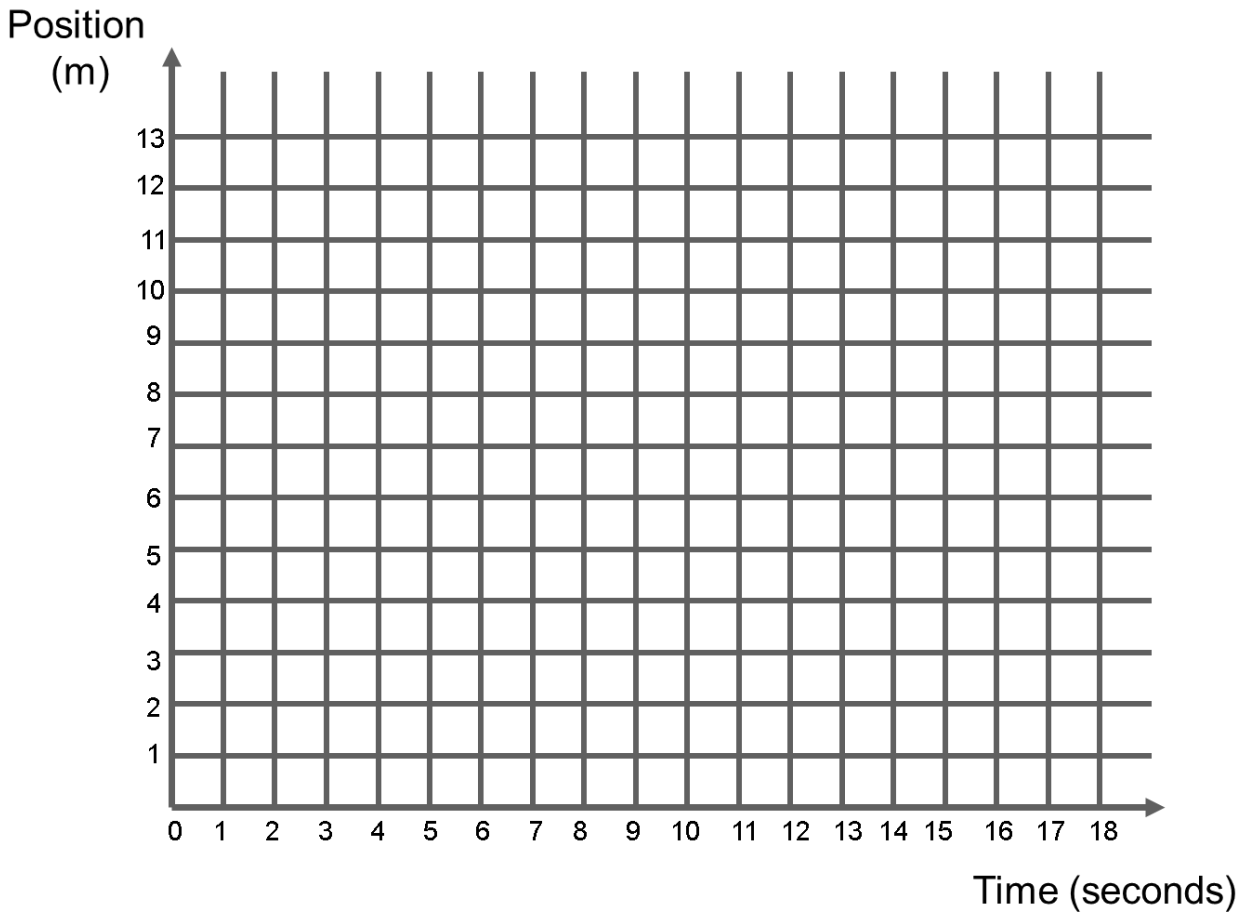
Position-Time Graphs

Also known as:

