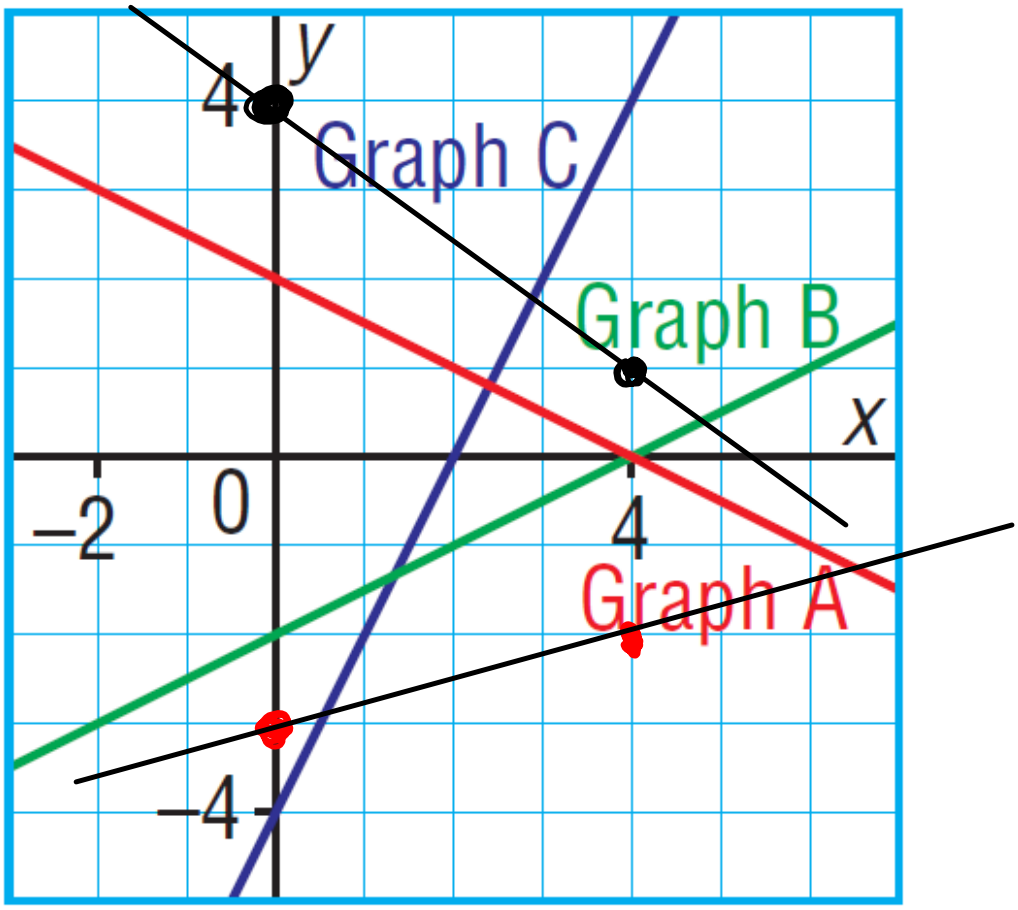
Warm Up

Match the equations with their graph:

