

Constant Velocity Example Problems

1. Benjamin watches a thunderstorm from his apartment window. He sees the flash of a lightning bolt and begins counting the seconds until he hears the clap of thunder 10.0 s later. How far away was the lightning bolt in meters if the speed of sound is 340 m/s?

Givens:

Equation:

Show Work:

Answer:

2. It takes 2.56 s for a laser beam to travel to the moon and back. What is the distance to the moon in km if the speed of light is 3×10^8 m/s?

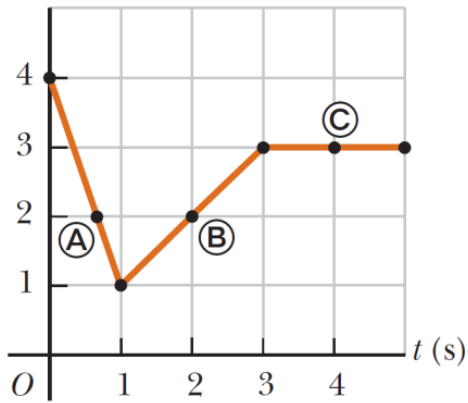
Givens:

Equation:

Show Work:

Answer:

3. The graph below represents the motion for an object. (a) What is the object's instantaneous velocity at point A, B, and C? (b) What is the object's average velocity from 0s to 2s and from 1s to 5s?



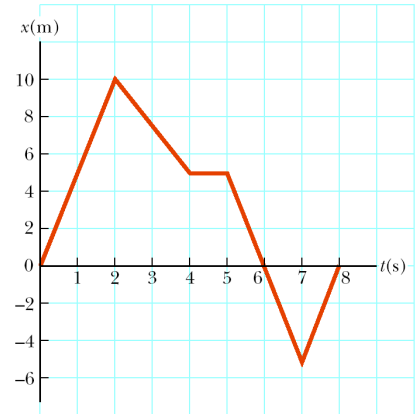
4. A runner goes out for a jog and runs for 0.5h at 10 mph, then 0.25 h at 5 mph, stops for a break for 20 minutes, and then jog for another hour at 8 mph. What is the runner's average velocity

Unit 1 WS 6: Constant Velocity Word Problems

1. The slowest animal ever discovered was a crab found in the Red Sea. It traveled with an average speed of 5.70 km/y. How many years would it take this crab to travel 100 km?
2. For a long time it was the dream of many runners to break the "4 minute mile." Now quite a few runners have achieved what once seemed an impossible goal. On July 2, 1988, Steve Cram of Great Britain ran a mile in 3.81 minutes. During this amazing run, what was Steve's average speed in: A) mi/min? B) mi/h?
3. The horse racing record for a 1.50 mi oval track is shared by two horses. Fiddle Isle, who ran the race in 143 s on March 21, 1970, and John Henry, who ran the same distance in an equal time on March 16, 1980. What were the horses' average speeds in: A) mi/s? B) mi/h? C) What was the horses' average velocity?
4. Tiffany, who is opening in a new Broadway show, has some limo trouble in the city. With only 8.0 minutes until curtain time, she hails a cab and they speed off to the theater down a 100 m long one-way street at a speed of 25 m/s. At the end of the street, the cab driver waits at a traffic light for 1.5 min. and then turns north onto a 1700 m long traffic filled avenue on which he is able to travel at a speed of only 10.0 m/s. Finally, this brings them to the theater. A) Does Tiffany arrive before the theater lights dim? B) How much is she late by or early by?
5. It is now 10:29 a.m., but when the bell rings at 10:30 a.m. Suzette will be late for Physics for the third time this week. She must get from one side of the school to the other by hurrying down three different hallways. She runs down the 1st hallway, a distance of 35 m, at a speed of 3.5 m/s. The 2nd hallway is filled with students, and she covers its 48 m length at an average speed of 1.2 m/s. The final hallway is empty, and Suzette sprints its 60 m length at a speed of 5.0 m/s. What is the exact time Suzette gets to class?
6. Hans stands at the rim of the Grand Canyon and yodels down to the bottom. He hears his yodel echo back from the canyon floor 5.2 s later. How deep is the canyon at this location?
7. A torpedo fired from a submerged submarine is propelled through the water with a speed of 20.0 m/s and explodes upon impact with a target 2000 m away. If the sound of the impact is heard 101.4 s after the torpedo was fired, what is the speed of sound in water?
8. A person travels by car from one city to another with different constant speeds between pairs of cities. She drives for 0.5 h at 80.0 km/h, 0.2 h at 100 km/h, and 0.75 h at 40.0 km/h and spends 0.25 h eating lunch and buying gas. (a) Determine the average speed for the trip. (b) Determine the distance between the initial and final cities along the route.

9. Two boats start together and race across a 60-km-wide lake and back. Boat A goes across at 60 km/h and returns at 60 km/h. Boat B goes across at 30 km/h, and its crew, realizing how far behind it is getting, returns at 90 km/h. Turnaround times are negligible, and the boat that completes the round trip first wins. (a) Which boat wins and by how much? (Or is it a tie?) (b) What is the average velocity of the winning boat?

10. A graph of position versus time for a certain particle moving along the x -axis is shown to the right. Find the average velocity in the time intervals from (a) 0 to 2.0 s, (b) 0 to 4.0 s, (c) 2.0 s to 4.0 s, (d) 4.0 s to 7.0 s, and (e) 0 to 8.0 s.



11. A motorist drives north for .058 h at 85.0 km/h and then stops for 0.25 h. He then drives south, traveling 130 km in 2.00 h. (a) What is his total displacement? (b) What is his average velocity?

12. To qualify for the finals in a racing event, a racecar must achieve an average speed of 250 km/h on a track with a total length of 1,600 m. If a particular car covers the first half of the track at an average speed of 230 km/h, what minimum average speed must it have in the second half of the event in order to qualify?

13. A tennis player moves in a straight-line path as shown in to the right. Find her average velocity in the time intervals from (a) 0 to 1.0 s, (b) 0 to 4.0 s, (c) 1.0 s to 5.0 s, and (d) 1.0 to 3.0 s.

