

Linear Relationships and Constant Rate of Change

A rate of change is a rate that describes how one quantity changes in relation to another. In a linear relationship, the rate of change between any two quantities is the same. A linear relationship has a constant rate of change. The constant rate of change is written as the change in y over the change in x .

1. The student council asks for cost estimates for a skating party. The following tables represent the costs from two skating companies: Rollaway Skates and Wheelie's Skates and Stuff.

Rollaway Skates

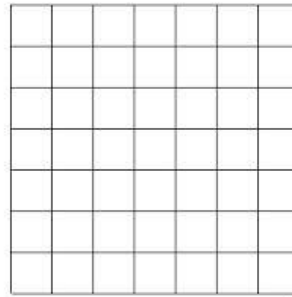
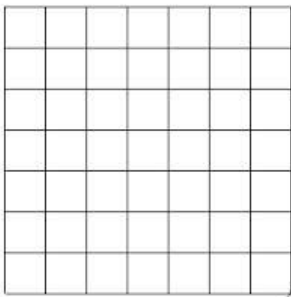
Number of People (x)	Cost \$ (y)
0	\$0
1	\$5
2	\$10
3	\$15
4	\$20
5	\$25
6	\$30

Wheelie's Skates and Stuff

Number of People (x)	Cost \$ (y)
0	\$100
1	\$103
2	\$106
3	\$109
4	\$112
5	\$115
6	\$118

For each company, is the relationship between number of people and cost linear? If so, what is the constant rate of change? For each company, is the relationship between number of people and cost proportional? If so, what is the constant of proportionality (k)?

Graph the points from each table on the graphs below. Make sure to label the x and y -axes as well as write in the proper scale on each graph.



Does the graph help you to determine if the relationships are linear or proportional? Why?

2. Suppose each of the following patterns continues. **Which tables show a linear relationship?** Explain your answer by stating the constant rate of change if it is linear. If the relationship is proportional, state the constant of proportionality (k).

a.

x	y
10	31
20	61
30	91
40	121

b.

x	y
1	9
5	17
7	21
20	47

c.

x	y
5	15
20	60
30	90
40	120

d.

x	y
1	12
2	24
3	36
4	48

3. Harvest Foods has apples on sale at 12 for \$3.

The Cost of Apples

Number of Apples	12		1	48	10	
Cost	\$3	\$1.50				\$4.50

- What is the cost per apple?
- Complete the rate table to show the costs of different numbers of apples.
- How many apples can you buy for \$1?
- Is the relationship between the number of apples and cost linear? Explain.

4. For the graphs below state whether they are linear or proportional or both.

