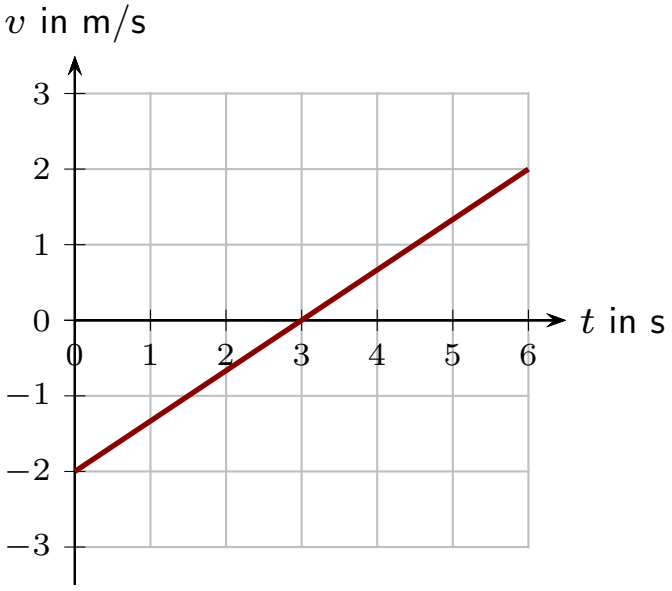
Question 1

A graph of velocity vs. time for an object moving in one dimension is illustrated.

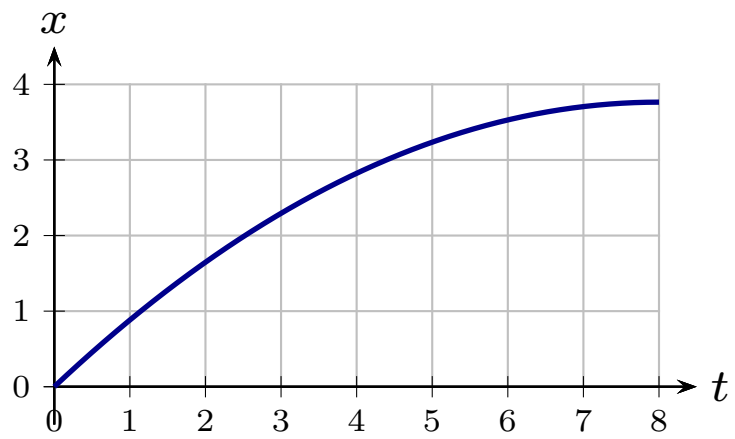


Which of the following is true about the object's motion during the period from $0\,\mathrm{s}$ to $6\,\mathrm{s}$?

1. It is always speeding up. $a > 0$ always.
2. It is always speeding up. $a > 0$ sometimes, $a < 0$ sometimes.
3. At some times it is speeding up; at others it is slowing down. $a > 0$ always.
4. At some times it is speeding up; at others it is slowing down. $a < 0$ always.
5. At some times it is speeding up; at others it is slowing down. $a > 0$ sometimes, $a < 0$ sometimes.

Question 2

A graph of position vs. time for an object moving in one dimension is illustrated.



Which of following is true about the object's acceleration during the illustrated period?

1. $a = 0$ at all times.
2. $a < 0$ at all times.
3. $a > 0$ at all times.
4. $a > 0$ at some times and $a < 0$ at other times.

Warm Up Question 1

A car, at rest at an initial instant, has a constant positive acceleration for the next 100 seconds. Consider the displacement of the car during the first $5\,\mathrm{s}$ interval after it starts to move and the second $5\,\mathrm{s}$ interval after it starts to move. Is the displacement during the second interval the same as, smaller than or larger than the first interval? Explain your answer.

1. Larger in the second interval. Car travels faster later on.
2. Equal. Velocity is constant.
3. Equal. Acceleration is constant.

Warm Up Question 2

A snail moves in a straight line with constant positive acceleration. At an initial instant the snail's velocity is v_0. Consider an interval after this with duration t. Does the equation

$$\Delta x = v_0 t$$

correctly predict the displacement of the snail during this interval? Explain your answer.

1. Yes. Displacement is velocity times time.
2. No. It ignores acceleration.
3. No. It only uses initial velocity and velocity changes.
4. No.

$$\Delta x = v_0 t + \frac{1}{2} a t^2$$