# Piecewise Functions

The Free Wheelers Bicycle Club went on a Saturday bicycle trip. The graph shows the relationship between time in hours and distance in miles from the starting point for one female club member. She traveled away from her start point in a straight line. When the timing started, she was already traveling at the given rate. Use the graph of d and the table to answer the following questions.

Bicycle Trip

t	d
0	0
2	30
4	30
7	60
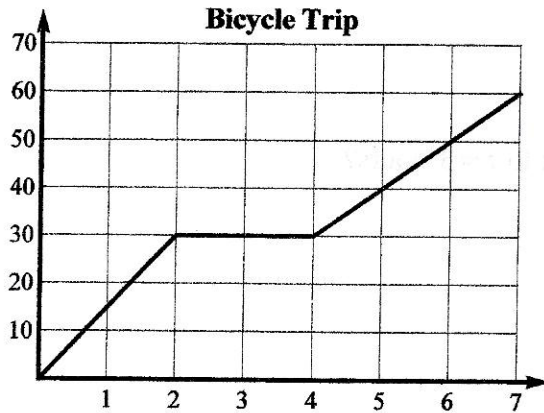
1. For this situation, _____ is a function of _____.

2. Write these labels on the appropriate axes with the units, where distance is measured in miles and time is measured in hours.

3. During which interval is she moving the fastest? Explain how you selected your answer.

4. Describe what is happening on the bicycle trip for the first 2 hours.

5. The graph consists of three distinct line segments. Write an equation for each part: one for the interval $t = 0$ hours to $t = 2$ hours, one for the interval $t = 2$ hours to $t = 4$ hours, and one for the interval $t = 4$ hours to $t = 7$ hours. This graph is called a piecewise function and would be written as

$$d = \begin{cases} 15t & \text{for } 0 \le t \le 2 \\ \underline{\hspace{3cm}} & \text{for } \underline{\hspace{2cm}} \\ \underline{\hspace{3cm}} & \text{for } \underline{\hspace{2cm}} \end{cases}$$
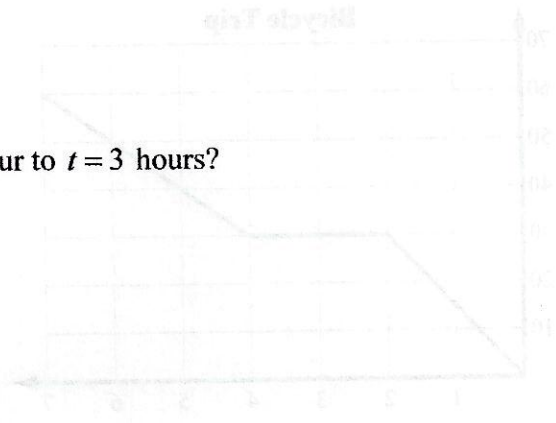
6. When is $d = 22$ miles? Show the work that leads to your conclusion and interpret the meaning of the answer.

7. What is the average speed for the interval $t = 1$ hour to $t = 3$ hours?

8. Suppose that at the end of the fourth hour, the bicyclist decides to go back to her starting position. Illustrate what the graph might look like for the return trip.

9. Create a story for the original graph of the function d for the interval $t = 0$ hours to $t = 7$ hours.