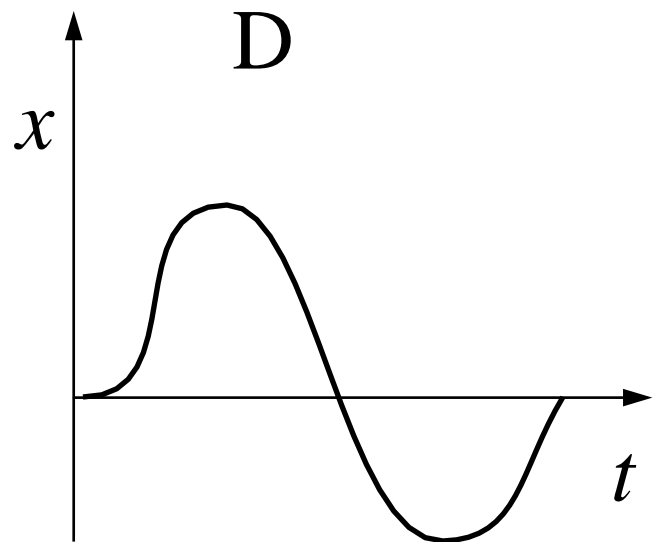
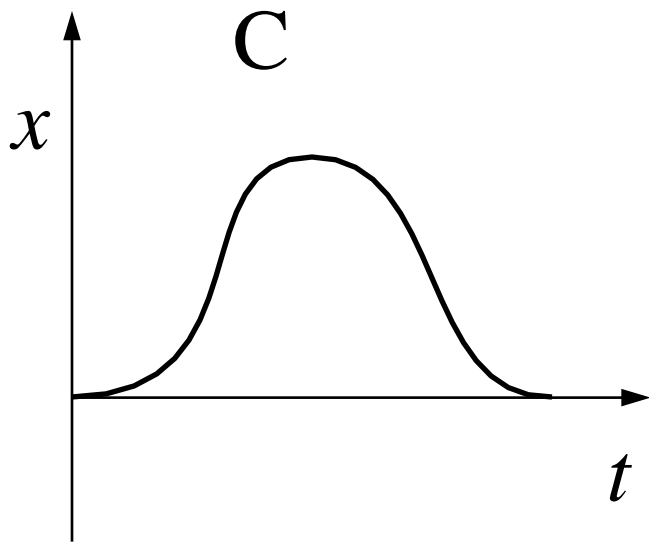
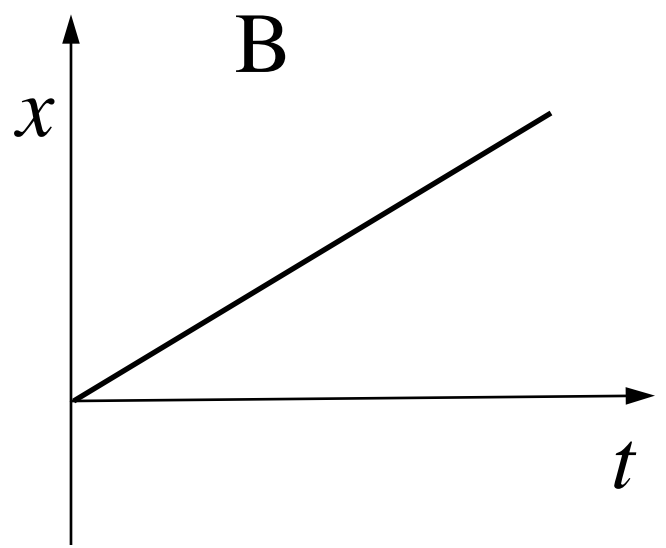
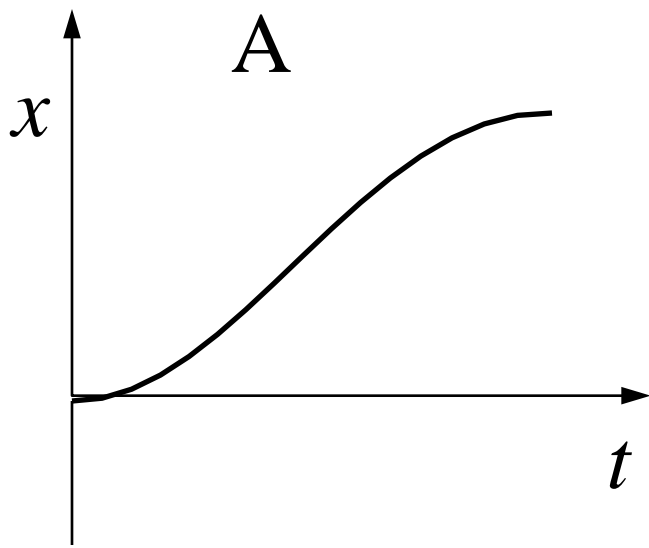


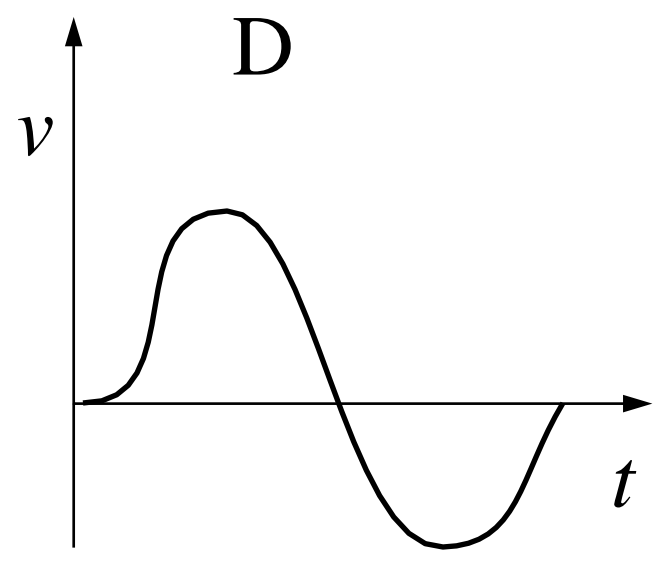
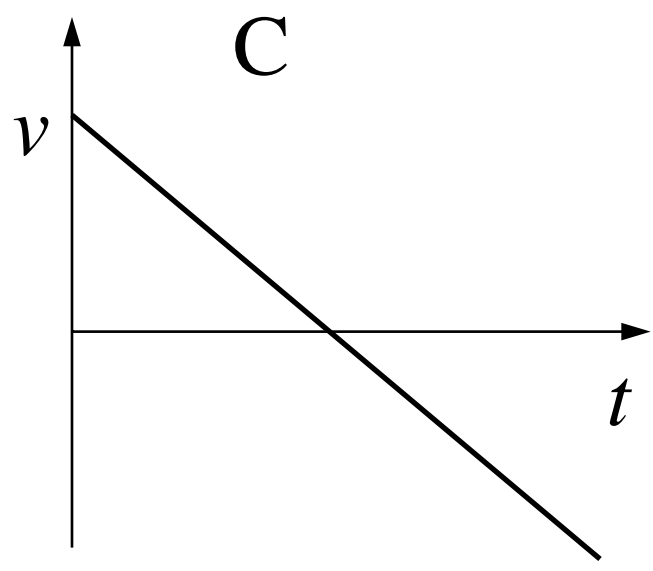
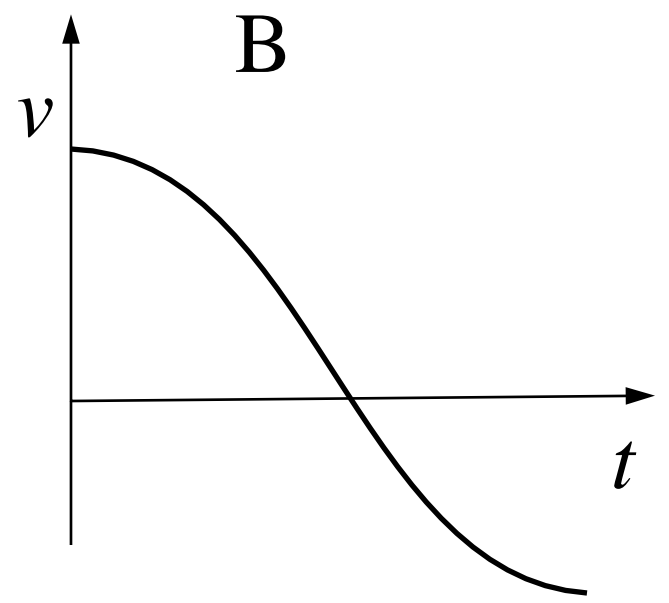
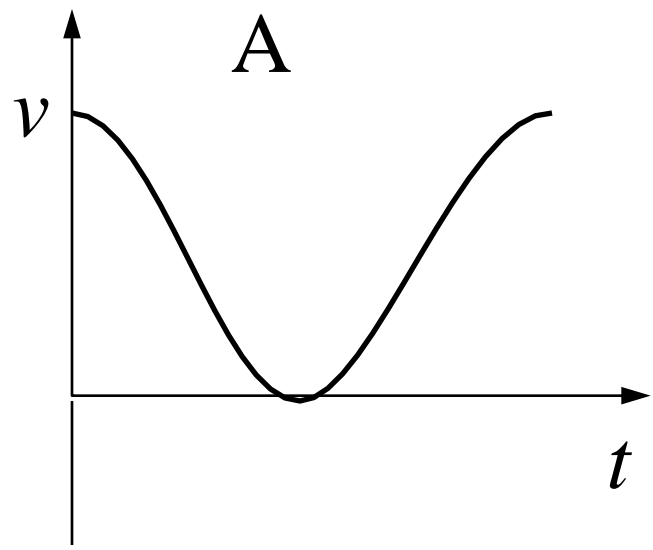
How many of the below numbers display exactly three (3) significant digits?