$y = 2x - 4$ $y = -\frac{1}{2}x + 2$ $y = \frac{1}{2}x - 2$



Graph: $y = -\frac{3}{4}x + 4$ $y = \frac{1}{4}x - 3$

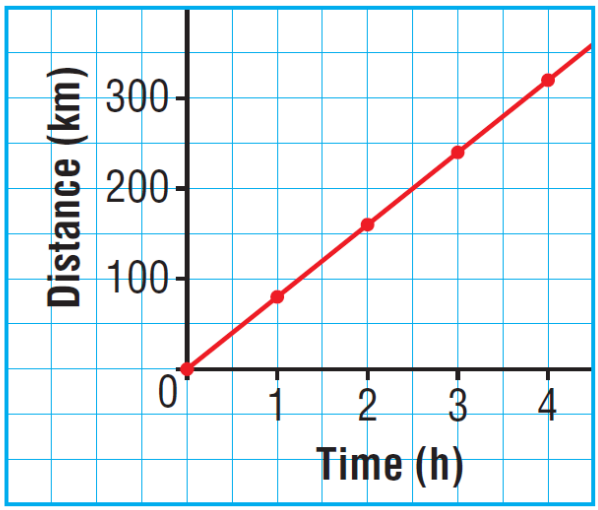
$y = \frac{-3}{4}x + 4$

Slope $= \frac{+1}{4}$

Slope $= \frac{\text{rise}}{\text{run}} = \frac{-3}{4}$

4.5 Using Graphs to Estimate Values

Graph of a Car Journey



We can use **interpolation** to estimate values that lie *between* 2 data points on the graph.

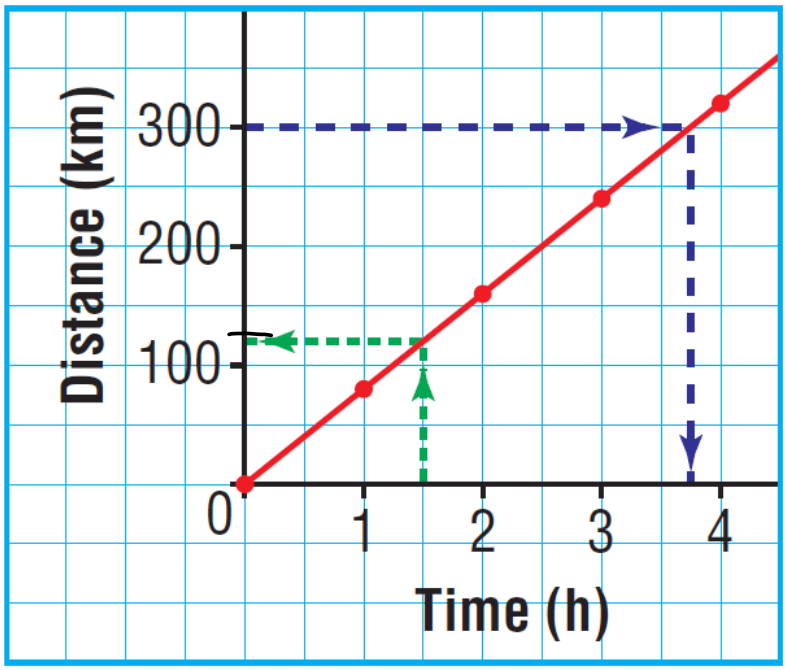
To estimate the distance travelled in 1.5 h:
- Begin at 1.5 on the *Time* axis.
- Draw a vertical line to the graph.
- Then draw a horizontal line from the graph to the *Distance* axis.
  This line intersects the axis at about 120 km.

So, the distance travelled in 1.5 h is about 120 km.

To estimate the time it takes to travel 300 km:
- Begin at 300 on the *Distance* axis.
- Draw a horizontal line to the graph.
- Then draw a vertical line from the graph to the *Time* axis.
  This line intersects the axis at about 3.75 h, which is 3 h 45 min.

So, it takes about 3 h 45 min to travel 300 km.

