

If the average velocity is nonzero for some time interval, does this mean that the instantaneous velocity is never zero during this interval?

Good response with illustrative example

No, average velocity only tells you how far something has been displaced over a certain time interval while instantaneous velocity would be more similar to the speed at which a body is moving at a specific point in time. For instance, if you drove in a straight line for an hour for 100 miles your average velocity would be 100 mph, however, if you stopped at any point in time while you were driving your instantaneous velocity would be zero at that time.

Slight confusion cleared up with a good example

No, the instantaneous velocity could be zero at any given point in time. Since the average velocity is, by name, an average, the instantaneous velocity could be zero for the entire interval so long as there is any one specific point on the interval where the velocity is above zero.

The best example I can think of to prove that an instantaneous velocity could be zero in a situation such as the one described in the question is a traffic question. Even though you are making progress, and thus your displacement is a nonzero value, there are still long sections of time wherein you are making no progress.

Insufficient explanation, doesn't answer question

No, average velocity is the change in position divided by the time while the instantaneous velocity is the velocity at a certain point.

Insufficient explanation, doesn't answer question, and is incorrect

No, the average velocity being nonzero for some time interval does not mean that the instantaneous velocity is never zero because instantaneous velocity does not equal average velocity.

Estimate your average walking speed in meters per second when you go through a particularly long line in the caf. Explain your logic.

Good simple logic with round numbers

I estimated 20 meters from where we scan our ID's to the back wall of the caf; 60 feet is about 20 meters. With a long line, I am assuming to take about 15 minutes to wait in line. 15 minutes is about 1,000 seconds. My average walking speed would be 0.02 m/s; dividing 20 m by 1000 seconds.

Good logic, but in the weeds with the numbers

I calculated in my head that 80 feet is around 24 meters from the door of the bottom floor of Norton to the back of the caf where we get our food. When there is a long line in the caf it takes about 30 minutes to wait until you can get your food. I calculated that 30 minutes are about 1800 seconds. The formula for my average walking speed is distance/ time. I would use this formula by dividing 24 meters over 1800 seconds, which would give me about .012 m/s.

Correct, though not looking at the overall average

At peak rush in the caf the line moves about 1 step every 10 seconds, estimating that one step is half a meter, you would be moving at .2 m/s.

Good explanation, error apparent

Average walking speed in meters per second when going through a long line in the caf:

Estimated time: 10 minutes = 600 seconds

Estimated distance per step: 2 meters

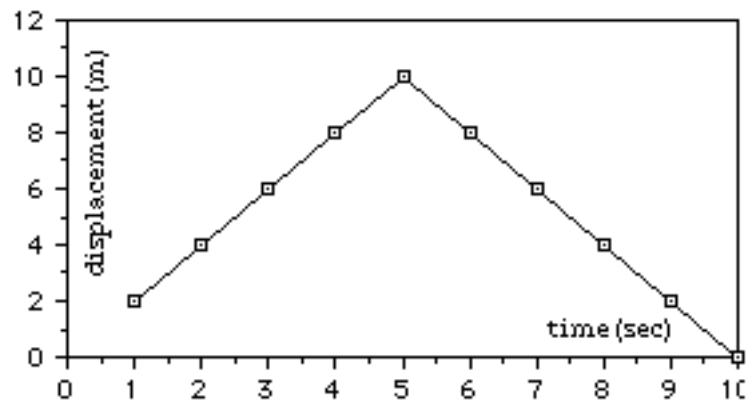
change in x/ change in t

$2/600=0.002$ meters per second

Calculator use apparent! Don't do it!!!

Typically the longest lines in the caf that I will stand through are about 20 feet, which is about 6.7 meters. I would guess that at the most the line can take 8 minutes (480 seconds). With that information, my average velocity would be 0.014m/s.

The figure shows a displacement versus time graph for a ball rolling along the floor.



During the third second the speed of the ball was

Select one:

- a. 1 m/s
- b. 2 m/s
- c. 3 m/s
- d. cannot be determined