

Question 1

A man pushes an object across a horizontal sheet of ice, such as in the PhET animation “Forces and Motion”. The man pushes the crate for an initial period of 2 s and after this the crate loses contact with the man’s hand. Which of the following is/are true?

1. The crate can move only *while* the man pushes on it.
2. The crate can move only *after* the man has stopped pushing it.
3. The crate can move *while* the man pushes on it and *after* the man has stopped pushing on it.

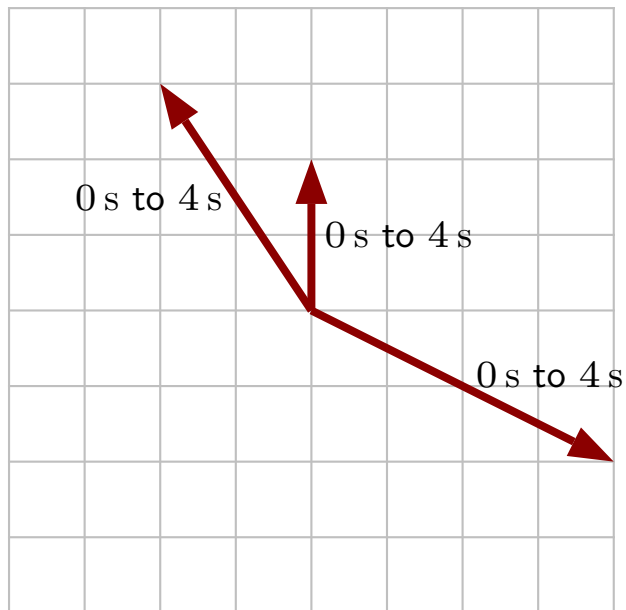
Question 2

A man pushes an object across a horizontal sheet of ice, such as in the PhET animation “Forces and Motion”. The man pushes the crate for an initial period of 2 s and after this the crate loses contact with the man’s hand but continues to slide to the right. Which of the following is/are true?

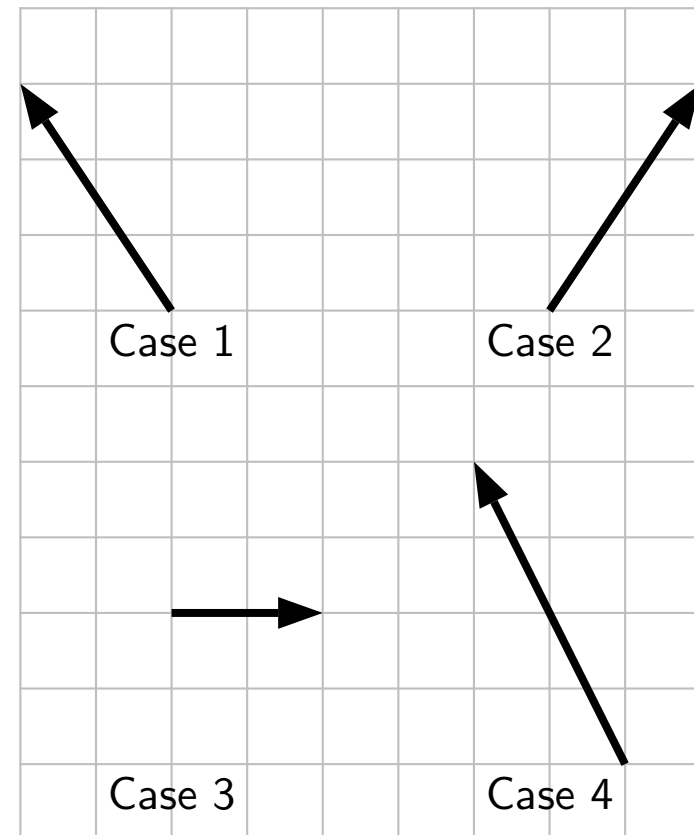
1. The man never exerts a force on the crate.
2. The man exerts a force on the crate during all times that the crate is moving.
3. The man only exerts a force on the crate *during* the initial period of 2 s.
4. The man only exerts a force on the crate *after* the initial period of 2 s.

Question 3

The following force vectors act on one object during various times as indicated.

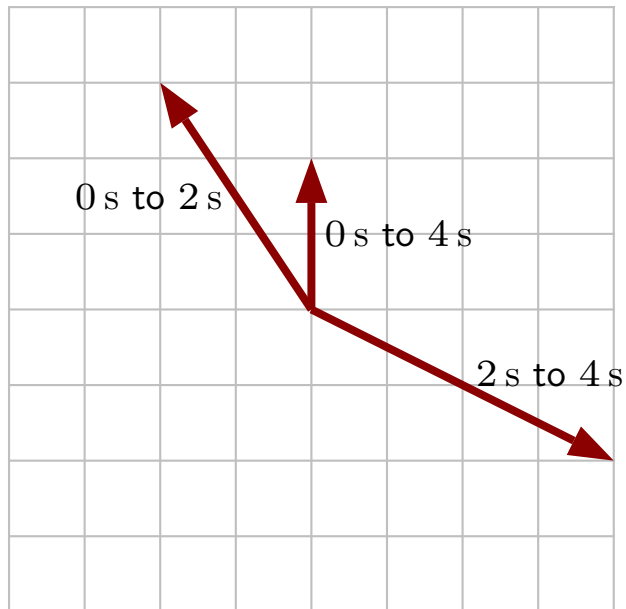


Which of the following best represents the net force acting on the object from 0 s to 4 s?