Graph of a Car Journey



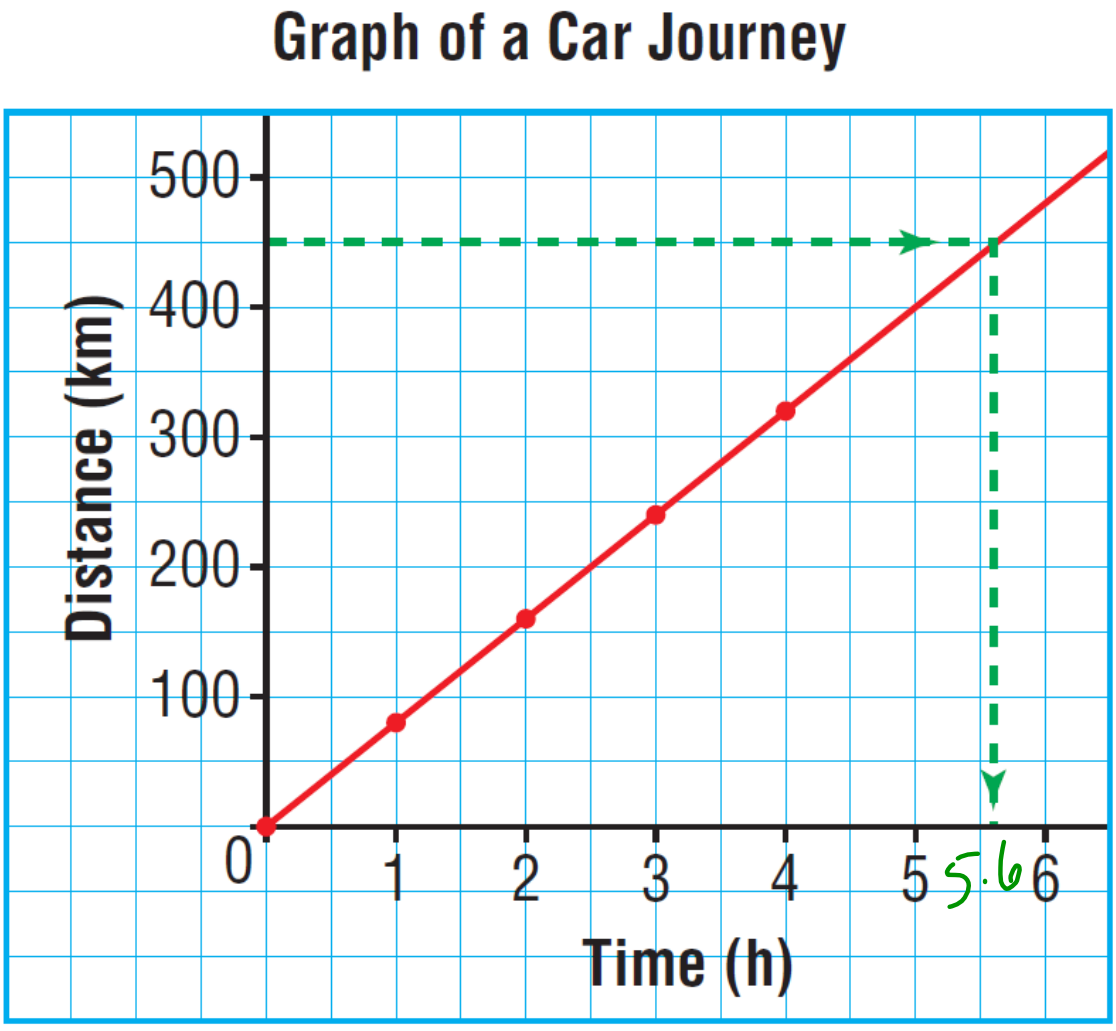
Suppose the car maintains the same average speed. We can extend the graph to predict how far the car will travel in a given time or to predict the time it takes to travel a given distance.

This is called **extrapolation**. When we use a graph to predict in this way, we assume that the relation is linear and will continue to be linear.
We use a ruler to extend the graph.

To estimate the time it takes to travel 450 km:

- Extend the grid so the *Distance* axis shows at least 450 km.
  Use a ruler to extend the graph.
- Repeat the process to estimate the time to travel 450 km.

It takes a little more than 5.5 h,
or about 5 h 40 min to travel 450 km.

