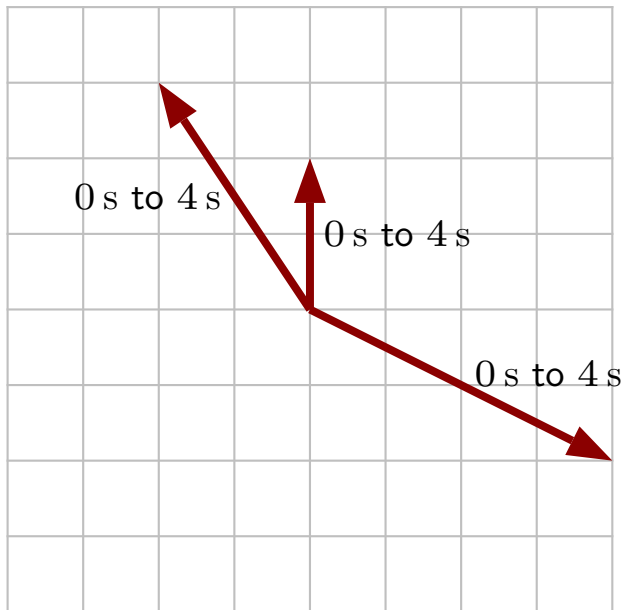
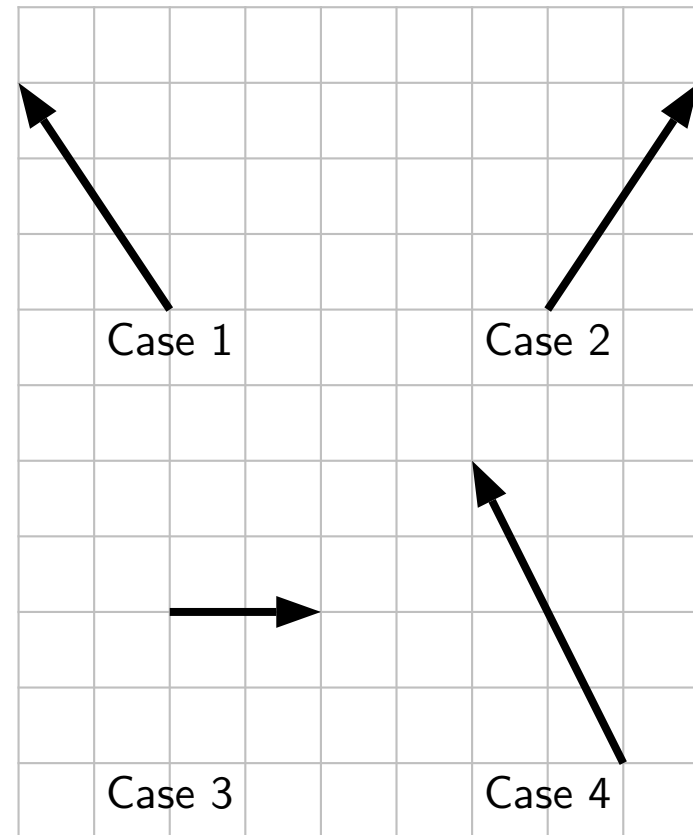


# Question 1

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 2

A cart moves along a horizontal surface to the right. During a particular period the cart slows down while moving to the right. The earth's gravitational force is irrelevant here and friction can be ignored.

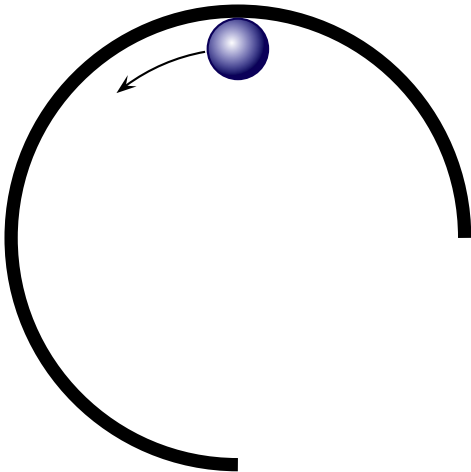


Which of the following is true regarding the net force on the cart during this period?

1.  $\vec{F}_{\text{net}} = 0$ .
2.  $\vec{F}_{\text{net}} \neq 0$  and points  $\uparrow$
3.  $\vec{F}_{\text{net}} \neq 0$  and points  $\downarrow$
4.  $\vec{F}_{\text{net}} \neq 0$  and points  $\rightarrow$
5.  $\vec{F}_{\text{net}} \neq 0$  and points  $\leftarrow$

## Question 3

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*:

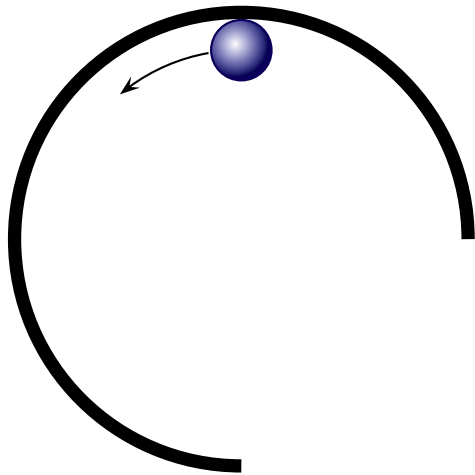


The ball slides at a constant speed while in contact with the hoop. Which of the following is true while the ball slides along the hoop?

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 4

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?

