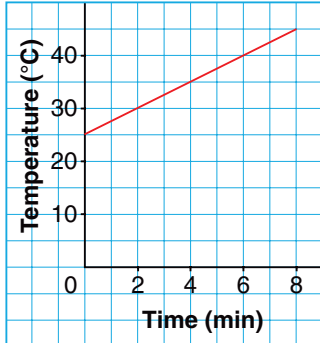


Practice

1. Does each graph represent direct variation? Explain how you know.

a) Heating of a Chemical



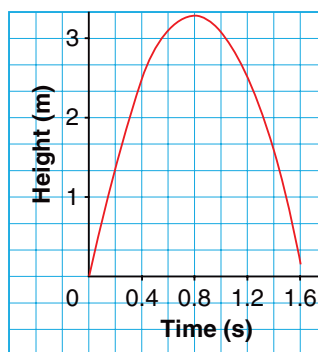
b) Scuba Diver's Depth



c) Reid's Earnings



d) Height of a Ball



2. The perimeter of a square varies directly as its side length.

a) Complete a table to show the perimeters of squares with side lengths from 0 cm and 5 cm.

Side length (cm)	Perimeter (cm)
0	0
1	4
2	8
3	12
4	16
5	20

b) Graph the data. Determine the rate of change.

c) Write a rule to determine the perimeter when you know the side length.

d) What is the perimeter when the side length is 11 cm?

3. About one-third of all water used in homes is for toilet flushes.

The table shows water use for a standard toilet manufactured after 1985.

Number of flushes	5	10	15	20	25	30
Water use (L)	65	130	195	260	325	390

a) Graph the data.

Is this a direct variation situation? Explain.

b) Determine the rate of change.

What does the rate of change represent?

c) Write a rule to determine the water use when you know the number of flushes.

d) How much water is used for 17 flushes?

4. "Nature's Best" sells bird seed for \$0.86 per kilogram.

a) Copy and complete this table for masses from 1 kg to 6 kg.

Mass of bird seed (kg)	Cost (\$)

b) Graph the data.

Does the graph represent direct variation? Explain.

c) Write a rule to determine the cost when you know the mass of seed.

d) How much would it cost to buy 13 kg of seed?

e) Will the cost for 26 kg be twice the cost for 13 kg? Explain your thinking.

To check your answer, use your rule to determine the cost for 26 kg.

You can use an equation to calculate values.

Example

Gas for a car is sold by the litre.

Here are the costs of gas for 5 customers at a gas station.

Volume of gas (L)	Cost (\$)
10	8.50
16	13.60
6	5.10
24	20.40
18	15.30

a) Graph the data.

Does the graph represent direct variation? Explain.

b) Determine the rate of change.

Explain what it represents.

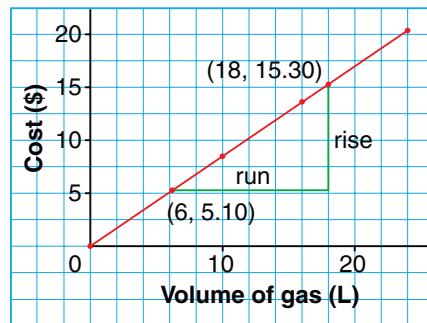
c) Write an equation for this relation.

d) Use the equation to determine the cost of 25.8 L of gas.

Solution

a)

Gasoline Costs



Yes, this graph represents direct variation.

The graph is linear and passes through the origin.

b) From the graph

The rise is: $\$15.30 - \$5.10 = \$10.20$

The run is: $18 \text{ L} - 6 \text{ L} = 12 \text{ L}$

The rate of change is: $\frac{\text{rise}}{\text{run}} = \frac{\$10.20}{12 \text{ L}}$
 $= \$0.85/\text{L}$

The rate of change is the change in price for each litre of gas.

So, the rate of change is the unit cost of gas; that is, the cost for 1 L.

- c) The cost of buying gas can be described by the rule:
 Cost of gas in \$ = (unit price in \$/litre) \times (volume of gas in litres)
 Let C represent the cost in dollars.
 The unit price is \$0.85/L.
 Let v represent the volume of gas in litres.
 Then an equation is: $C = 0.85 \times v$
 or, $C = 0.85v$
- d) Use the equation: $C = 0.85v$
 To determine the cost of 25.8 L of gas, substitute: $v = 25.8$
 $C = 0.85 \times 25.8$
 $= 21.93$
 25.8 L of gas cost \$21.93.

5. Kaitlin works planting trees in Northern Ontario.

She is paid 16¢ for each tree she plants.

- a) Complete a table to show how much Kaitlin would earn for planting up to 1000 trees.

Number of trees, n	Earnings, E (\$)
0	0
100	

- b) Graph Kaitlin's earnings.

Does the graph represent direct variation?

Explain.

- c) What is the rate of change?

What does it represent?

- d) Write an equation for this relationship.

- e) An experienced planter can plant between 1000 and 3000 trees a day.

Use the equation to determine how much Kaitlin would earn when she plants 1700 trees in one day.

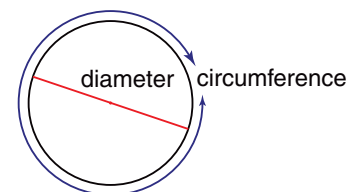


6. Jamal measured several circles.

He used thread to measure the circumference

and a ruler to measure the diameter.

Here are his results.



- a) Graph the data.

Does the graph represent direct variation?

Explain.

- b) Determine the rate of change.

Explain what it represents.

- c) Write an equation for this relationship.

- d) Use the equation to estimate the circumference of a circle with diameter 13 cm.

Diameter, d (cm)	Circumference, C (cm)
0	0
12	37.2
2	6.2
7	21.7
5	15.5

7. Drew filled three bags of trail mix at the bulk store.



- Graph *Cost* against *Mass* for the trail mix.
Does the graph represent direct variation? Explain.
- Determine the rate of change. Explain what it represents.
- Write an equation for this relation.
Use m for the mass of trail mix in grams and C for the cost in dollars.
- Determine the cost of 340 g of trail mix. How did you do this?
- Write a question you could answer using the graph or equation.
Answer the question.

8. **Assessment Focus** Look back at the situations and the equations that represent them. Use these to help you with this question. Describe a situation that could be modelled by each equation.
- $C = 0.90v$
 - $d = 90t$
 - $C = 5.50n$

9. Find a flyer from a grocery store or bulk food store that lists prices per 100 g. Choose an item from the flyer. Write a question about the item. Follow the style of question 7. Prepare a sample solution for your question. Exchange questions with a classmate. Answer the question you receive. Check each other's work.



10. **Take It Further** Anastasia drives 55 km to work. One day, she left home at 7:00 a.m. and arrived at work at 8:15 a.m.
- What would a graph of distance against time look like for Anastasia's drive to work?
Do you have enough information? Explain.
 - What is Anastasia's average speed? Explain.

In Your Own Words

How do you know when a graph represents direct variation?
Explain with examples of graphs and equations.