- .009
- 700
- 0.72
- 5.20
- 2002.1
- 0.720

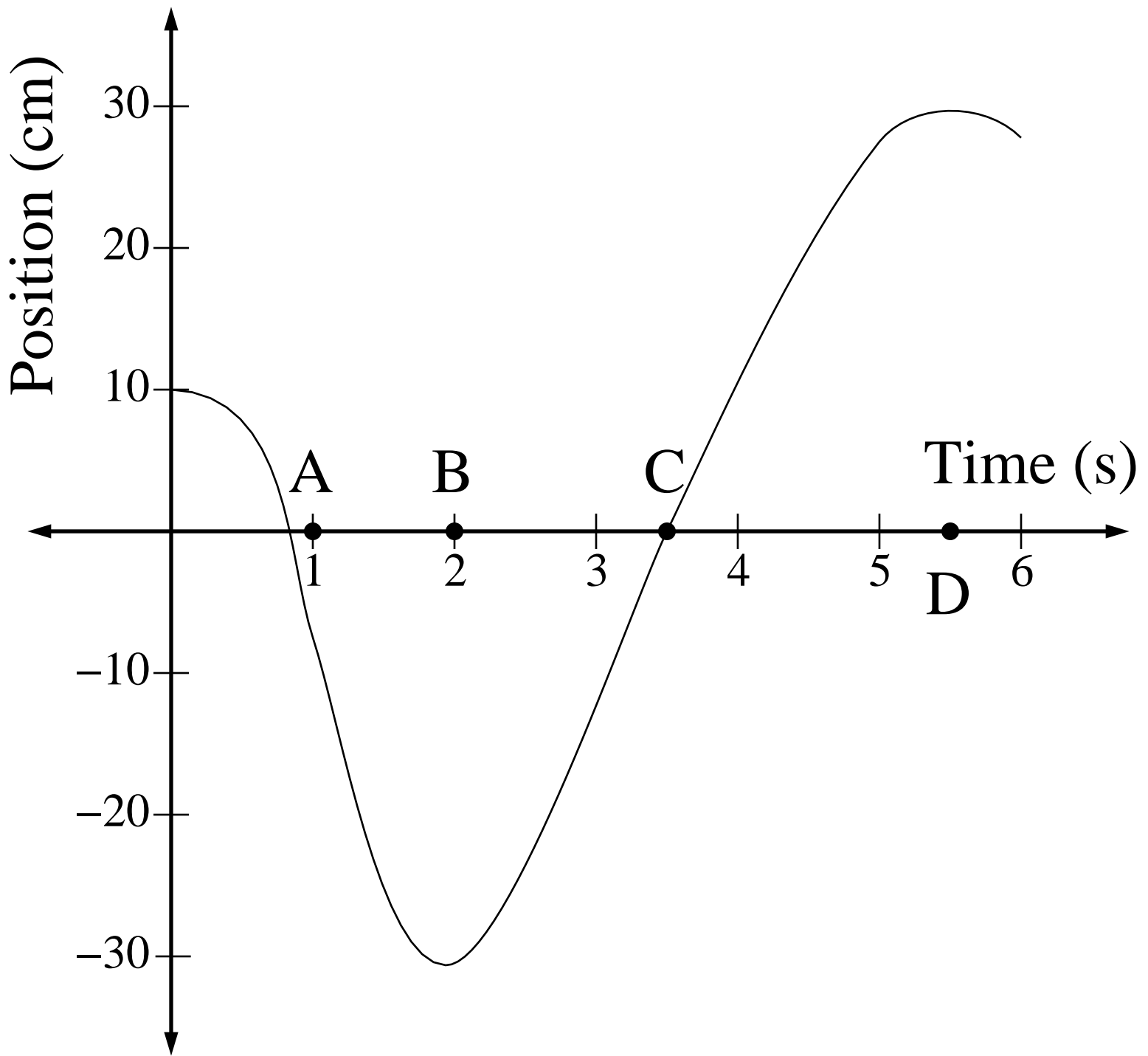
- A. One
- B. Two
- C. Three
- D. None of the above