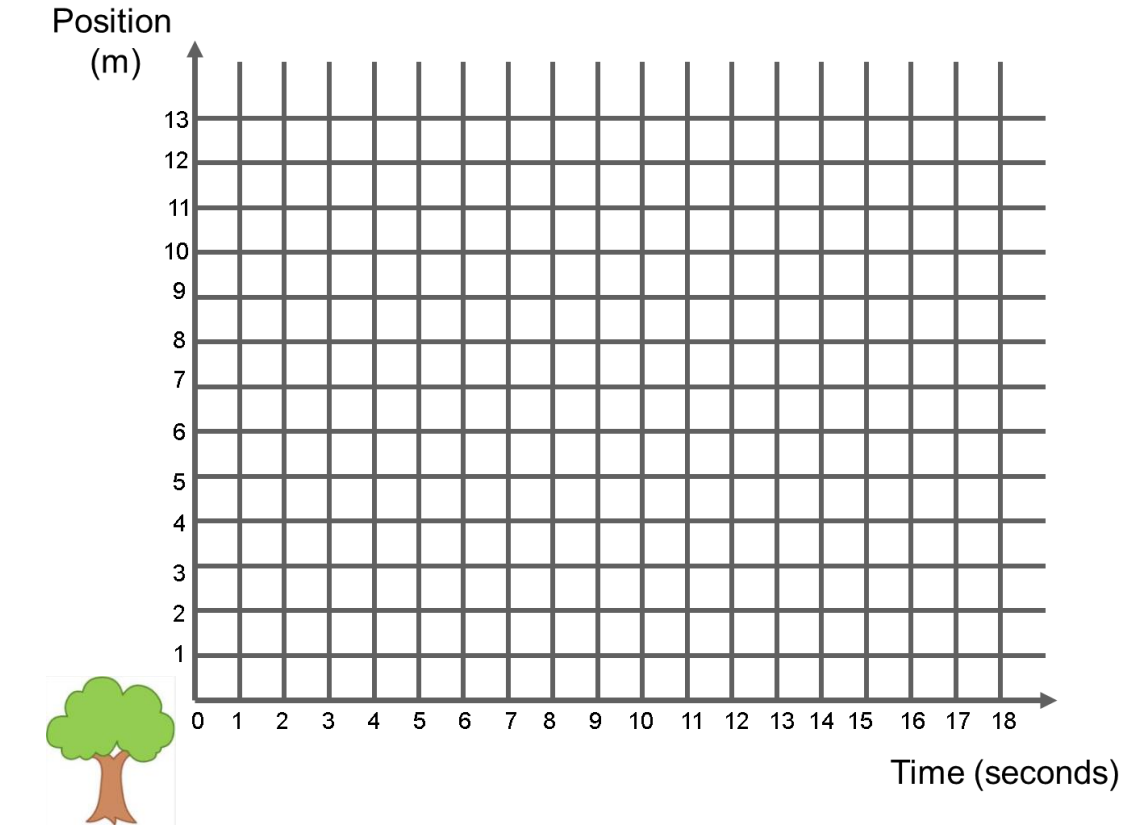
Motion Graphs

Motion Graphs



Position-Time (Motion) Graphs tell you where an object is located over a period of time. The slope of the graph tells you how fast the object is moving.

