

PHYSICS

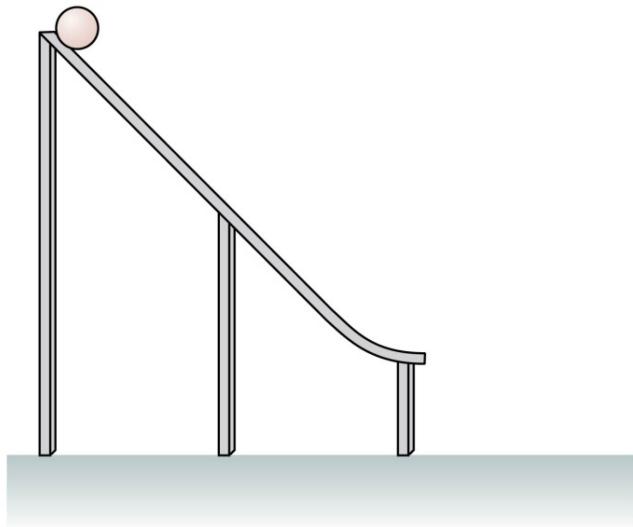
FOR SCIENTISTS AND ENGINEERS A STRATEGIC APPROACH 4/E

Chapter 5 QuickCheck Questions

RANDALL D. KNIGHT

QuickCheck 5.1

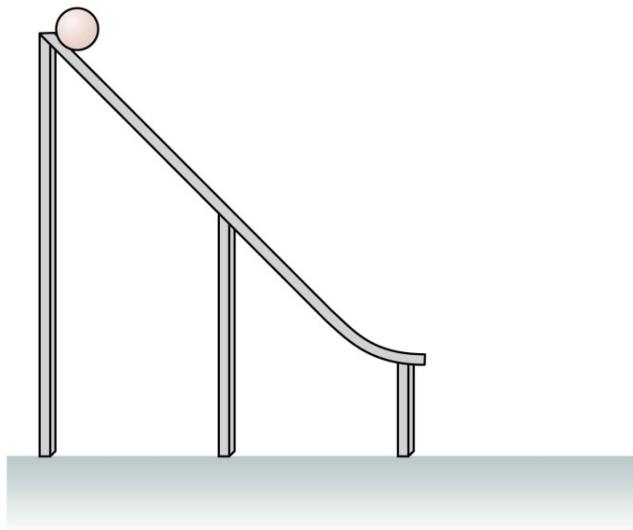
A ball rolls down an incline and off a horizontal ramp. Ignoring air resistance, what force or forces act on the ball as it moves through the air just after leaving the horizontal ramp?



- A. The weight of the ball acting vertically down.
- B. A horizontal force that maintains the motion.
- C. A force whose direction changes as the direction of motion changes.
- D. The weight of the ball and a horizontal force.
- E. The weight of the ball and a force in the direction of motion.

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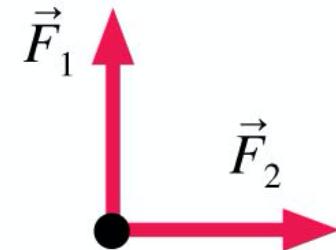


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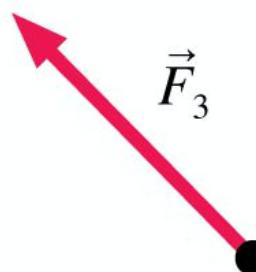
The answer will be deferred until later.

QuickCheck 5.2

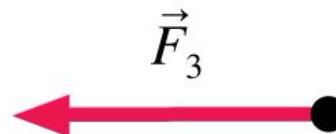
The net force on an object points to the left. Two of three forces are shown. Which is the missing third force?



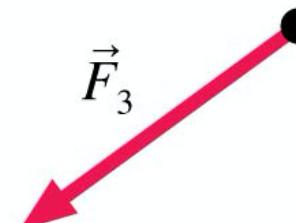
Two of the three forces exerted on an object



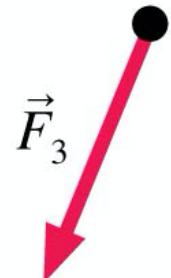
A.



B.



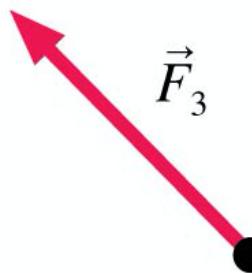
C.



D.

QuickCheck 5.2

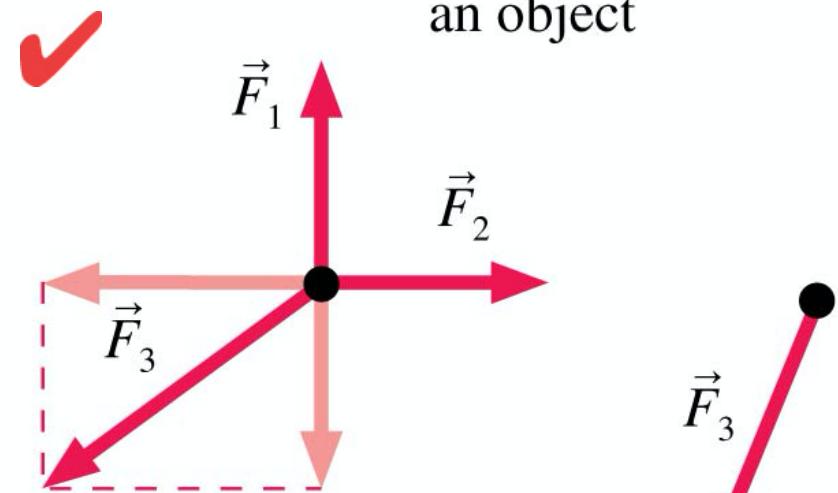
The net force on an object points to the left. Two of three forces are shown. Which is the missing third force?



