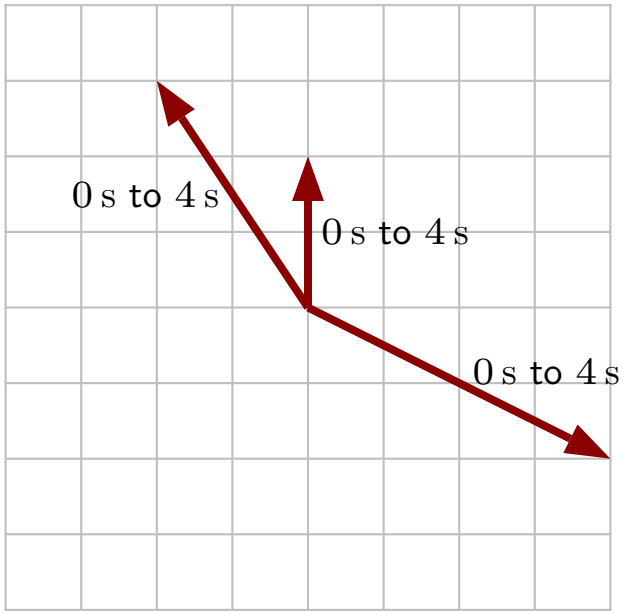
Question 1

An astronaut and a satellite in space are very distant from any other objects. The astronaut pushes the satellite for an initial period of $5\,\mathrm{s}$ and it moves to the right. After this the satellite loses contact with the astronaut's hand but continues to move to the right. Which of the following is true?

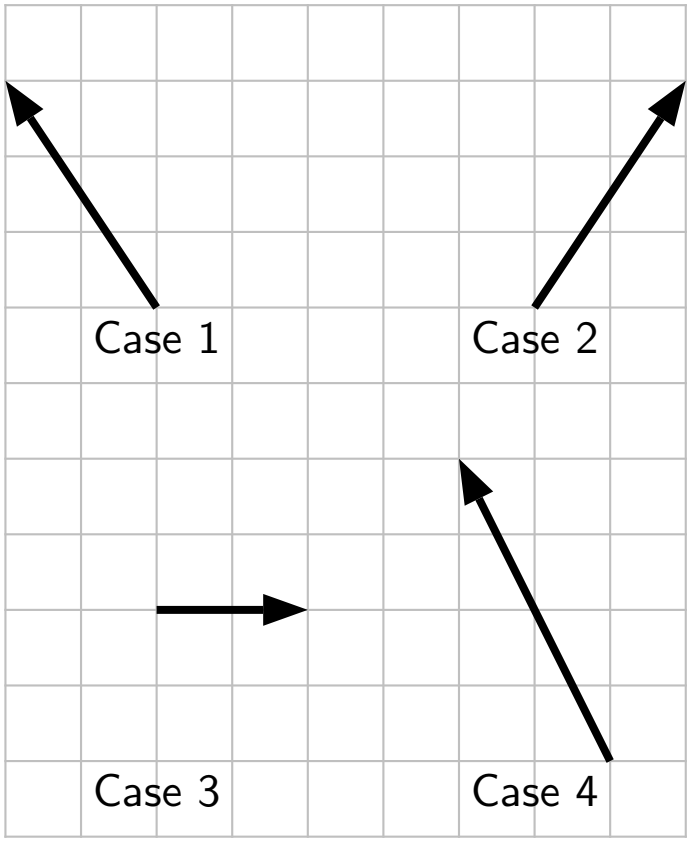
1. After $5\,\mathrm{s}$ there is no force on the satellite.
2. After $5\,\mathrm{s}$ there is a force on the satellite and it's exerted by the astronaut.
3. After $5\,\mathrm{s}$ there is a force on the satellite and it's exerted by the satellite.
4. After $5\,\mathrm{s}$ there is a force on the satellite and it's exerted by the something other than the astronaut or satellite.
5. After $5\,\mathrm{s}$ the satellite has a force and nothing else is needed to exert this.