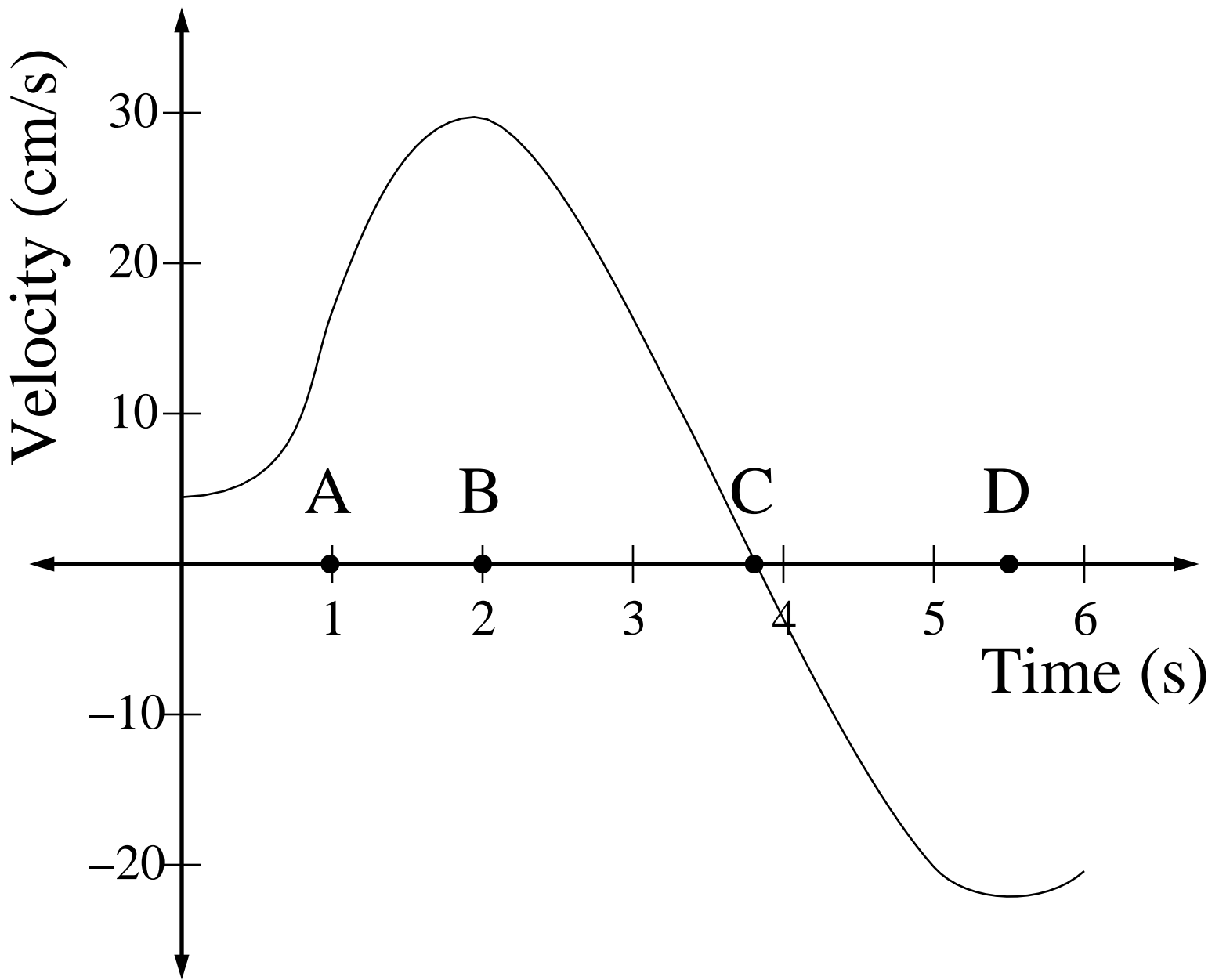


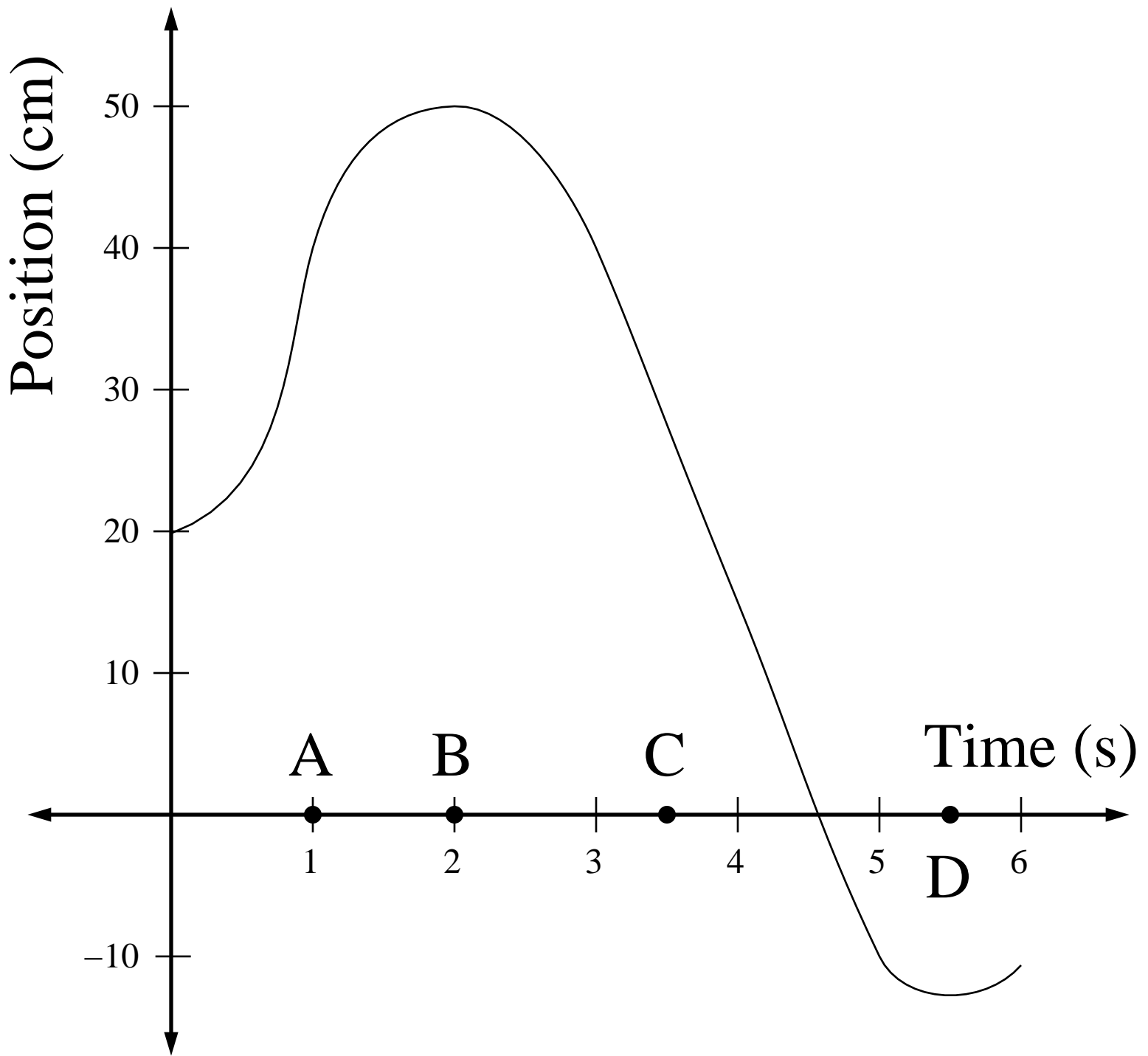
Starting from rest, a car accelerates down a straight road. A short time later the driver applies the brakes, and the car comes to a stop. Which of the above graphs of position vs. time best displays this motion?