A.

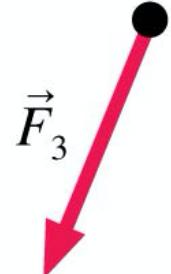


B.

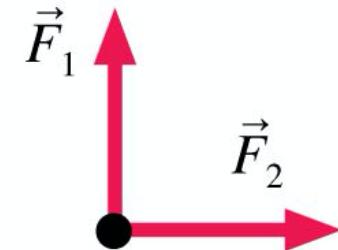


C.

Vertical
components cancel



D.



Two of the three
forces exerted on
an object

QuickCheck 5.3

A steel beam hangs from a cable as a crane lifts the beam. What forces act on the beam?

- A. Gravity.
- B. Gravity and tension in the cable.
- C. Gravity and a force of motion.
- D. Gravity and tension and a force of motion.

QuickCheck 5.3

A steel beam hangs from a cable as a crane lifts the beam. What forces act on the beam?

- A. Gravity.
- ✓ B. Gravity and tension in the cable.**
- C. Gravity and a force of motion.
- D. Gravity and tension and a force of motion.

QuickCheck 5.4

A book rests on a horizontal table. Gravity pulls down on the book. You may have learned something in a previous physics class about an upward force called the “normal force.” Deep in your heart, do you really believe the table is exerting an upward force on the book?

- A. Yes, I’m quite confident the table exerts an upward force on the book.
- B. No, I don’t see how the table can exert such a force.
- C. I really don’t know.

QuickCheck 5.5

A bobsledder pushes her sled across horizontal snow to get it going, then jumps in. After she jumps in, the sled gradually slows to a halt. What forces act on the sled just after she's jumped in?

- A. Gravity and kinetic friction.
- B. Gravity and a normal force.
- C. Gravity and the force of the push.
- D. Gravity, a normal force, and kinetic friction.
- E. Gravity, a normal force, kinetic friction, and the force of the push.

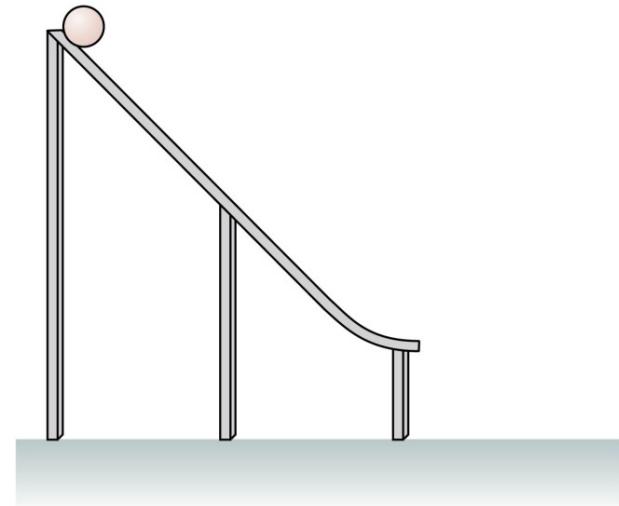
QuickCheck 5.5

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- E. Gravity, a normal force, kinetic friction, and the force of the push.

QuickCheck 5.1 (revisited)

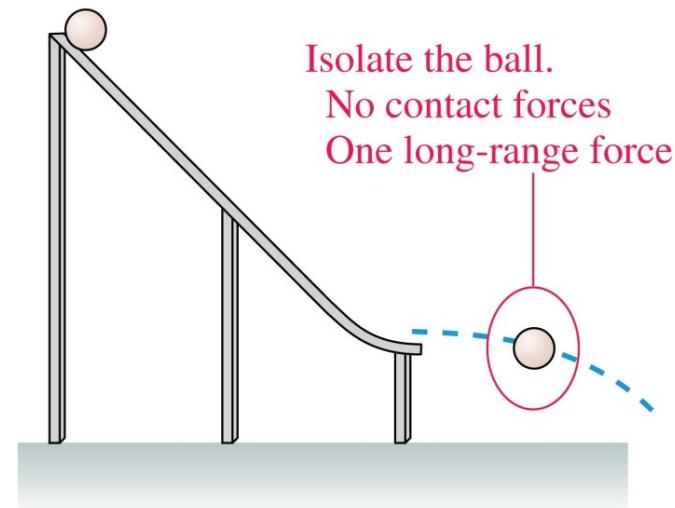
A ball rolls down an incline and off a horizontal ramp. Ignoring air resistance, what force or forces act on the ball as it moves through the air just after leaving the horizontal ramp?