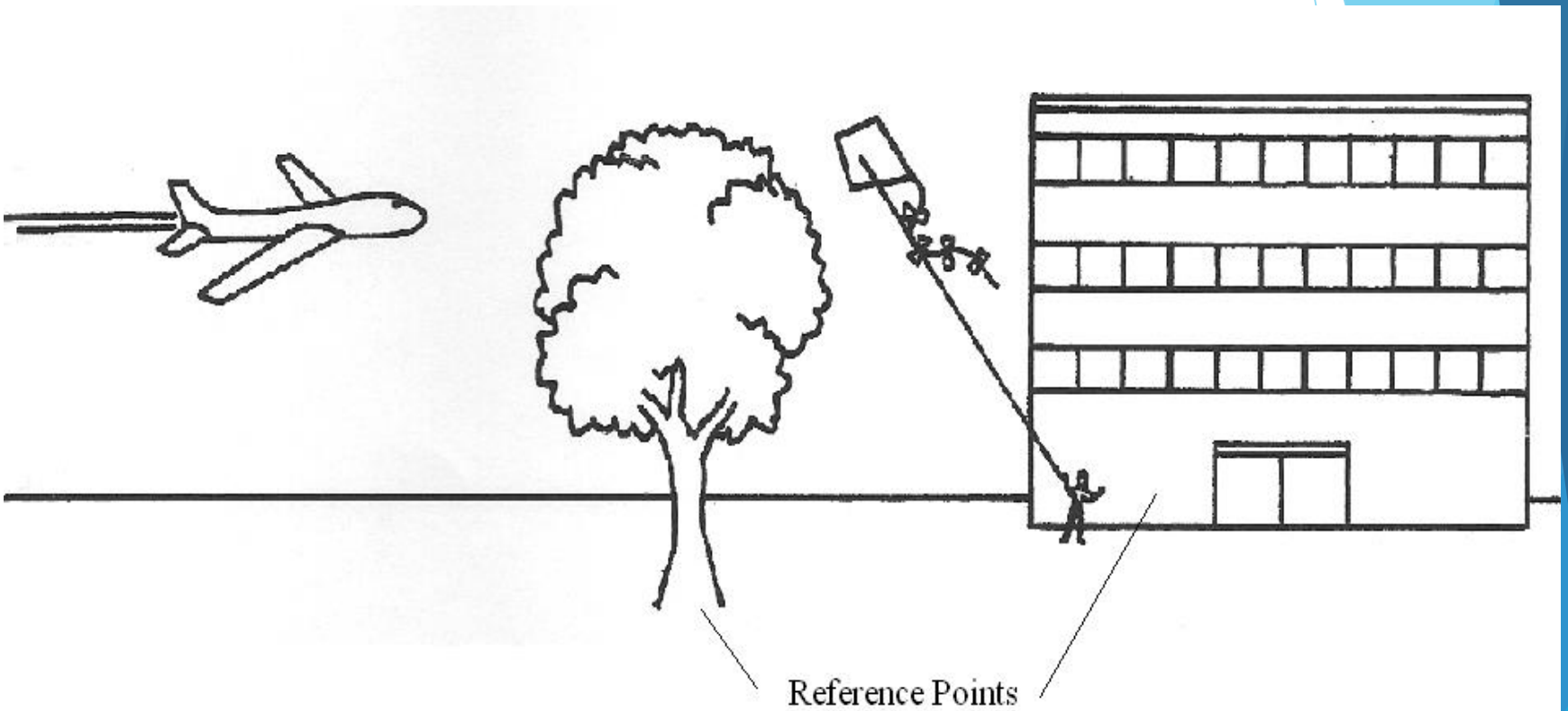
Reference Point



Reference Point

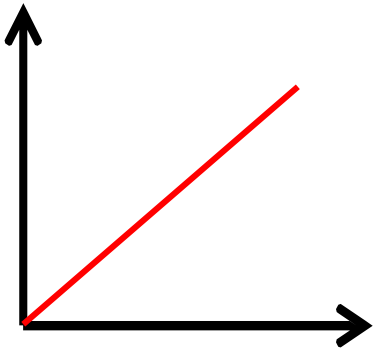
A **reference point** is a place or object used for comparison to determine if something is in motion.

Frame of Reference

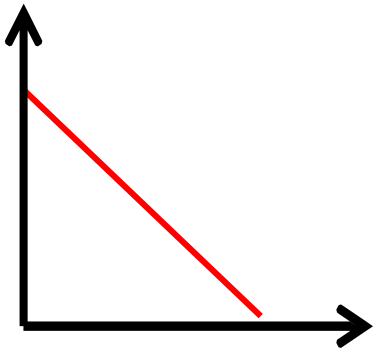


The sign of the slope indicates direction of motion.
What would a graph look like if an object is…