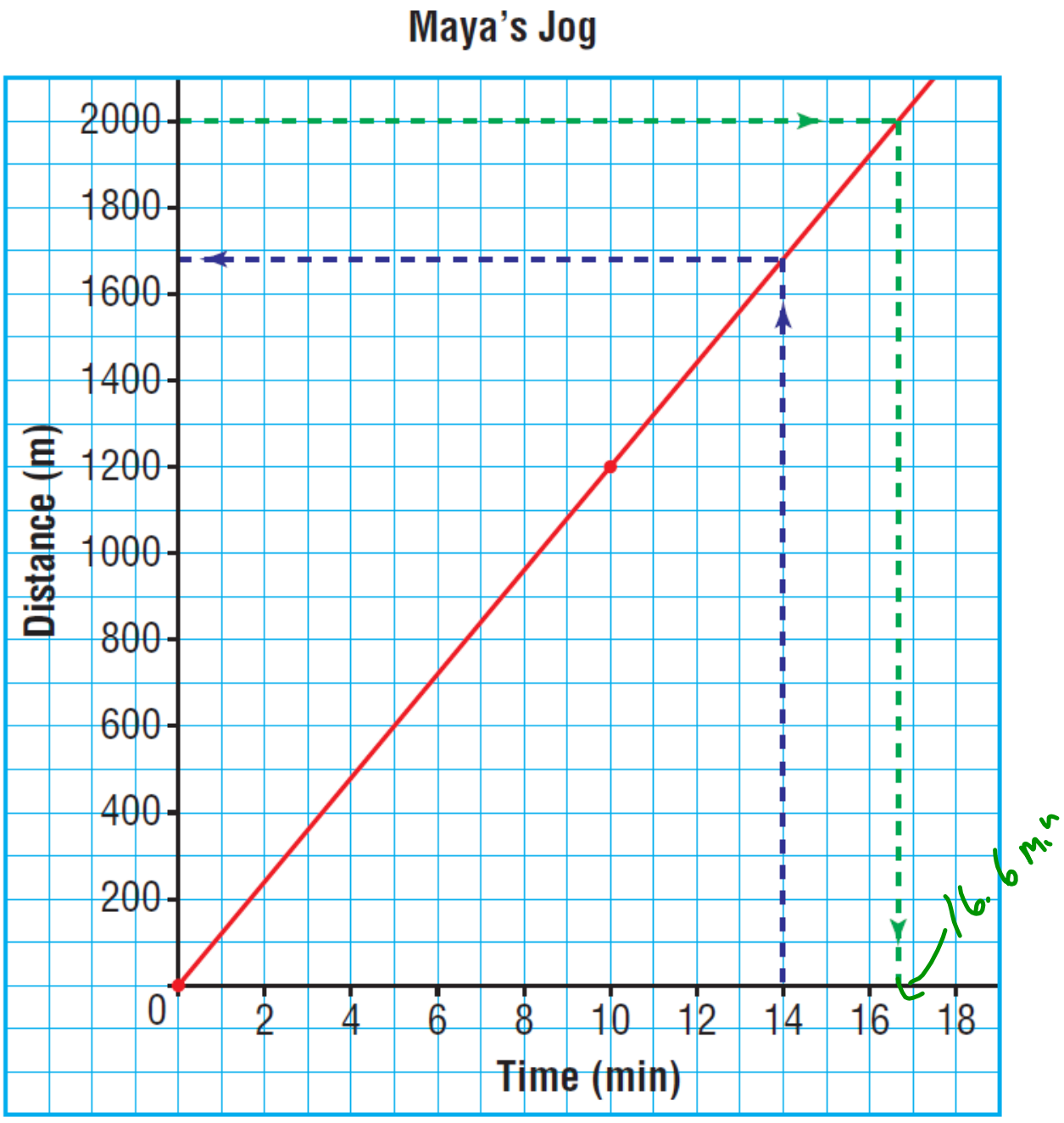


Use the graph.

a) Predict how long it will take Maya to jog 2000 m.

b) Predict how far Maya will jog in 14 min.