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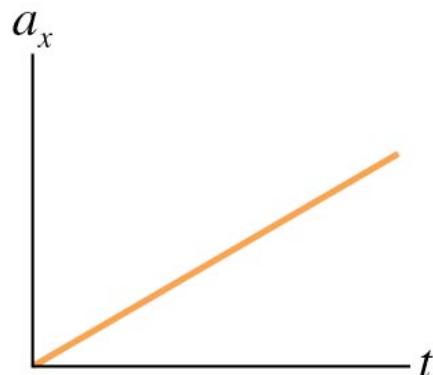
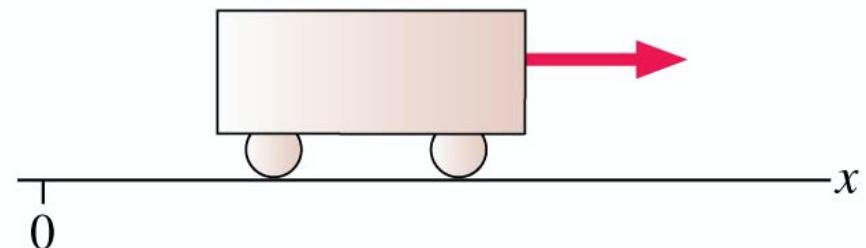


Isolate the ball.
No contact forces
One long-range force

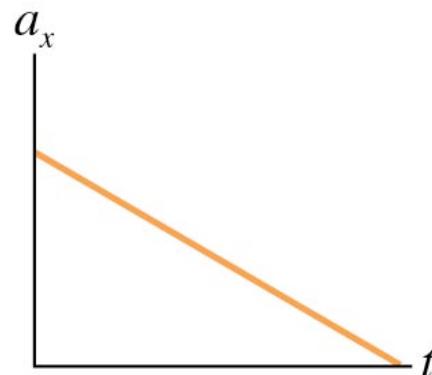
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QuickCheck 5.6

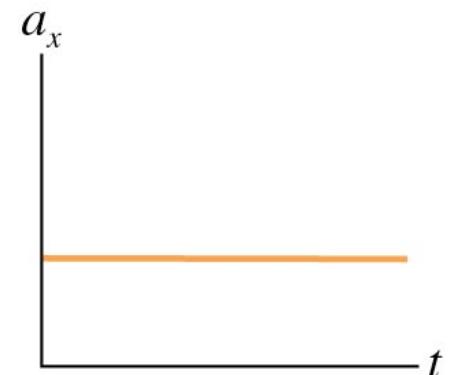
A cart is pulled to the right with a constant, steady force. How will its acceleration graph look?



A.



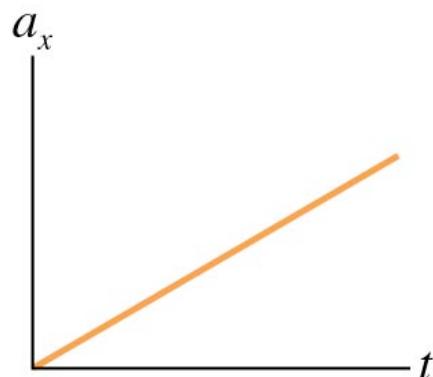
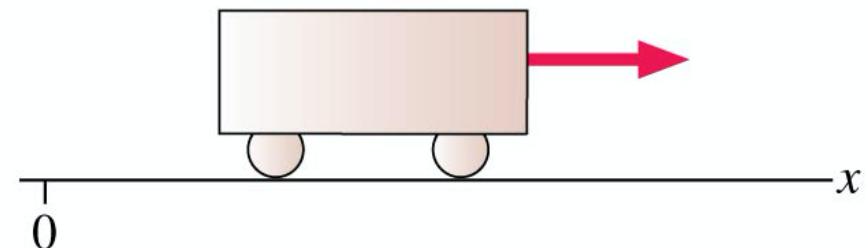
B.



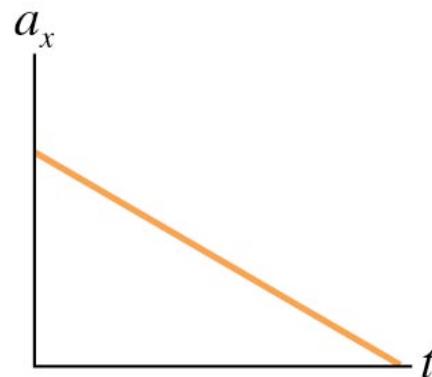
C.

QuickCheck 5.6

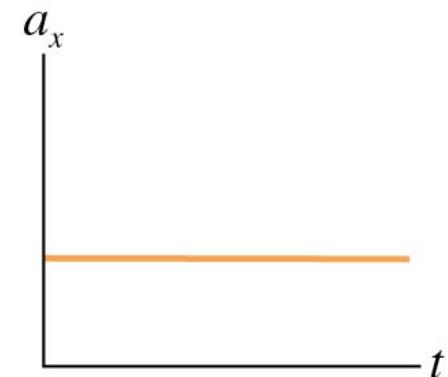
A cart is pulled to the right with a constant, steady force. How will its acceleration graph look?



A.



B.



C.



A constant force produces a constant acceleration.

QuickCheck 5.7

A constant force causes an object to accelerate at 4 m/s^2 . What is the acceleration of an object with twice the mass that experiences the same force?

- A. 1 m/s^2
- B. 2 m/s^2
- C. 4 m/s^2
- D. 8 m/s^2
- E. 16 m/s^2

QuickCheck 5.7

A constant force causes an object to accelerate at 4 m/s^2 . What is the acceleration of an object with twice the mass that experiences the same force?