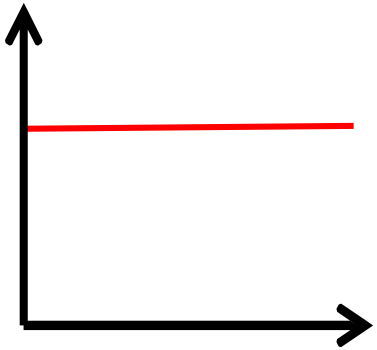
Moving away from 0 meters



Moving towards 0 meters



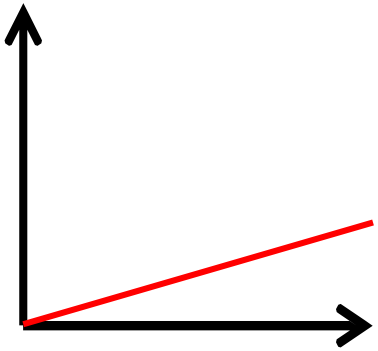
Stopped



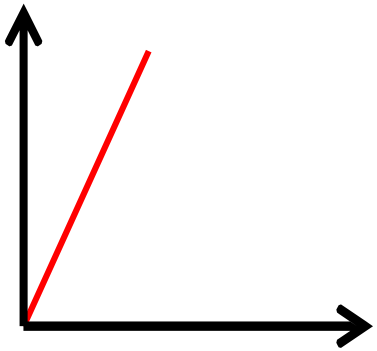
The steepness of the line indicates how fast an object is moving.

What would a graph look like if an object is…

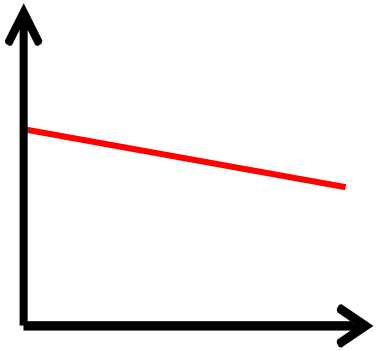
Moving slowly away from 0 m.



Moving quickly away from 0 m.



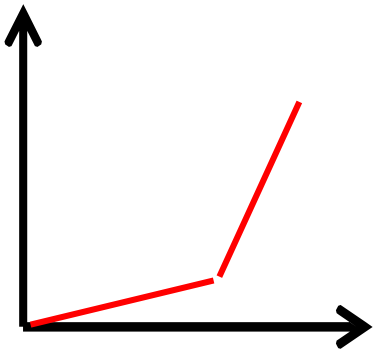
Moving slowly towards 0 m.



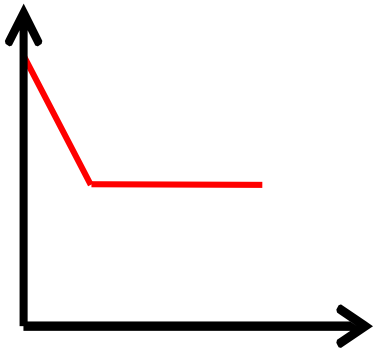
What if the object's motion changes?

