

4.5 Using Graphs to Estimate Values

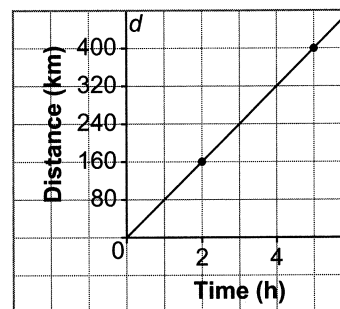
FOCUS Use interpolation and extrapolation to estimate values on a graph.

When we estimate values between 2 given data points on a graph of a linear relation, we use **interpolation**.

Example 1 Using Interpolation to Solve Problems

This graph shows the distance travelled by Bobbie's family on a trip from Calgary to Moose Jaw. How long did it take his family to travel 320 km?

Bobbie's Family Trip



Solution

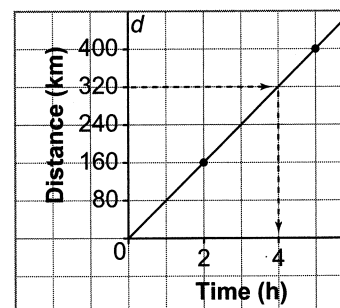
To find how long it took to travel 320 km:

- Locate the point on the vertical axis that represents 320 km.
- Draw a horizontal line to the graph.
- Then draw a vertical line from the graph to the horizontal axis.

Read the value where the vertical line meets the horizontal axis.

It took about 4 h to travel 320 km.

Bobbie's Family Trip



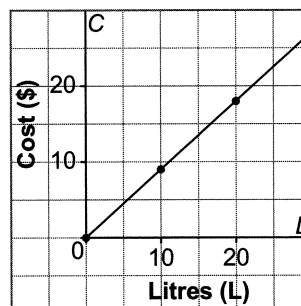
We could follow the same process to find that, after 3 h, the family has travelled about 240 km.

Check

1. Use the graph to find the following values.

- The cost of 15 L of fuel.
About \$ _____.
- The quantity of fuel that can be purchased for \$10.
About _____ L.

Cost of Fuel

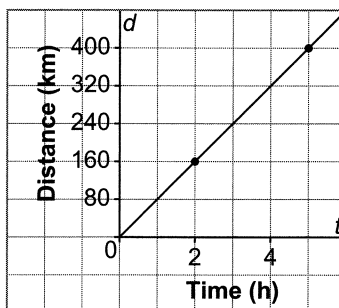


When we extend a graph of a linear relation to estimate values that lie beyond the graph, we use **extrapolation**.

Example 2 Using Extrapolation to Solve Problems

On his family trip from Calgary to Moose Jaw, Bobbie wants to predict how long it will take to travel 640 km.

Bobbie's Family Trip



We assume that Bobbie's family will continue to travel at the same average speed.

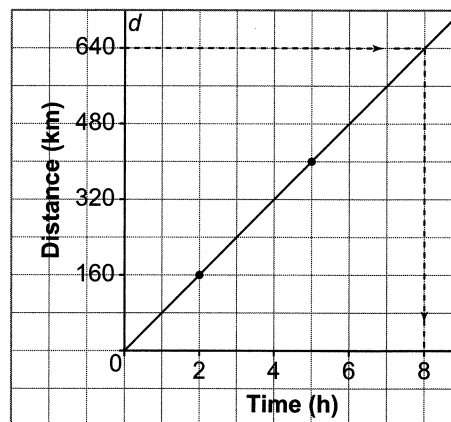
Solution

Since the relation appears to be linear, we can extend the graph.

- Locate the point on the vertical axis that represents 640 km.
- Draw a horizontal line to the graph.
- Then draw a vertical line from the graph to the horizontal axis.

Read the value where the vertical line meets the horizontal axis. It will take about 8 h to travel 640 km.

Bobbie's Family Trip



Check

1. Use the graph to find the cost of 30 L of fuel.

Cost of Fuel

