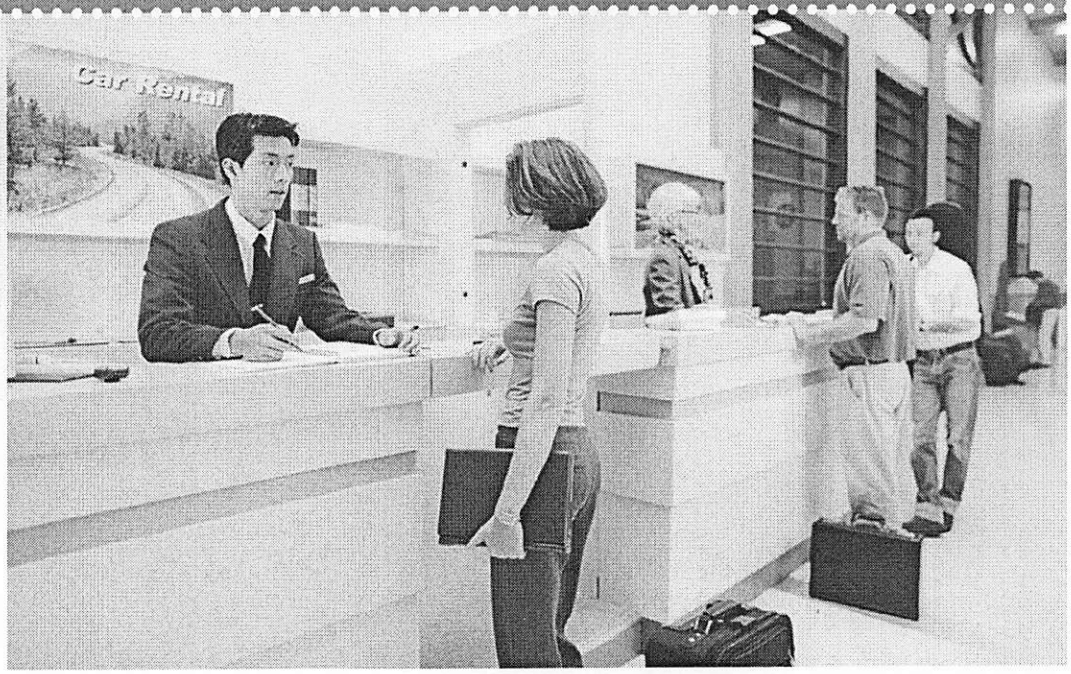
MATH LAB

5.4 Graphing Data

LESSON FOCUS

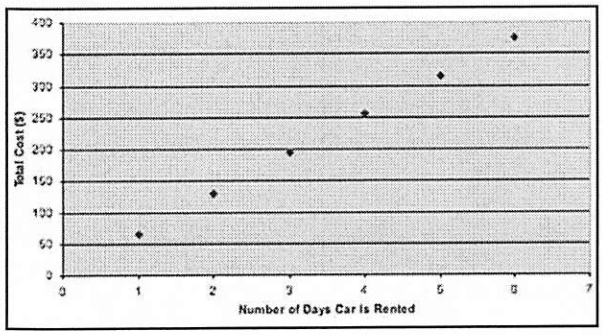
Graph data and investigate the domain and range when the data represent a function.



Make Connections

To rent a car for less than one week from Ace Car Rentals, the cost is \$65 per day for the first three days, then \$60 a day for each additional day.

Number of Days Car Is Rented	Total Cost (\$)
1	65
2	130
3	195
4	255
5	315
6	375



Why are the points on the graph not joined?

Is this relation a function? How can you tell?

What is the domain? What is the range?

Construct Understanding

TRY THIS

Work with a partner.

You will need:

- a length of rope
- a metre stick
- grid paper, a graphing calculator, or a computer with graphing software

When you tie knots in a rope, the length of the rope is related to the number of knots tied.

A. You will investigate the relation between the number of knots and the length of rope.

- Measure the length of the rope without any knots. Tie a knot in the rope. Measure the length of the rope with the knot.
- Repeat the measurements for up to 5 knots. Try to tie the knots so they are all the same size and tightness.
- Record the number of knots and the length of the rope in a table.

Number of Knots	Length of Rope (cm)

B. Graph the data.

- How did you determine on which axis to plot each variable?
- How did you choose the scale for each axis so the data fit on the axes?
- Did you join the points? Justify your answer.

C. If you used a graphing calculator, sketch the graph. If you used a computer, print the graph.

- Is the length of the rope a function of the number of knots? Explain.
  If your answer is yes, list the set of ordered pairs. What is the domain? What is the range?
- Would it make sense to extend the graph to the right? To the left?
  If your answer is yes, how far could you extend it? What is the new domain? What is the new range?
  If your answer is no, what restrictions are there on the domain and range?

Suppose you used another piece of rope with the same length. Would the length of the rope after each number of knots be the same as that which you first recorded? Why or why not?

D. Suppose you combined your data with those of 4 pairs of classmates.

- When you graph all the data, does the graph represent a function? Justify your answer.
- Suppose you calculated the mean rope length for each number of knots, then graphed the data. Would the graph represent a function? Justify your answer.

Assess Your Understanding

1. For each table of values below:

i) Graph the data. Will you join the points? Justify your answer.

ii) Does the graph represent a function? Explain.

a) At a constant pressure, the speed of sound in air is related to the air temperature.

Air Temperature (°C)	Speed of Sound (m/s)
0	331
5	334
10	337
15	340
20	343

b) The recommended daily dose of vitamin C is related to a female's age in years.

Age (years)	Dose of Vitamin C Tablet (mg)
3	15
6	25
9	45
12	45
15	65
18	65
21	75

2. Graph the data in these tables of values from Lesson 5.2, question 9. Decide whether to join the points.

How can you tell from each graph that the relation is a function?

a)

Number of Cans of Juice Purchased, n	Cost, C ($)
1	2.39
2	4.00
3	6.39
4	8.00
5	10.39
6	12.00

b)

Altitude, A (m)	Temperature, T (°C)
610	15.0
1220	11.1
1830	7.1
2440	3.1
3050	−0.8
3660	−4.8