What would a graph look like if an object is…

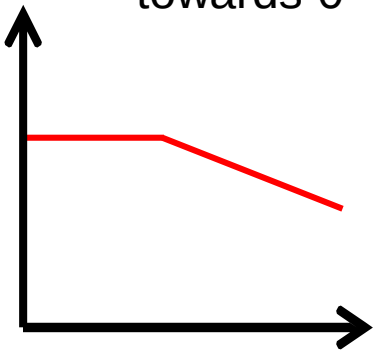
Moves slowly then quickly away from 0

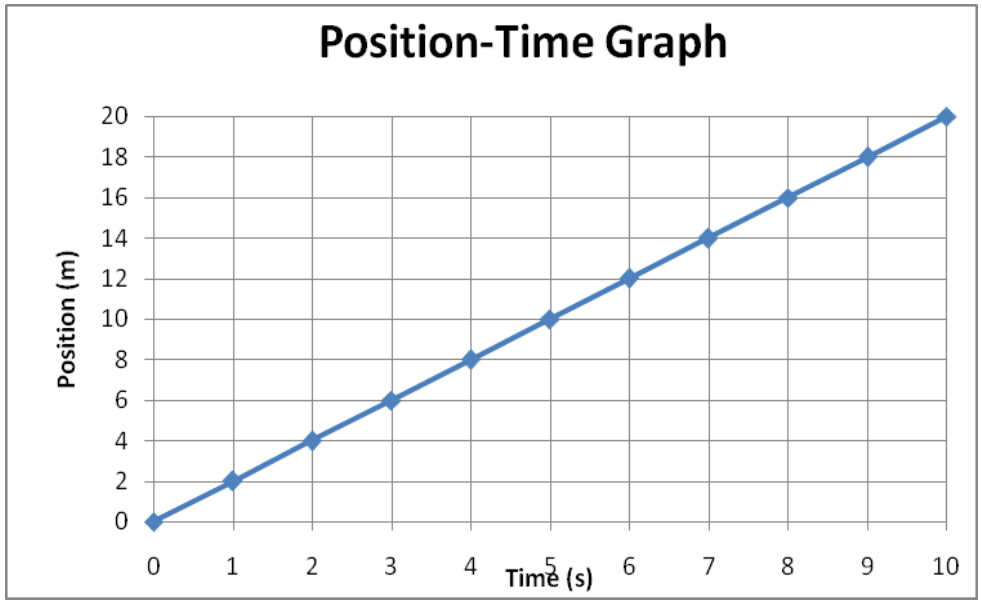


Moves quickly towards 0 then stops



Stopped then moves slowly towards 0





When time increases, what happens to the distance?

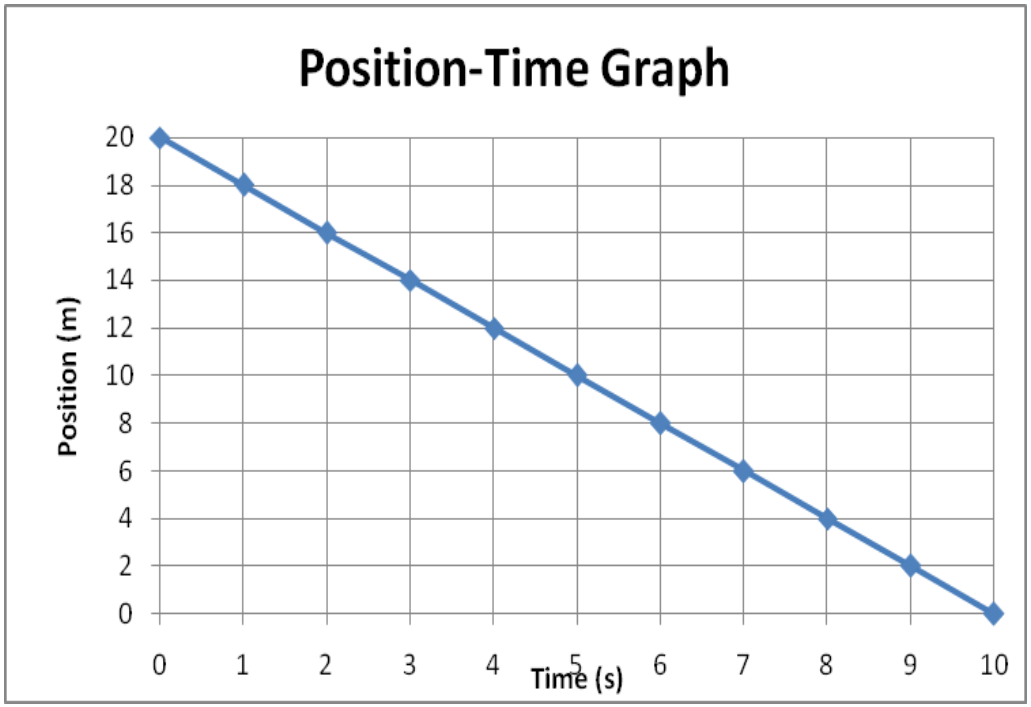
it increases

Describe the object's motion.

Constant positive velocity

What is the velocity of the object?

2 m/s away from the reference



When time increases, what happens to the distance?

