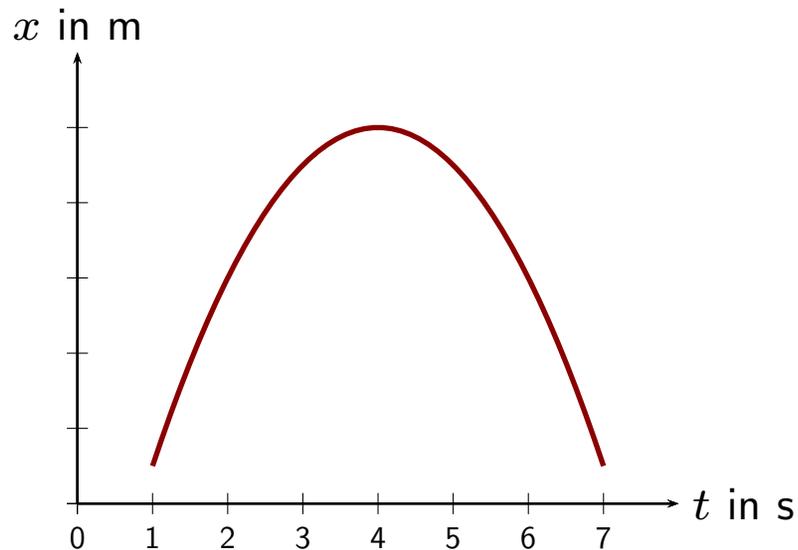# Question 1

A graph of position vs. time for an object that moves in one dimension is as illustrated.

x in m

t in s

Which of the following is true?

1. The object speeds up at all times.

2. The object slows down at all times.

3. The object speeds up before $4\,$s and slows down after $4\,$s.

4. The object slows down $4\,$s and speeds up after $4\,$s.

Question 2

A cart slides to the left with constantly decreasing *speed.*
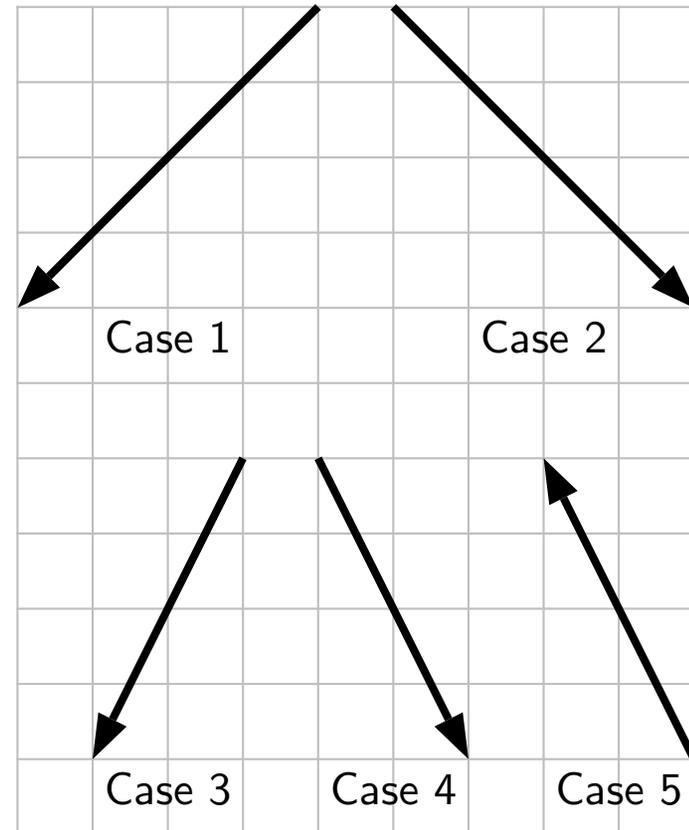
Which of the following is true?

1. The average acceleration is positive.

2. The average acceleration is negative.

3. The average acceleration is negative if the cart is right of the origin but positive if it is left of the origin.

4. The average acceleration is negative if the cart is left of the origin but positive if it is right of the origin.

5. The average acceleration is zero.

Question 3

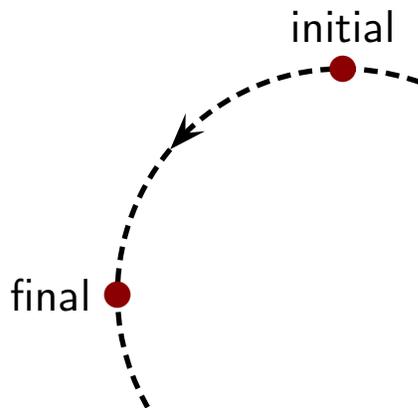Consider the two vectors $\vec{A}$ and $\vec{B}$ as illustrated.
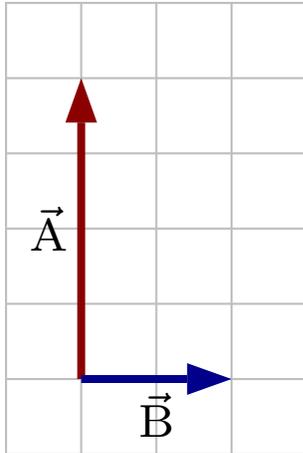
Which of the following best represents $2\vec{B} - \vec{A}$?

Question 4

A bug moves along a circular arc at a constant speed.

initial

final

Which of the following is true about the average acceleration from the initial instant to the final instant as illustrated?

1. $\vec{a}_{\mathrm{av}} = 0$

2. $\vec{a}_{\mathrm{av}} \neq 0$ with direction $\longleftarrow$

3. $\vec{a}_{\mathrm{av}} \neq 0$ with direction $\downarrow$

4. $\vec{a}_{\mathrm{av}} \neq 0$ with direction $\searrow$

5. $\vec{a}_{\mathrm{av}} \neq 0$ with direction $\swarrow$