A. 1 m/s^2

✓ B. 2 m/s^2

$$a = \frac{F}{m}$$

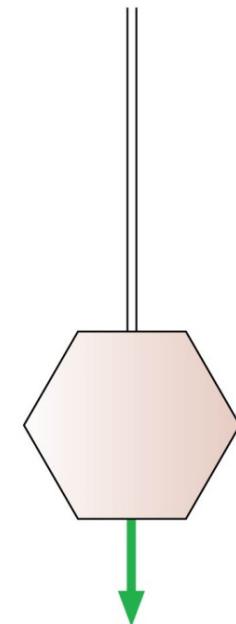
C. 4 m/s^2

D. 8 m/s^2

E. 16 m/s^2

QuickCheck 5.8

An object on a rope is lowered at constant speed.
Which is true?

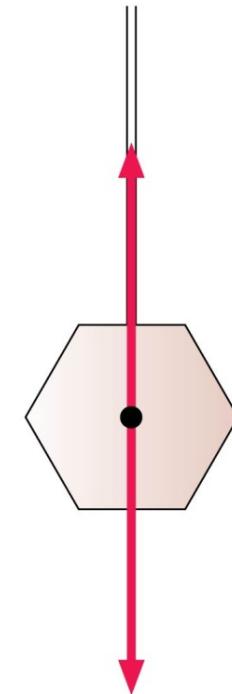


- A. The rope tension is greater than the object's weight.
- B. The rope tension equals the object's weight.
- C. The rope tension is less than the object's weight.
- D. The rope tension can't be compared to the object's weight.

QuickCheck 5.8

An object on a rope is lowered at constant speed.
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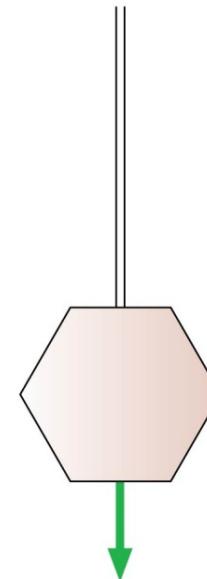
Constant velocity
Zero acceleration
 $\vec{F}_{\text{net}} = \vec{0}$



- A. The rope tension is greater than the object's weight.
- B. **The rope tension equals the object's weight.**
- C. The rope tension is less than the object's weight.
- D. The rope tension can't be compared to the object's weight.

QuickCheck 5.9

An object on a rope is lowered at a steadily decreasing speed. Which is true?

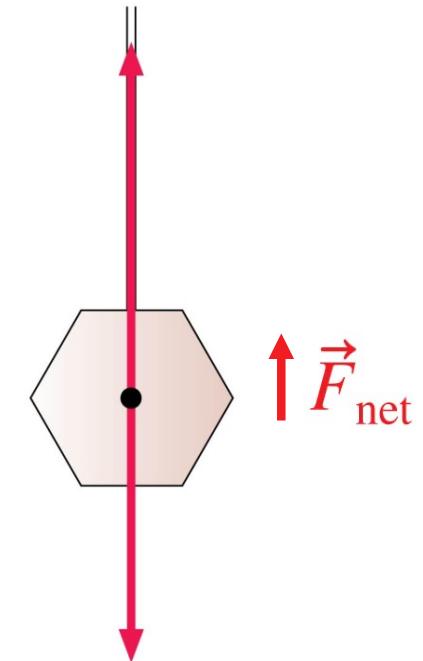


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QuickCheck 5.9

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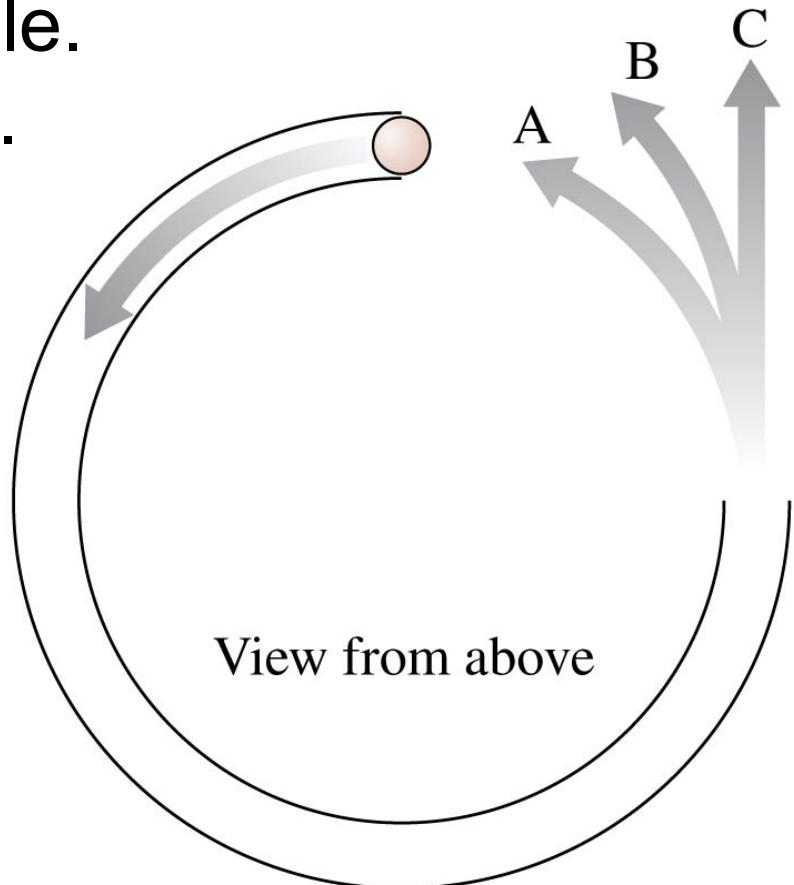
Decreasing downward velocity
Acceleration vector points up
 \vec{F}_{net} points up



- A. The rope tension is greater than the object's weight.
- B. The rope tension equals the object's weight.
- C. The rope tension is less than the object's weight.
- D. The rope tension can't be compared to the object's weight.