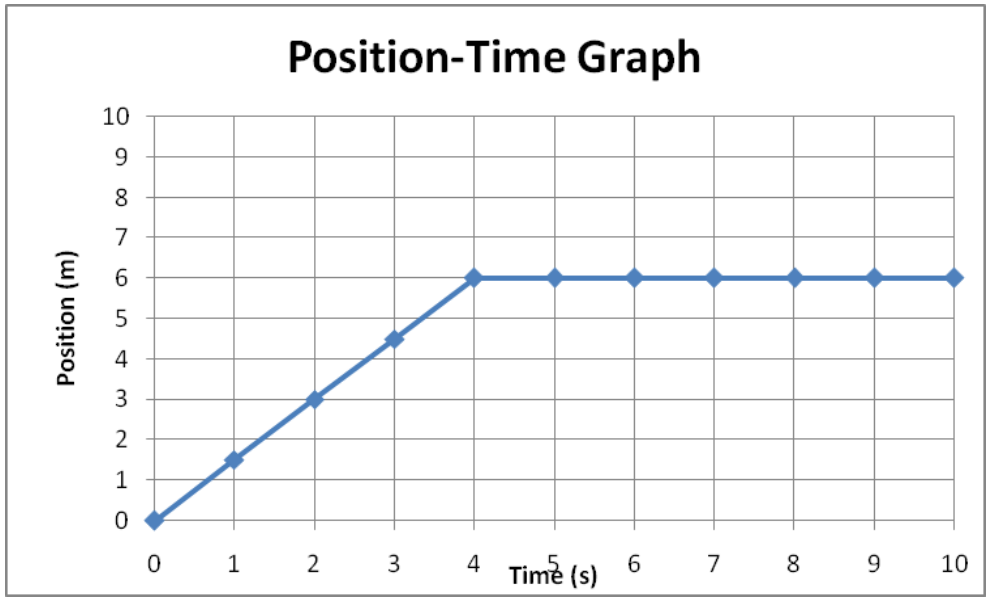
It decreases

Describe the object's motion.

constant negative velocity

What is the velocity of the object?

-2 m/s toward the reference point



Is the object's motion constant? Explain.

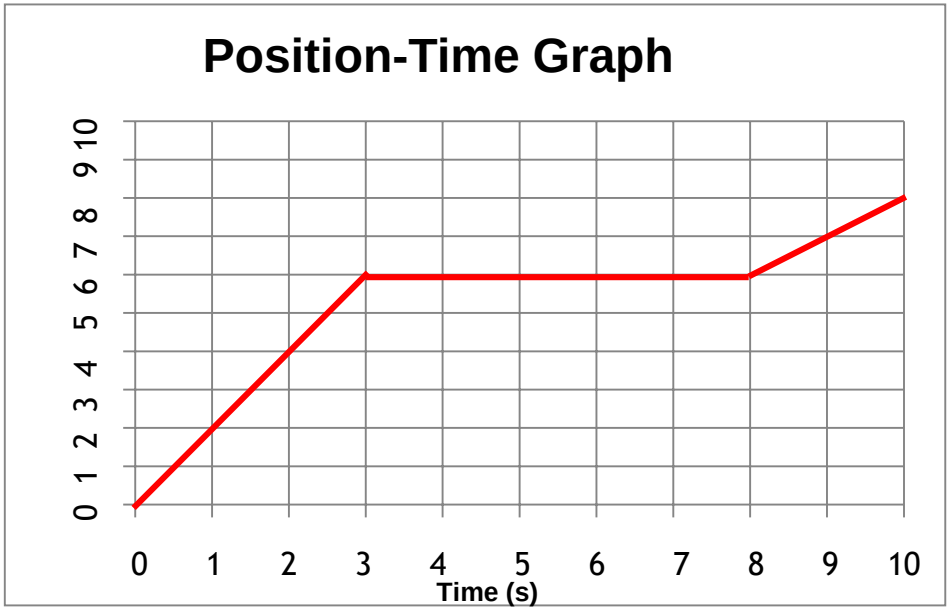
No, it moves forward at a constant rate, then stops.

What is the velocity during the first 4 seconds?

1.5 m/s

What is the velocity during the last 6 seconds?

0 m/s



Problem 1: A car travels 6 meters in 3 seconds. It then stops for 5 seconds. Then the car goes 2 meters in 2 seconds.

What is the velocity of the car for the first 3 seconds?