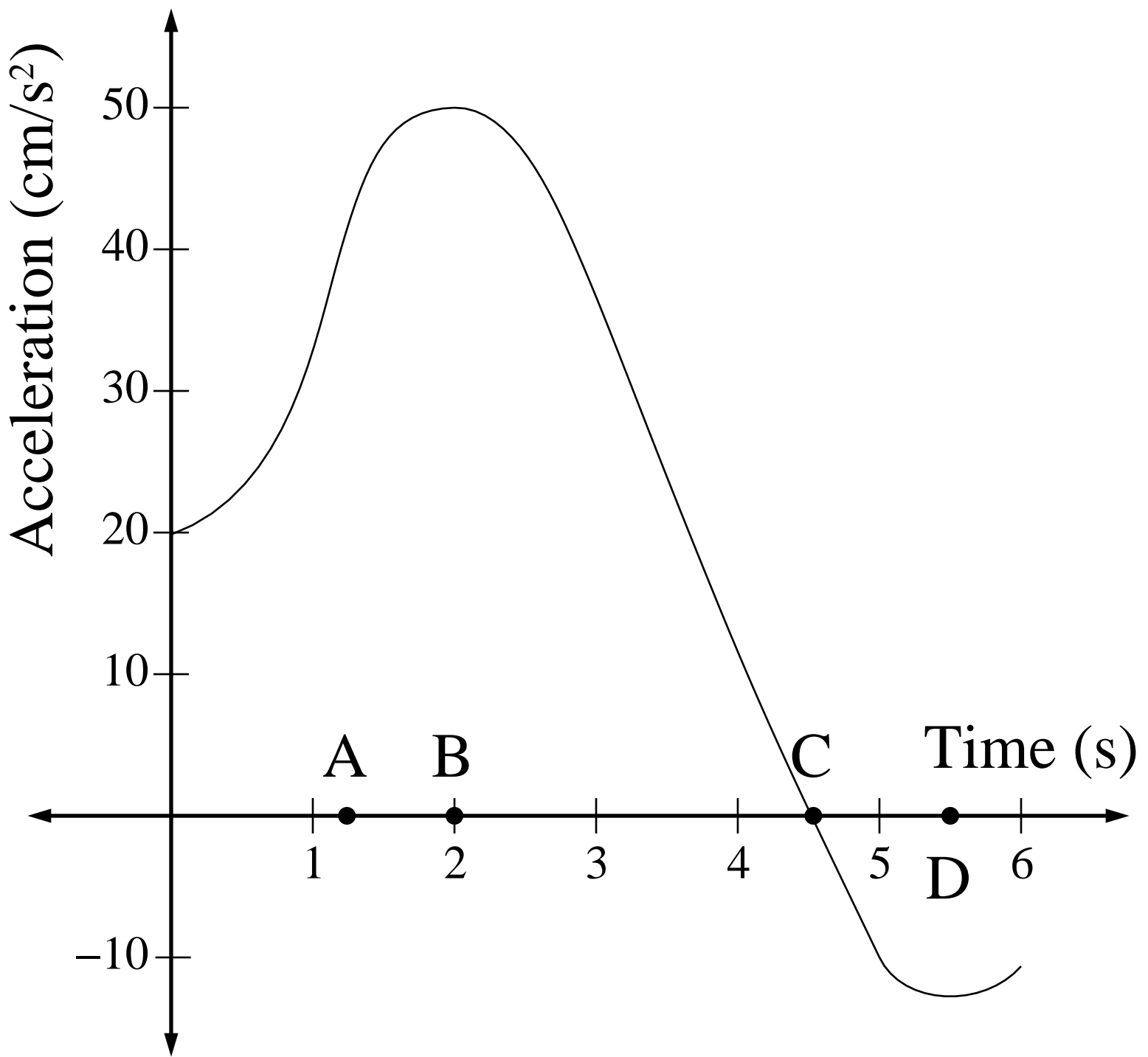


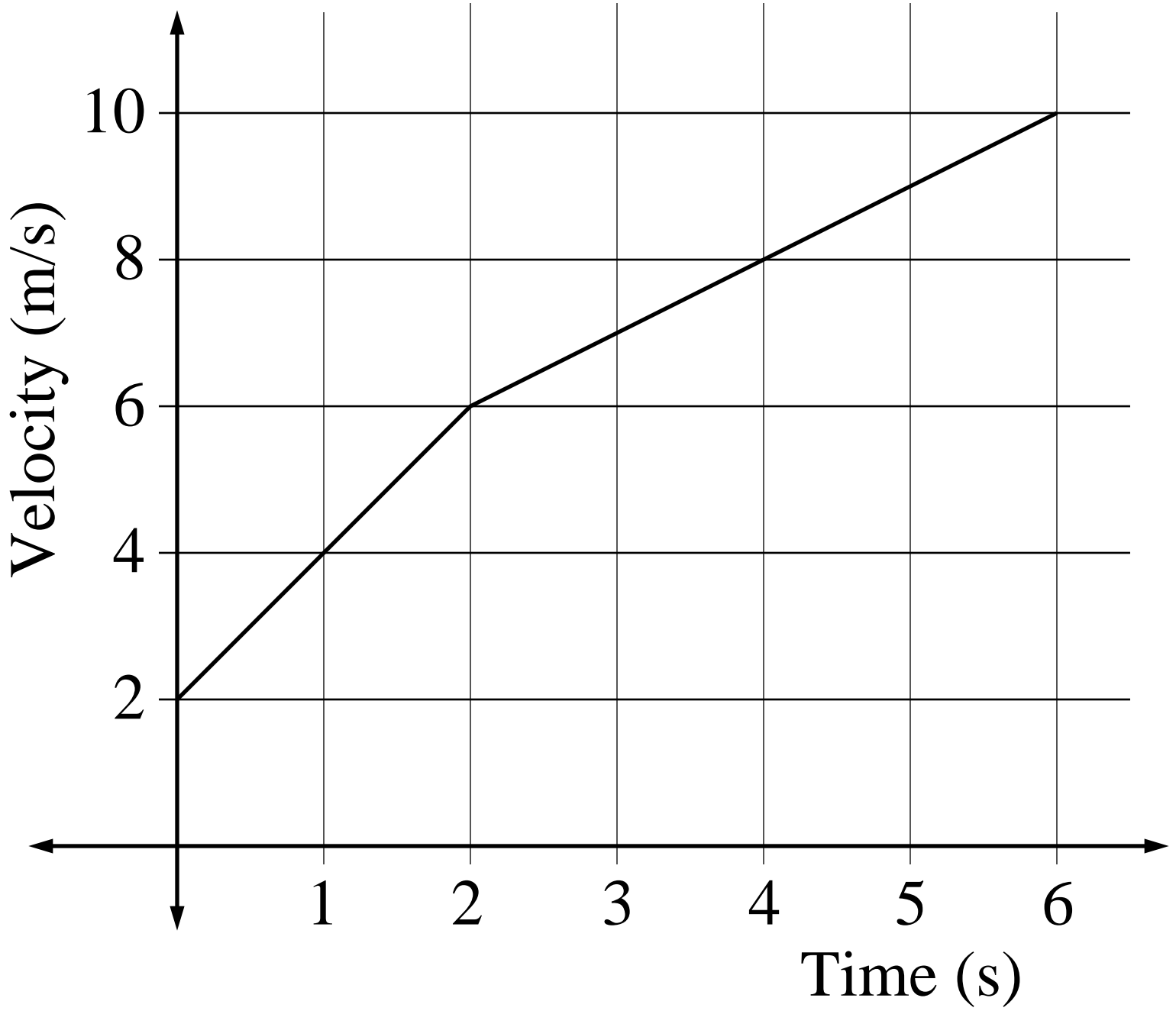
A boy throws a steel ball straight up. Which of the above graphs of velocity vs. time best displays this motion?



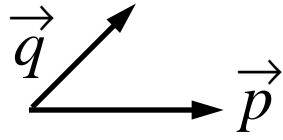




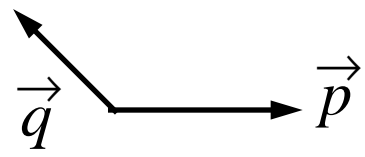




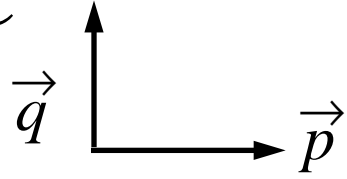
A



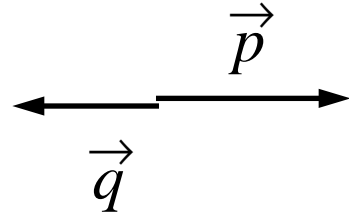
B

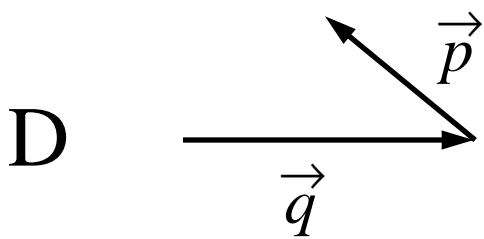
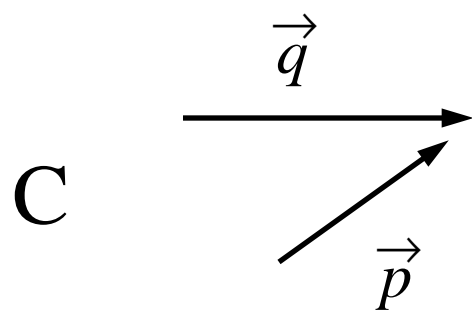
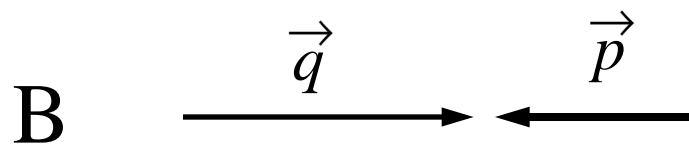
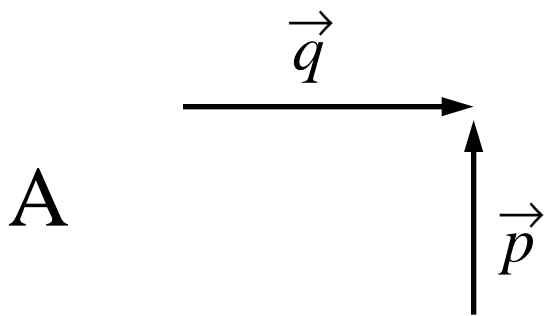