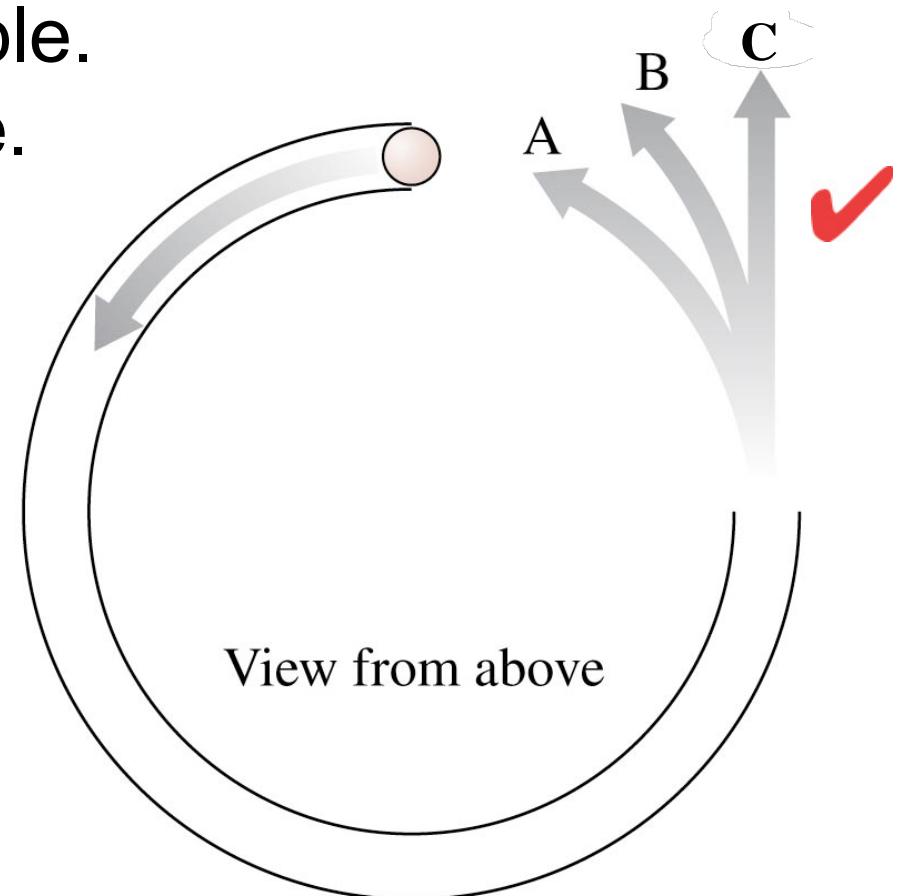
QuickCheck 5.10

A hollow tube lies flat on a table.
A ball is shot through the tube.
As the ball emerges from the other end, which path
does it follow?



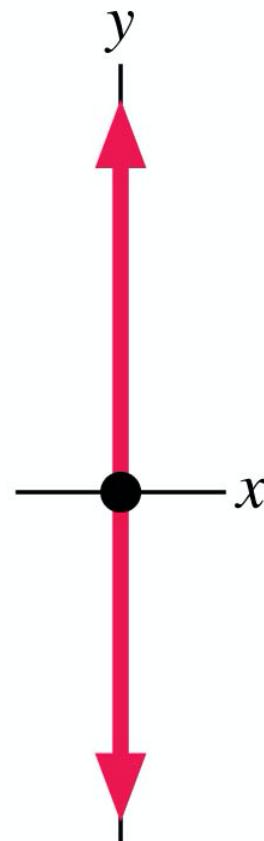
QuickCheck 5.10

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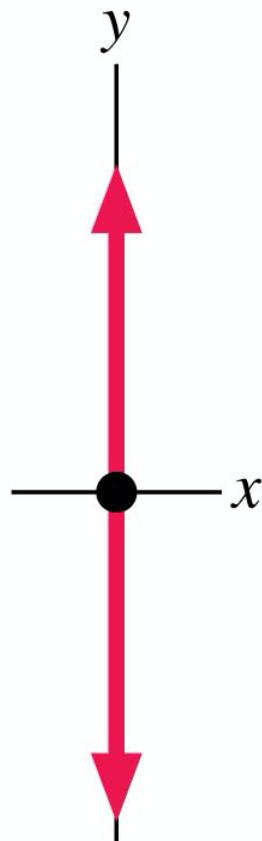


QuickCheck 5.11

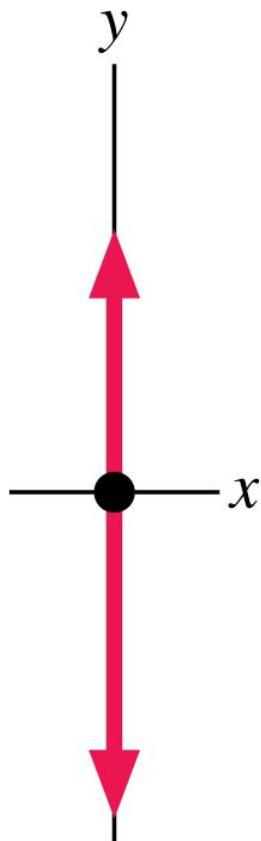
An elevator, lifted by a cable, is moving upward and slowing. Which is the correct free-body diagram?