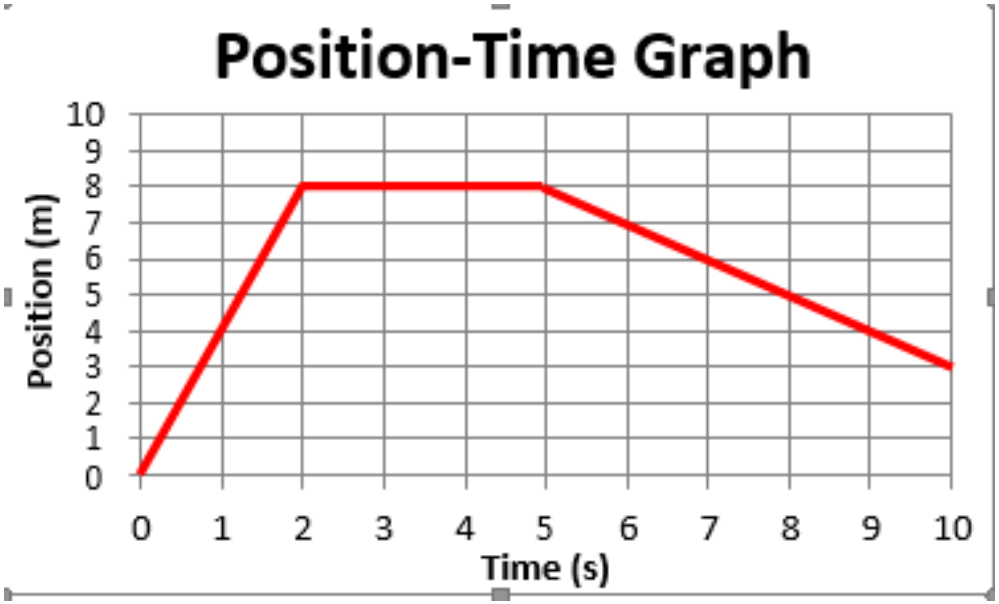
6 m/3 s = 2 m/s

What is the velocity of the car from times 3-8 seconds?

0 m/s

During which time is the car moving faster, 0-3 seconds or 8-10 seconds? How could you know this without calculating the velocity?

From 0-3 seconds, the slope is steeper



Problem 2: A car travels 8 meters in 2 seconds. It stays motionless for 3 seconds. It then goes -5 meters in 5 seconds.

What is the velocity of the car for the first 2 seconds?

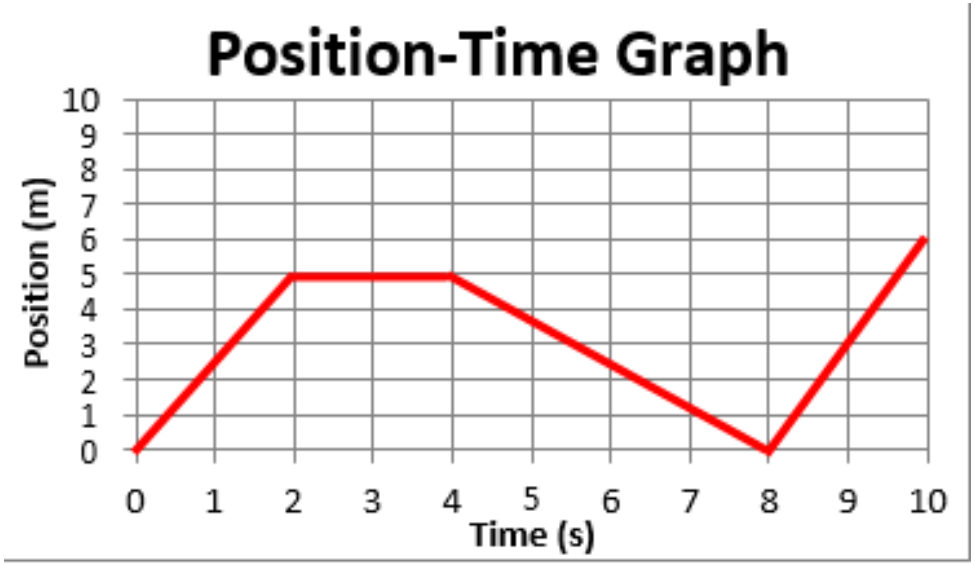
8 m/2 s = 4 m/s

What is the velocity of the car from times 2-5 seconds?

0 m/s

What is the velocity of the car from times 5-10s?

-5m/5s = -1m/s



What is the velocity of the car for the first 2 seconds?

5 m/2 s = 2.5 m/s

What is the velocity of the car from times 4-8 seconds?

-5 m/4 s = -1.25 m/s

How far did the car move from 8-10s

3 m/s * 2 s = 6 m

Problem 3: A car travels 5 meters in 2 seconds. The car then stays motionless for 2 seconds. It then moves 5 meters in the opposite direction in 4 seconds. Last, the car moves forward at 3m/s for 2 seconds.