CHAPTER | MOTION
1 | **Math Support**

Speed and Distance-Time Graphs

The formula for speed is $S = \dfrac{d}{t}$

S is the speed of the object, d is the distance the object has moved, and t is the time it took the object to move that distance.

If information about distance and time is presented in a graph form, you can find the speed using the distance and time information given in the graph. Sometimes this involves subtracting one distance from another and subtracting one time from another.

A Cyclist's Speed

Distance (meters) vs. Time (seconds)

distance
120 m − 90 m

time
50s − 40s

SAMPLE PROBLEM

Using the graph above, find the bicyclist's speed between 40 s and 50 s.

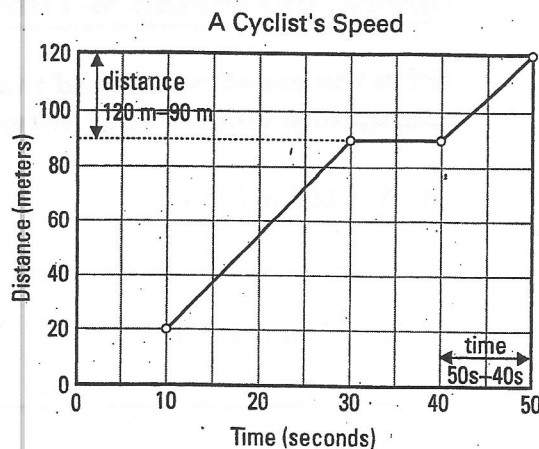|	
Use the graph to find the distance at 50 s:	120 m.
Use the graph to find the distance at 40 s:	90 m.
Find the time interval between 40 s and 50 s:	50 s − 40 s = 10 s.
Find the distance traveled between 40 s and 50 s:	120 m − 90 m = 30 m.

Substitute the distance and the time into the formula for speed: $S = \dfrac{d}{t} = \dfrac{3\,\text{m}}{10\,\text{s}} = 3\ \text{m/s}$

Answer: Between 40 s and 50 s, the bicyclist's speed was 3 m/s.

EXERCISES

1. Using the graph above, find the bicyclist's speed between 10 s and 30 s.

Find distances from graph.

_____

Calculate time interval.

_____

Calculate distance traveled.

_____

Substitute and solve.

_____

Answer.

_____

2. Using the graph above, find the bicyclist's speed between 30 s and 40 s.

Find distances from graph.

_____

Calculate time interval.

_____

Calculate distance traveled.

_____

Substitute and solve.

_____

Answer.

_____

CHAPTER | MOTION

1 | Math Practice

Speed and Distance-Time Graphs

Solve the equations to find the value for each question. Include the appropriate units in your answer.

1. $S = 600 \text{ m} / 15 \text{ s}$

_____

2. $S = 240 \text{ km} / 4 \text{ hr}$

_____

3. $S = 75 \text{ mi} / 2.5 \text{ hr}$

_____

4. $S = (35 \text{ m} - 20 \text{ m}) / (10 \text{ s} - 5 \text{ s})$

_____

5. $S = (46 \text{ m} - 18 \text{ m}) / (10 \text{ s} - 3 \text{ s})$

_____

6. $S = (49 \text{ m} - 21 \text{ m}) / (14 \text{ s} - 7 \text{ s})$

_____

Use the graph or the formula for speed to answer questions 7–12.

7. A trucker made a delivery to a town 180 km from his start point. The graph shows the time and distance for the trip. During which part of the trip was the trucker driving 55 km/h?

_____

8. The trucker stopped at a truck stop for a one-hour lunch break. During which part of the trip did he take his lunch break?

_____

9. What was the trucker's speed as he drove from the truck stop where he had lunch to his final destination?

_____

Distance-Time Record for Trip A

10. A jogger runs along a road for a distance of 2700 m. If it takes her 900 seconds to run that distance, what is her speed?

_____

11. A car travels 40 miles in the first hour and 50 miles in the second hour. What is the car's average speed over the entire trip?

_____

12. A bicyclist travels 10 km in half an hour, then rests for half an hour, then travels 50 km in three hours. What was the bicyclist's average speed over the entire trip?

_____