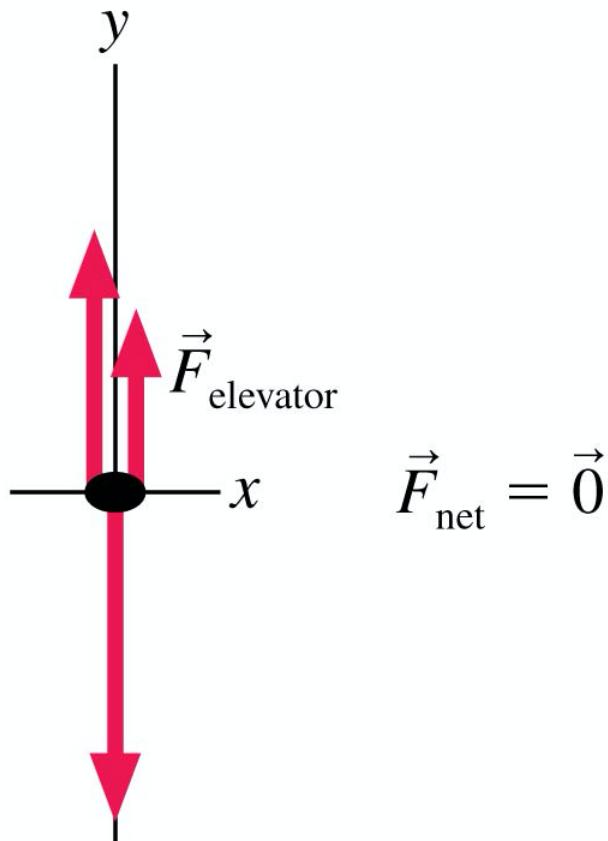
A.



B.



C.

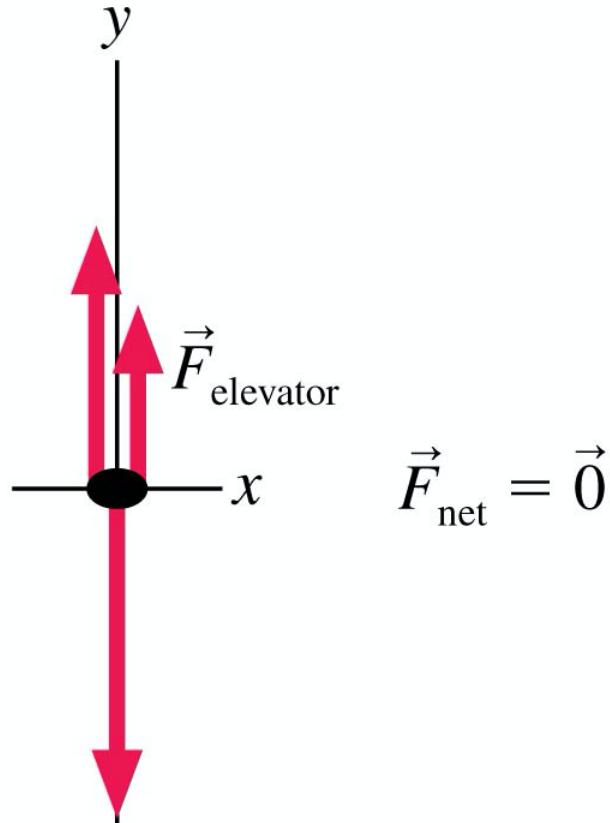
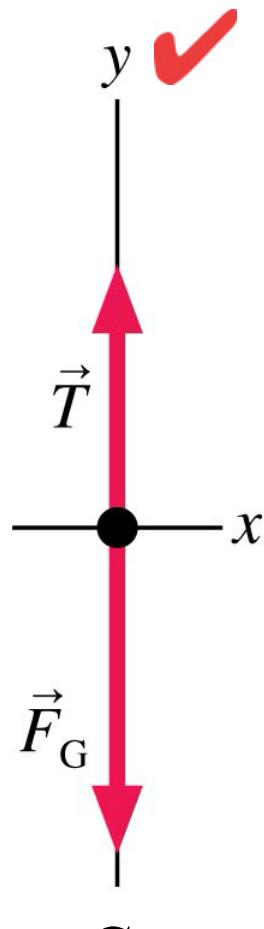
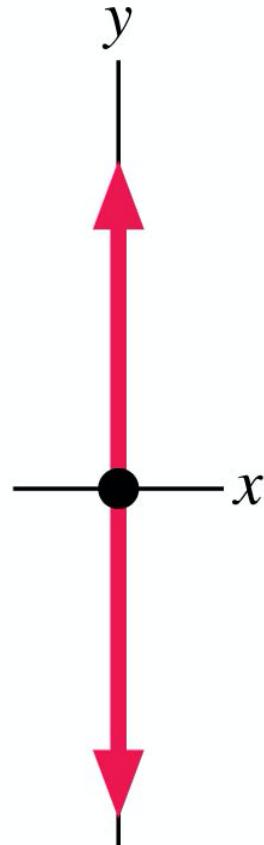
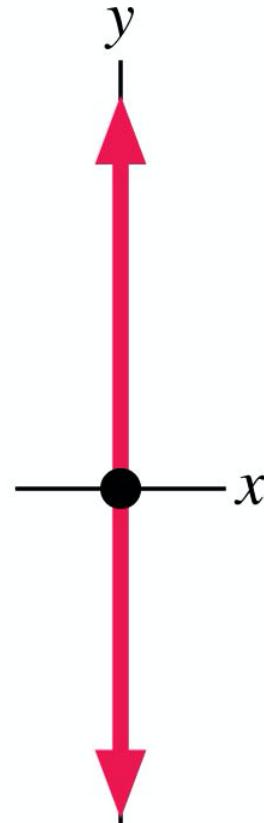


D.