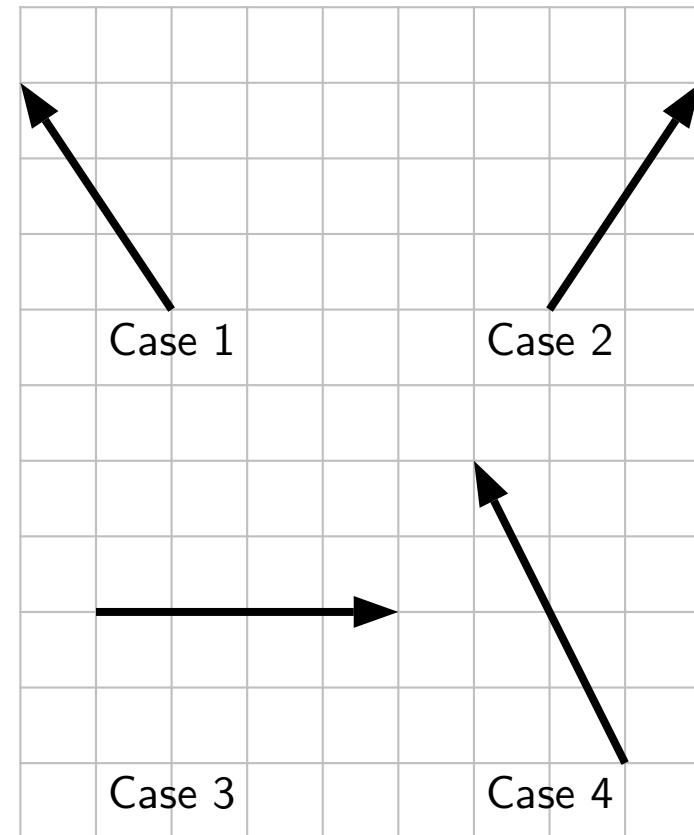


Question 4

The following force vectors act on one object during various times as indicated.

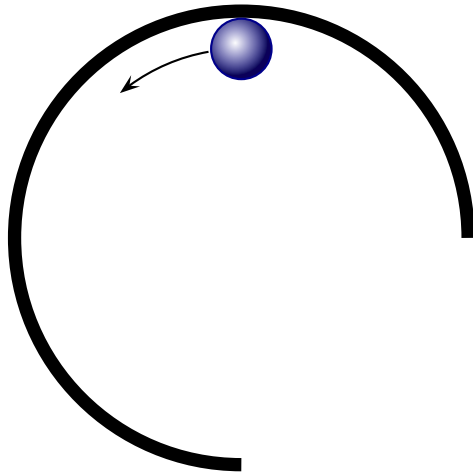


Which of the following best represents the net force acting on the object at 3 s?



Question 5

A nearly complete hoop is placed on a perfectly frictionless horizontal table. A marble is placed inside the hoop and given an initial push so that it rolls touching the inside of the hoop. Viewed *from above*:

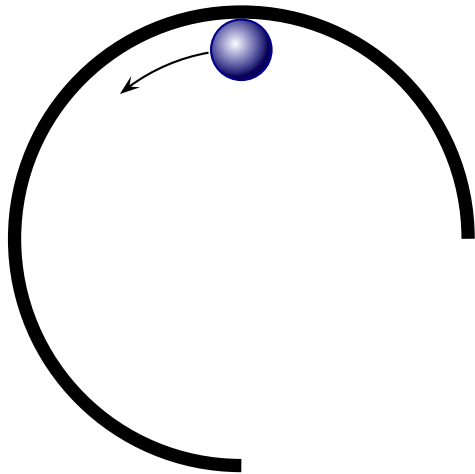


The ball slides at a constant speed while in contact with the hoop. Which of the following is true while the ball slides along the hoop?

1. The net force on the ball is zero.
2. The net force on the ball is not zero.
3. There is not enough information to decide whether the net force on the ball is zero or not.

Question 6

A nearly complete hoop is placed on a perfectly frictionless horizontal table. A marble is placed inside the hoop and given an initial push so that it rolls touching the inside of the hoop. Viewed *from above*:



The effects of the earth's gravity and the table cancel each other.

Which of the following best describes the trajectory of the marble after it leaves the hoop?



Case 1



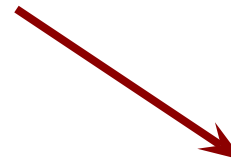
Case 2



Case 3



Case 4



Case 5