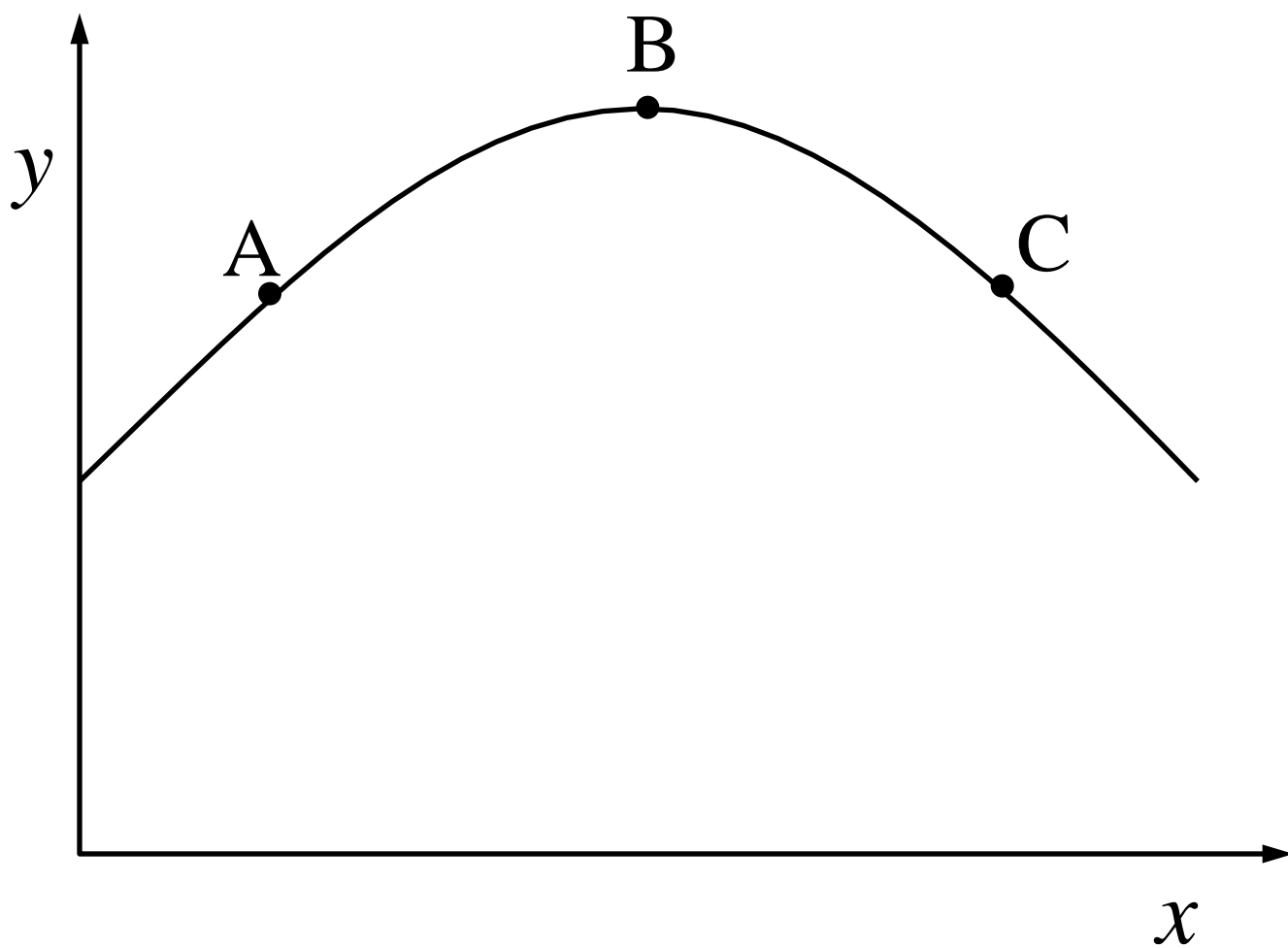
C



D



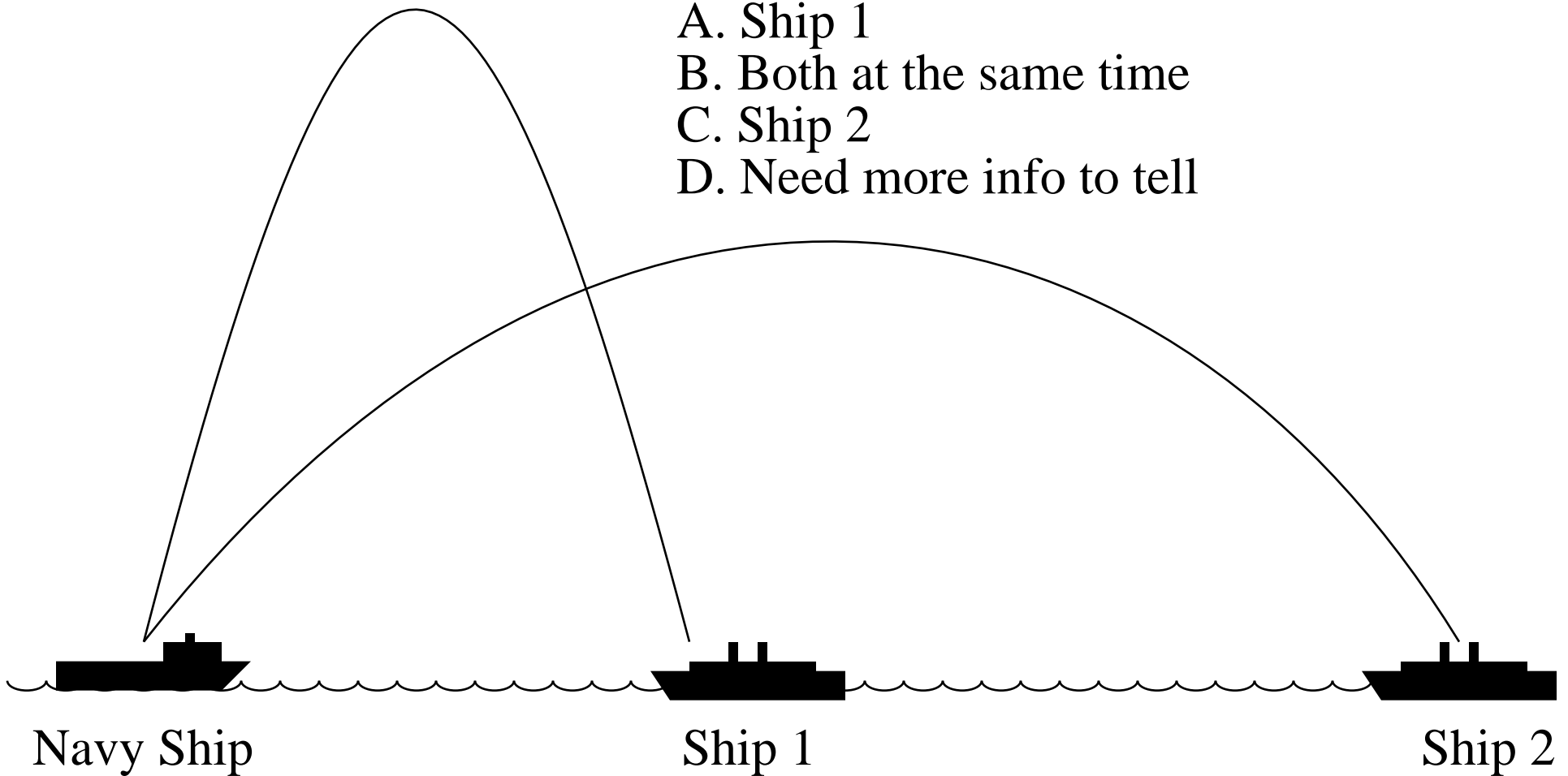




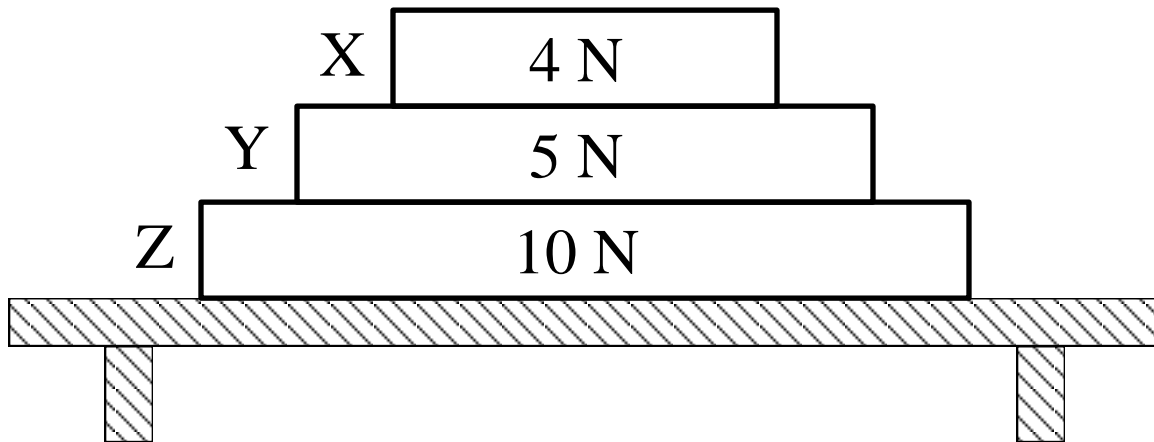
D: none of the above

A navy ship simultaneously fires shells at two enemy ships. The shells follow the parabolic trajectories shown in the diagram below. (Assume zero air resistance.) Which of the two enemy ships gets hit first?