E.

QuickCheck 5.11

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A.

B.

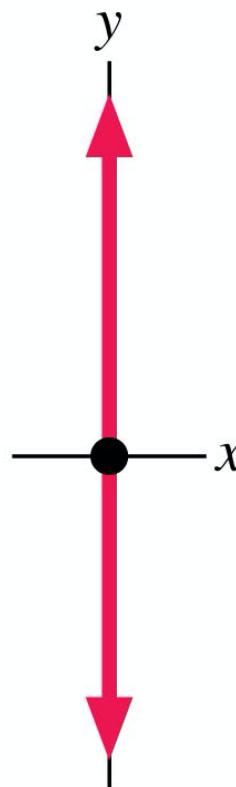
C.

D.

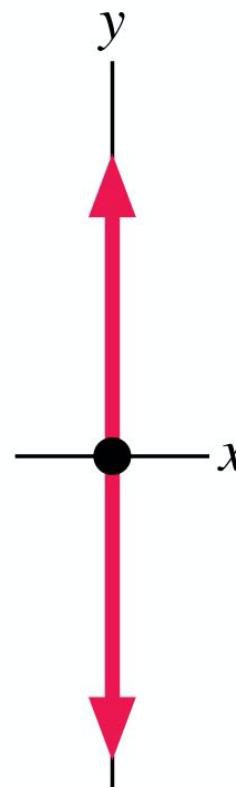
E.

QuickCheck 5.12

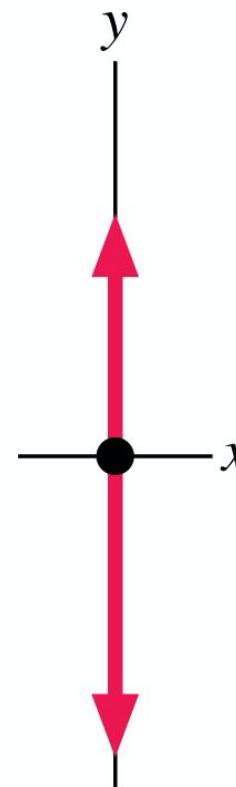
A ball has been tossed straight up. Which is the correct free-body diagram just after the ball has left the hand? Ignore air resistance.



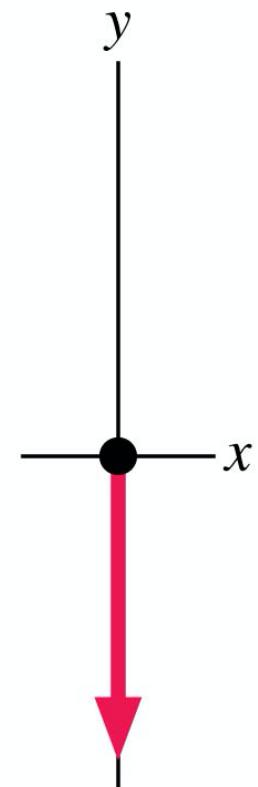
A.



B.



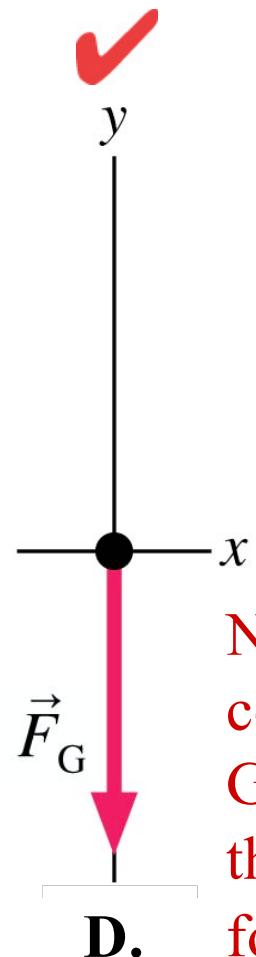
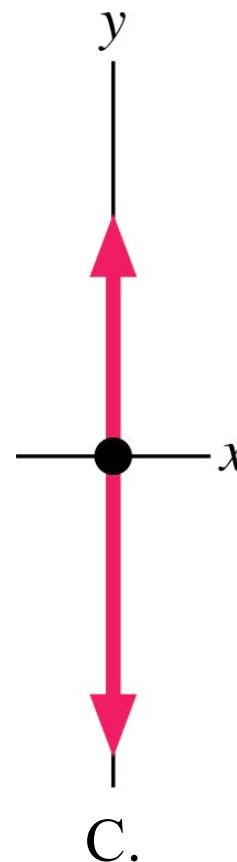
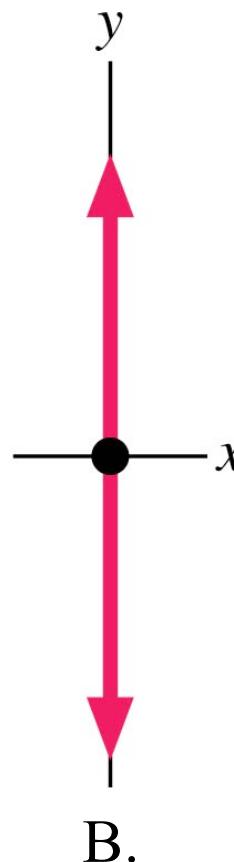
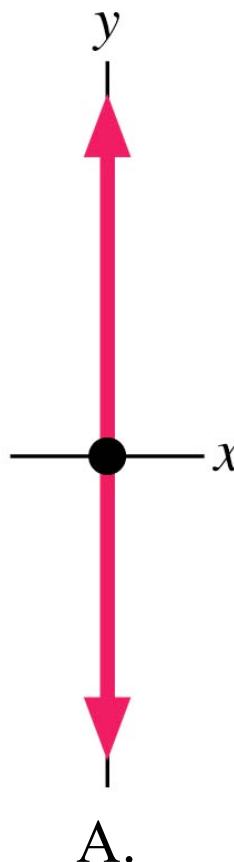
C.