Question 2

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

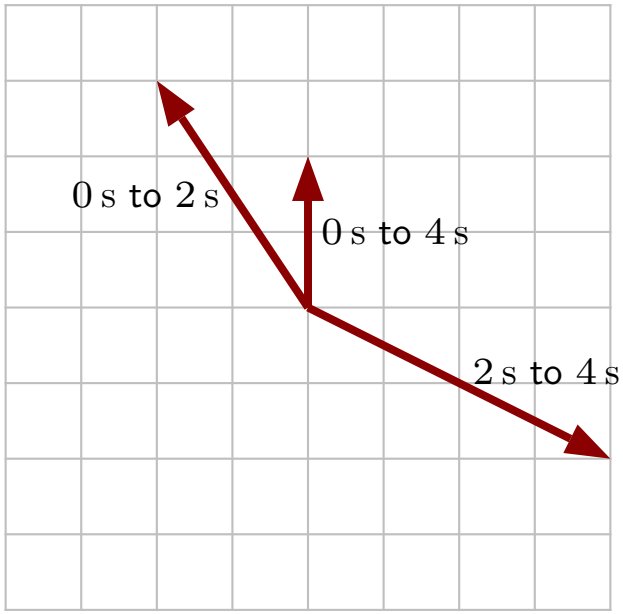


Which of the following best represents the net force acting on the object from $0\,\mathrm{s}$ to $4\,\mathrm{s}$?

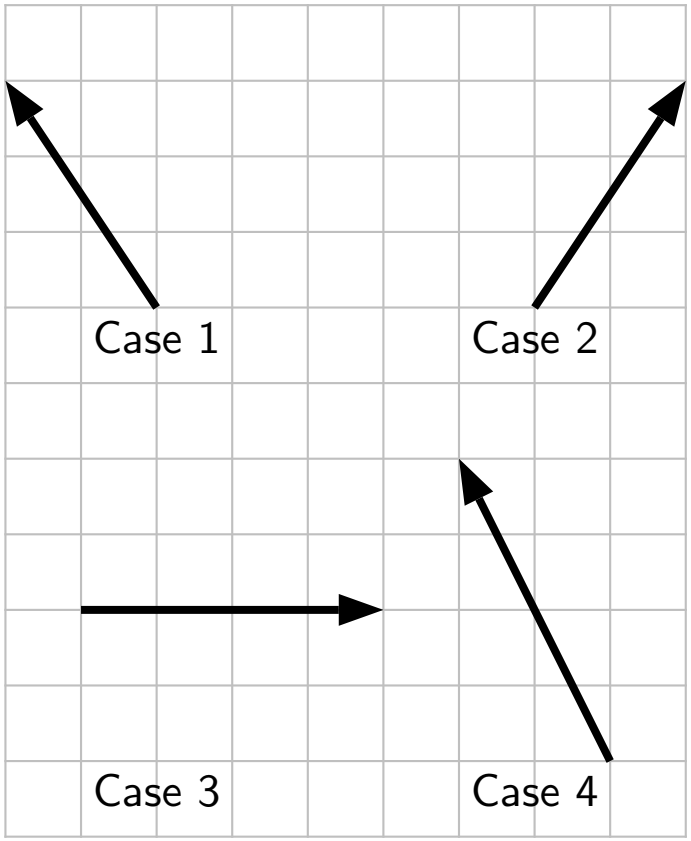


Question 3

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

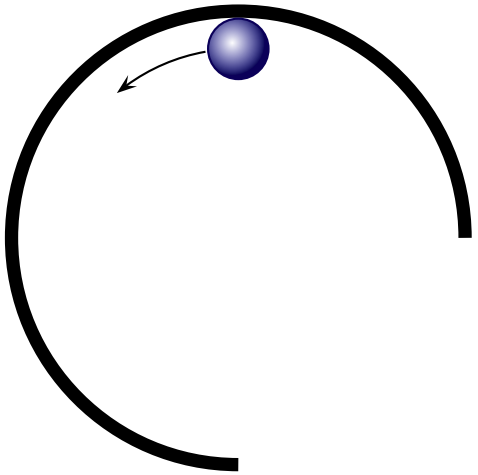


Which of the following best represents the net force acting on the object at $3\,\mathrm{s}$?



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:*

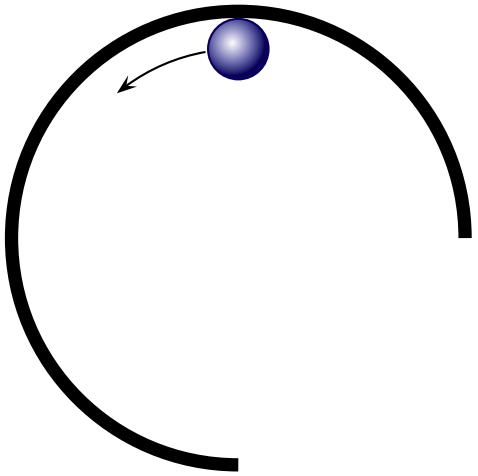


The ball slides at a constant speed while in contact with the hoop. Which of the following is true while the ball slides along the hoop?

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 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 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?