- A. Ship 1
- B. Both at the same time
- C. Ship 2
- D. Need more info to tell



Three books (X, Y, and Z) rest on a table. The weight (i.e., mg) of each book is indicated.



1) The net force acting on the book Y is:

- A. 4 N down
- B. 9 N down
- C. zero
- D. 5 N up

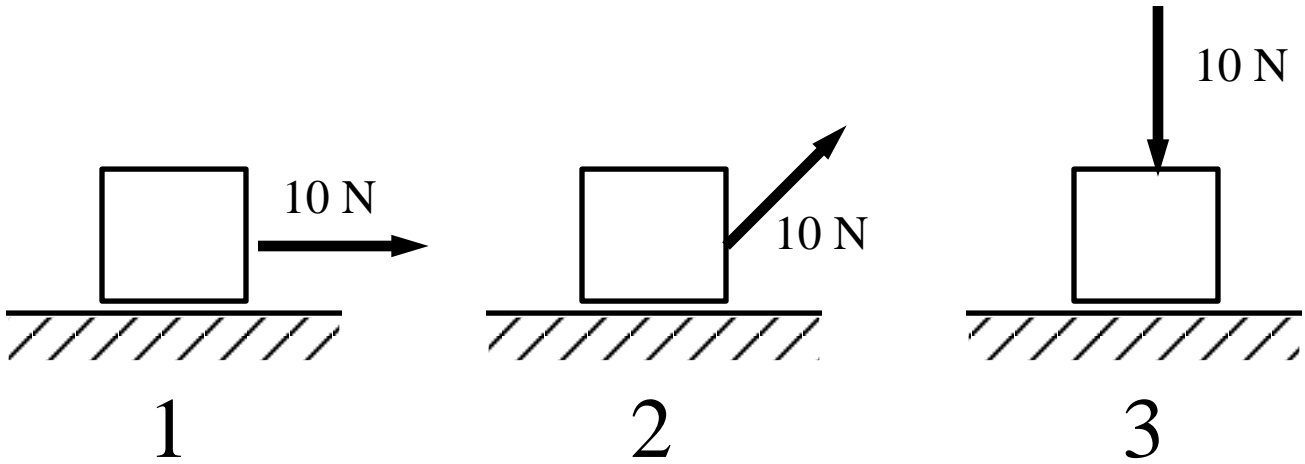
2) The force of book Z on book Y is:

- A. 5 N up
- B. 9 N up
- C. 19 N up
- D. zero

3) The force of book Y on the table is:

- A. 5 N up
- B. 5 N down
- C. 19 N down
- D. zero

A crate rests on a horizontal surface and a man pulls on it with a 10 N force. No matter what the orientation of the force, the crate does not move. Below are displayed three attempts to move the crate.



1) Rank the situations shown above according to the magnitude of the frictional force exerted by the surface on the crate, least to greatest.

- A. $1 < 2 < 3$
- B. $3 < 2 < 1$
- C. $2 < 1 < 3$
- D. $3 < 1 < 2$

2) Rank the situations shown above according to the magnitude of the normal force exerted by the surface on the crate, least to greatest.

- A. $1 < 2 < 3$
- B. $3 < 2 < 1$
- C. $2 < 1 < 3$
- D. $3 < 1 < 2$

You throw a ball straight up in the air. At the highest point:

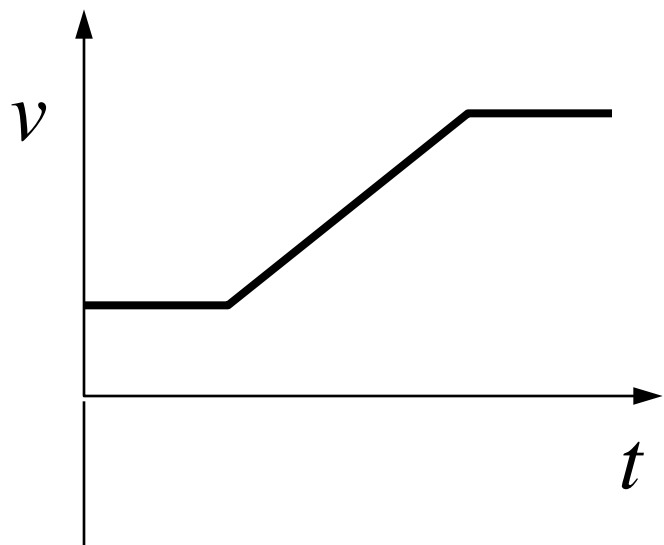
- A) velocity and acceleration are zero
- B) velocity is nonzero, but its acceleration is zero
- C) acceleration is nonzero, but its velocity is zero
- D) both are nonzero

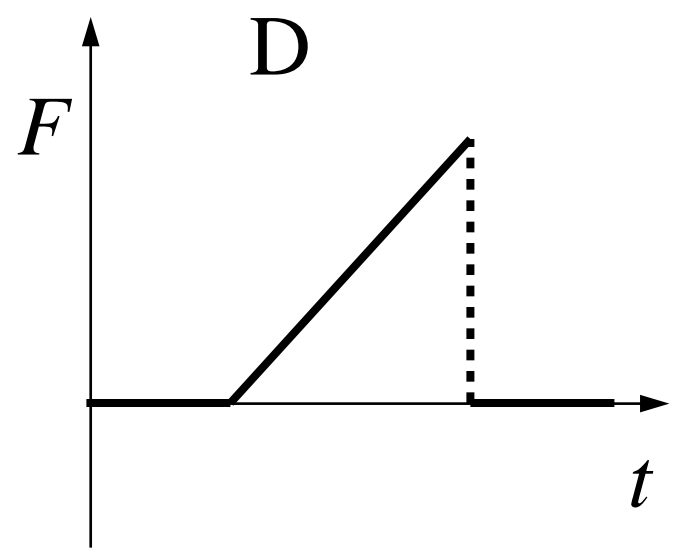
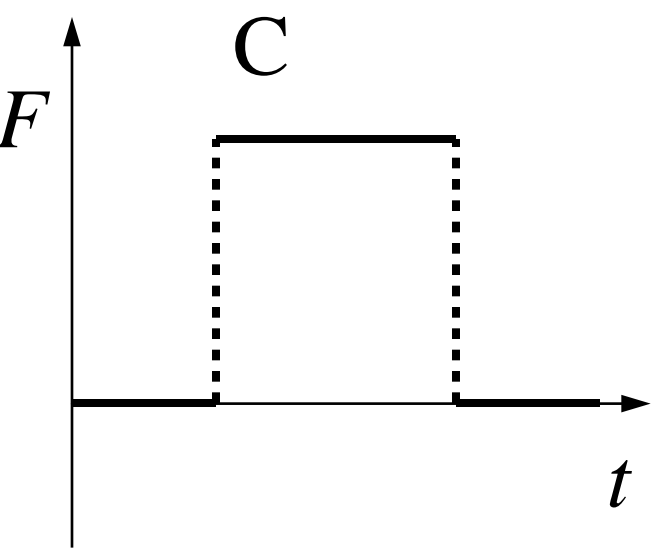
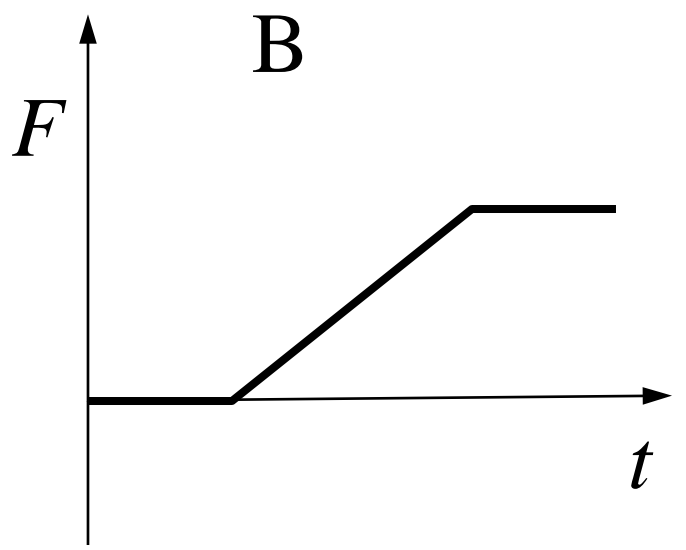
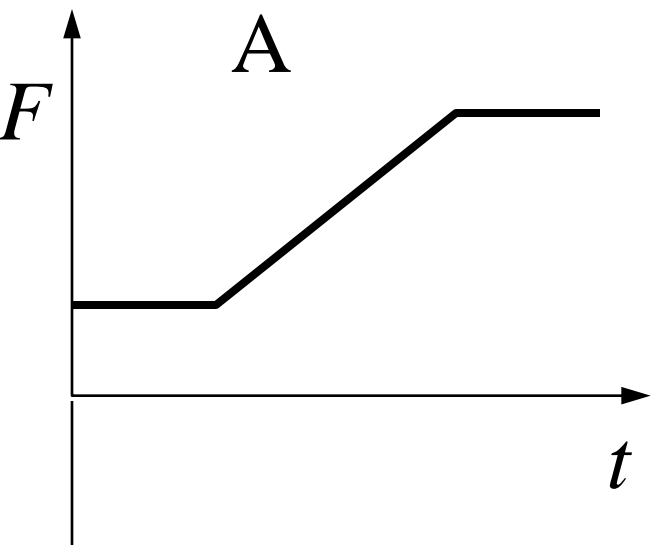