D.

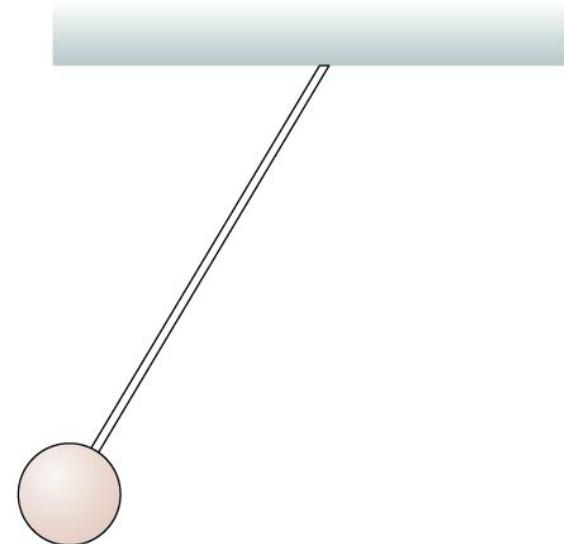
QuickCheck 5.12

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QuickCheck 5.13

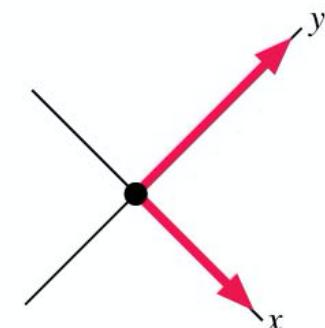
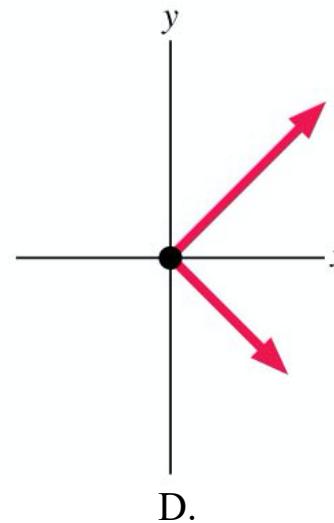
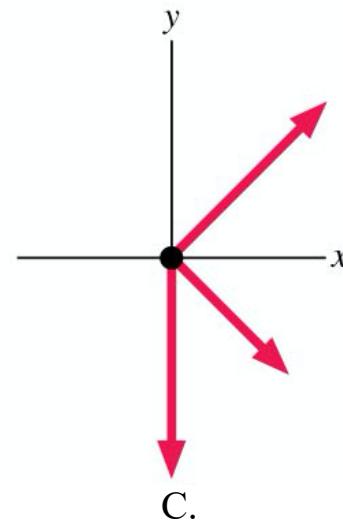
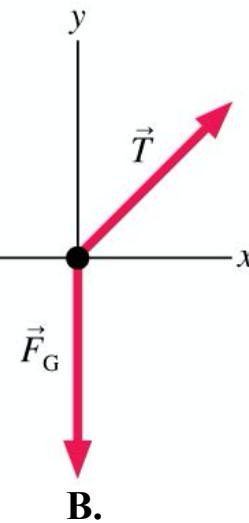
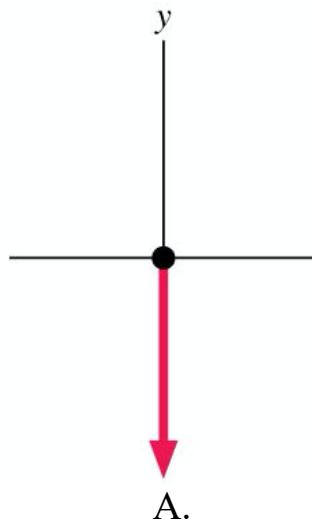
A ball, hanging from the ceiling by a string, is pulled back and released. Which is the correct free-body diagram just after its release?



- A. A ball is at the origin of a 2D Cartesian coordinate system. A vertical red arrow points downwards along the negative y-axis.
- B. A ball is at the origin of a 2D Cartesian coordinate system. A red arrow points downwards and to the right at approximately a 45-degree angle from the negative y-axis.
- C. A ball is at the origin of a 2D Cartesian coordinate system. A red arrow points upwards and to the right at approximately a 45-degree angle from the positive y-axis.
- D. A ball is at the origin of a 2D Cartesian coordinate system. A red arrow points downwards and to the left at approximately a 45-degree angle from the negative y-axis.
- E. A ball is at the origin of a 2D Cartesian coordinate system. A red arrow points upwards and to the left at approximately a 45-degree angle from the positive y-axis.

QuickCheck 5.13

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E.