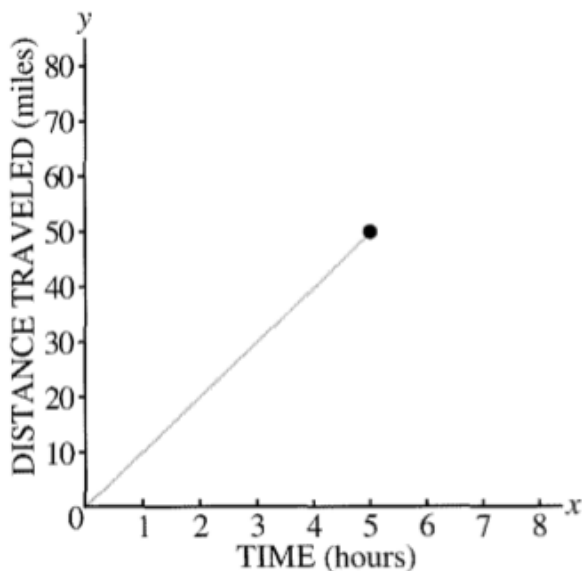


### Constant Speed



- 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.
  - Which person (O or X) is traveling faster?
  - If the entire length of the road is six miles, can you figure out approximately how fast each person is traveling? Explain.

Bea is participating in a long-distance roller-skating race. Her speed is approximately 10 miles per hour. The graph below shows Bea's progress. It shows that after 5 hours she had traveled 50 miles.



- Bea's motion:
  - Copy the graph onto graph paper. Use a whole piece of graph paper. You will be adding more to this graph.
  - One of the points on the graph is (5,50). Mark and label three more points on the graph of Bea's progress.
- The distance traveled and the time elapsed are in a proportional relationship. Explain how we know this.
- In this lesson we are assuming everyone travels at a constant speed.
  - What might make it impossible to travel at a constant speed? Explain.
  - Why might it be a good idea to assume constant speed anyway?

Abe is walking along the same road. Assume he is moving at an approximately constant speed. The table shows how long it took for Abe to go certain distances.

### Abe's Progress

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

5. a. Copy and complete the table up to 20 miles.  
b. 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.

Amazingly, Gabe and Al are on the same road, and started at the same time. Gabe is riding a scooter, going 30 mph. Al is driving a van, going 50 mph.

6. Make tables 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.
7. 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?
8. Look for a pattern.  
a. How far apart will Abe and Bea be after  $H$  hours? Explain.  
b. Is this a proportional relationship? Explain.
9. Mrs. Gral was traveling at a constant speed. She started on the same road at the same time as all the others, and was two miles ahead of Abe 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. Was she ahead of, or behind Bea? After three hours, how far ahead or behind?  
d. How fast was Mrs. Gral going? What mode of travel do you think she was using?
10. **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  $x$ ?