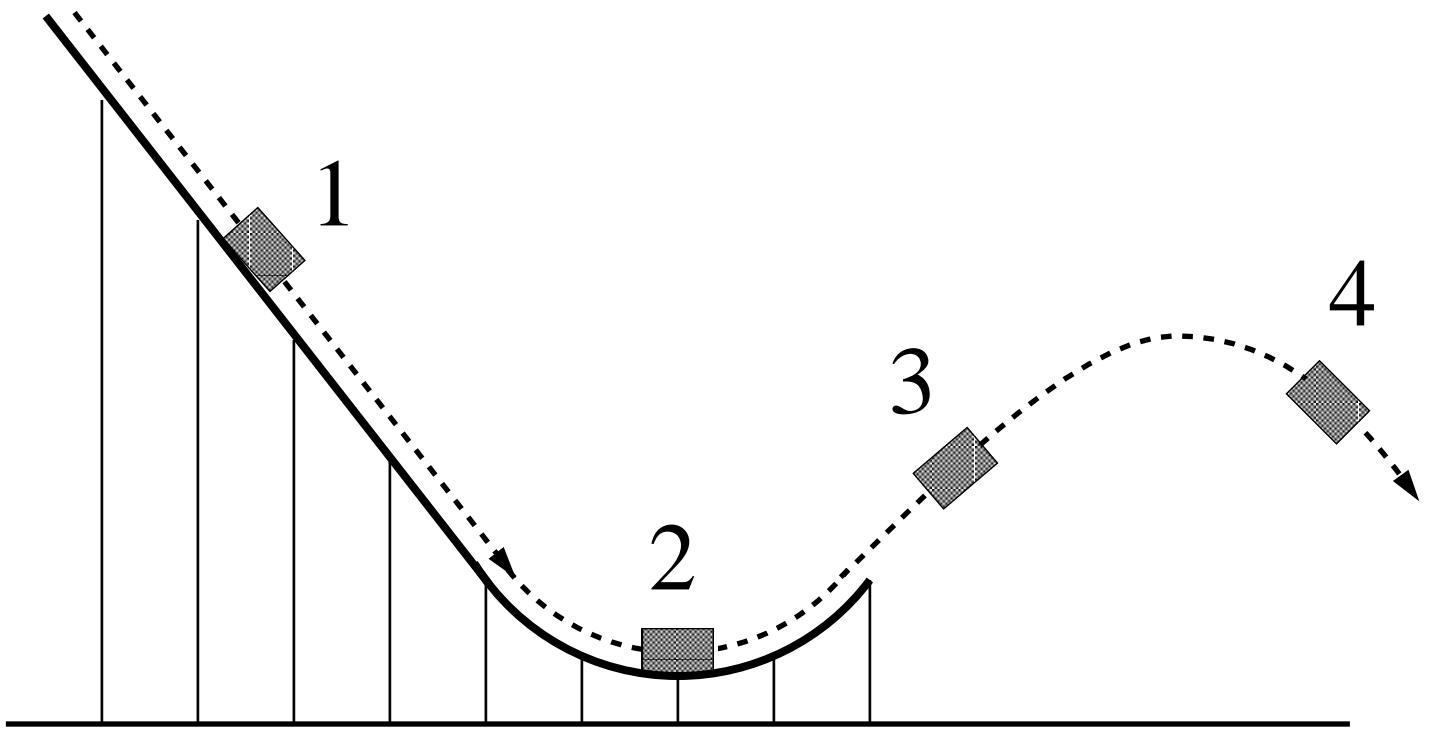
You throw a ball to a friend. At the highest point:

- A) velocity and acceleration are zero
- B) velocity is nonzero, but its acceleration is zero
- C) acceleration is nonzero, but its velocity is zero
- D) both are nonzero

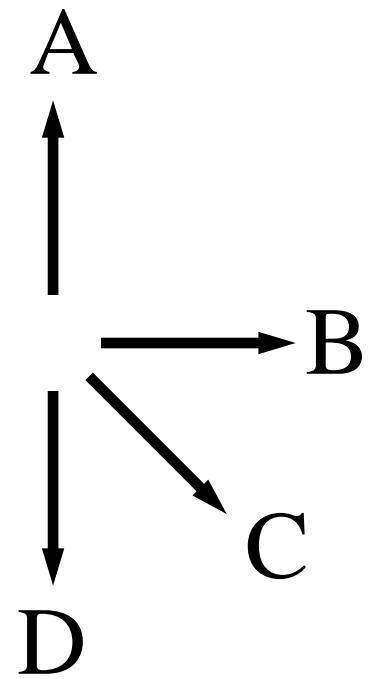


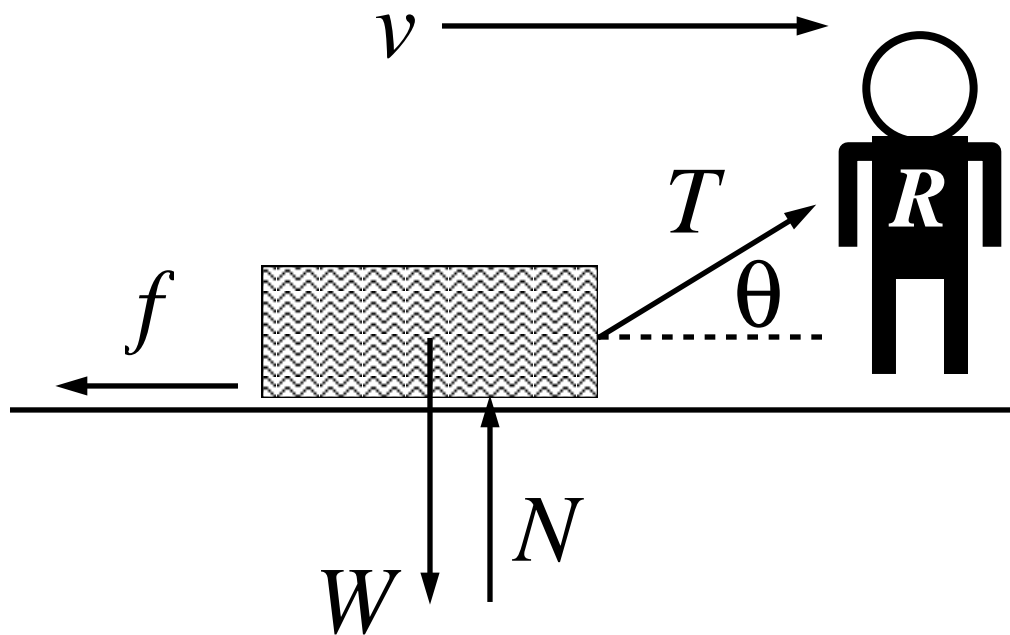






A package slides down a frictionless "ski jump". In which direction is the package's acceleration?