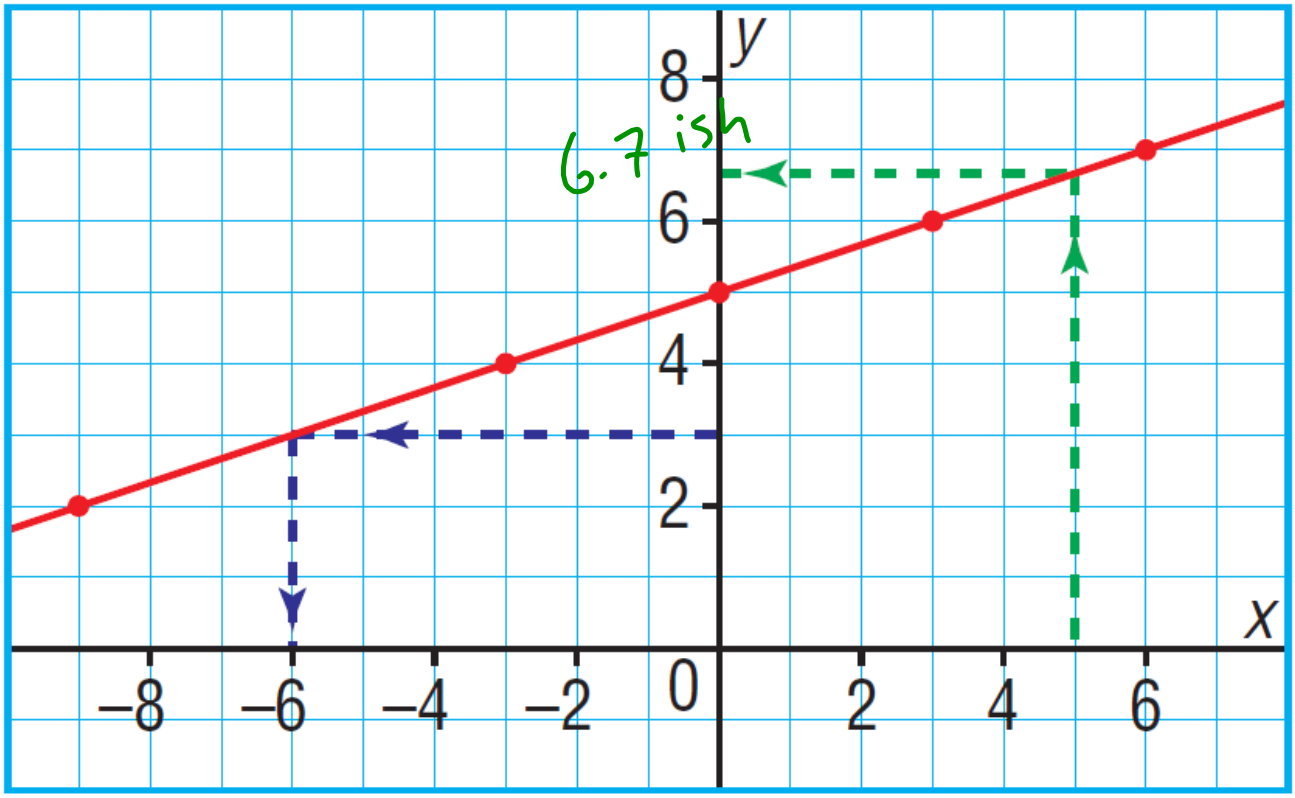
c) What assumption did you make?



Use this graph of a linear relation.

a) Determine the value of x when $y = 3$.

b) Determine the value of y when $x = 5$.



Page 196 #s 4, 5, 9, 10, 12.

Study Guide Pg 200.

Unit Review Page 201 #s 1acdf, 2be, 4ace, 5, 11, 13*.

*For the equation in 13 a) use **$y = -\frac{1}{2}x + 3$**

Practice Test Page 204