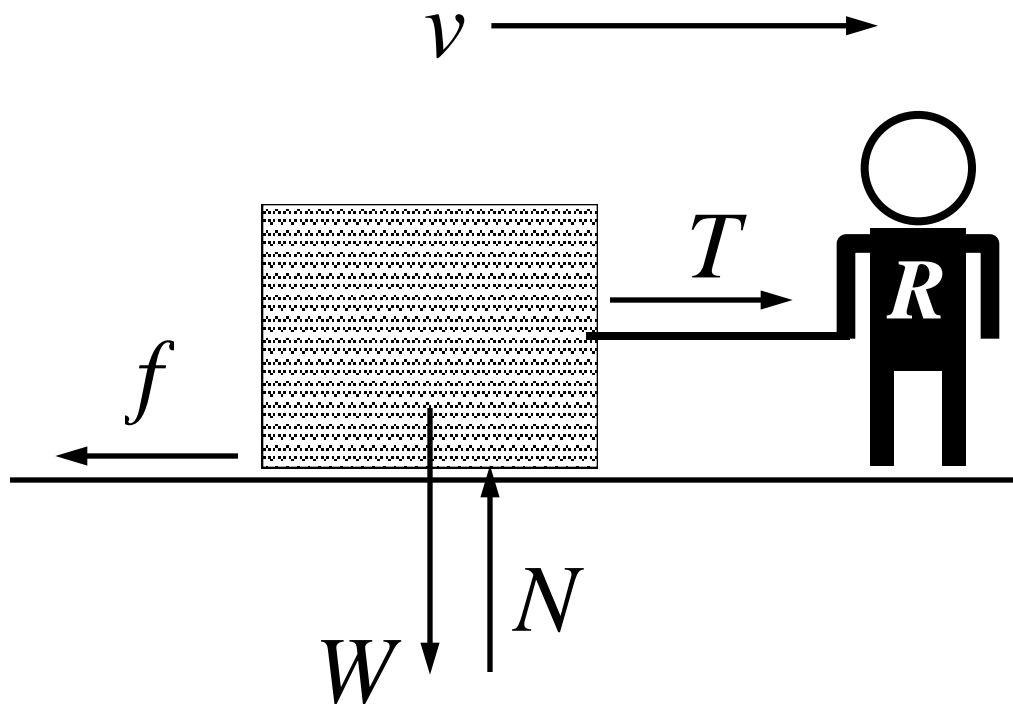




Rupert pulls a box across a horizontal surface at a constant velocity v , by pulling on a rope with tension T . Other forces (W : gravity, N : normal force, f : friction) act in the directions indicated. Which of the following relations among the force magnitudes must be true?

- A. $T=f$ and $N=W$
- B. $T>f$ and $N<W$

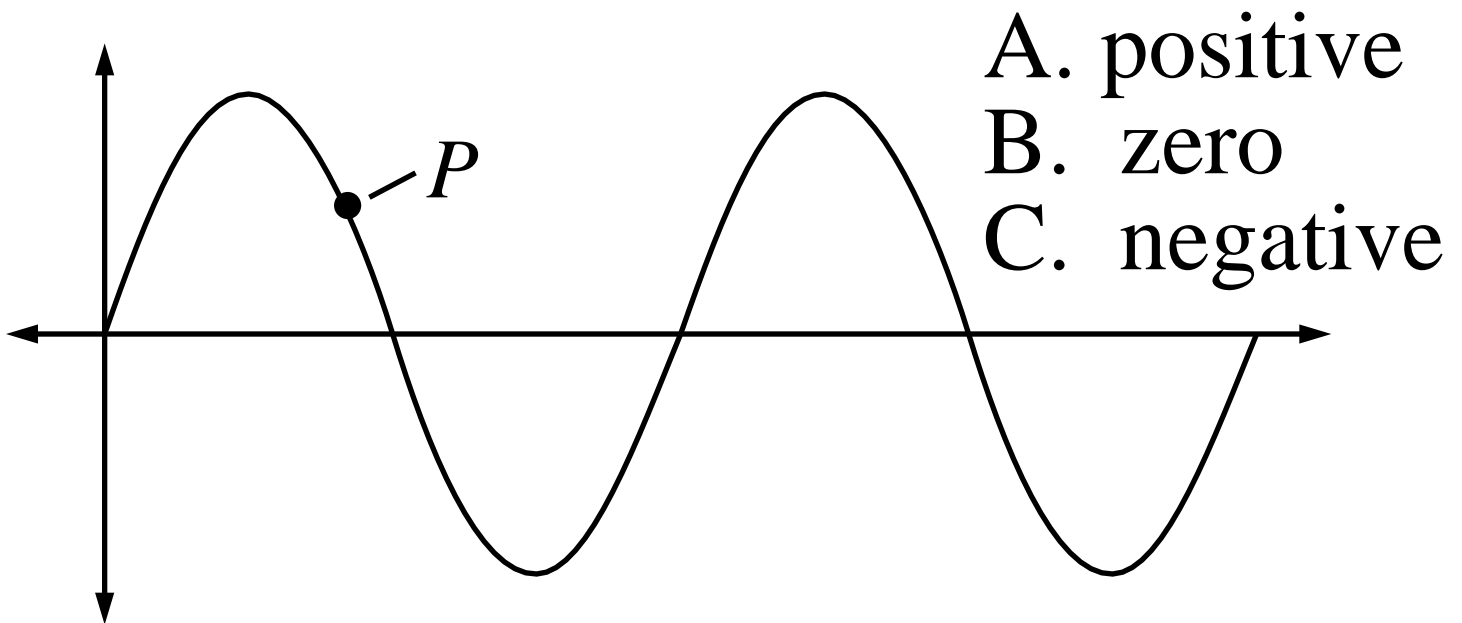
- C. $T>f$ and $N=W$
- D. $T=f$ and $N<W$



Rupert pulls a box across a horizontal surface at a constant velocity v , by pulling on a rope with tension T . Other forces (W : gravity, N : normal force, f : friction) act in the directions indicated. Which of the following relations among the force magnitudes must be true?

- A. $T=f$ and $N=W$
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- C. $T>f$ and $N=W$
- D. $T=f$ and $N<W$



Consider the point P ...

If this is a graph of position vs time

- 1) x ?
- 2) v ?
- 3) a ?

If this is a graph of velocity vs time

- 4) x ?
- 5) v ?
- 6) a ?

If this is a graph of acceleration vs time

- 7) x ?
- 8) v ?
- 9) a ?

An ant walks once around the perimeter of a rectangular tabletop with the dimensions $1.0 \text{ m} \times 2.0 \text{ m}$. If the ant ends up at its original position, what is its displacement and what is the distance it traveled?

- A.** displacement of 0 m, distance traveled 0 m
- B.** displacement of 0 m, distance traveled 6 m
- C.** displacement of 6 m, distance traveled 6 m
- D.** None of the above

Two vectors: \vec{p} and \vec{q} have the same

length: $|\vec{p}| = |\vec{q}| = 5$

how many of the below are possible lengths for the sum of the vectors?

$$|\vec{p} + \vec{q}|$$

A. 0

B. 1

(i) 0

C. 2

(ii) 5

D. 3

(iii) 10

the difference of the two vectors?

$$|\vec{p} - \vec{q}|$$

Two vectors: \vec{p} and \vec{q} have different

lengths: $|\vec{p}| > |\vec{q}|$

how many of the below are possible lengths for the sum of the vectors?

$$|\vec{p} + \vec{q}|$$

A. 0

B. 2

C. 4

D. none of above

(i) 0

(ii) $|\vec{p}| + |\vec{q}|$

(iii) $|\vec{p}| - |\vec{q}|$

(iv) $|\vec{q}| - |\vec{p}|$

(v) $|\vec{p}|$

the difference of the two vectors?

$$|\vec{p} - \vec{q}|$$