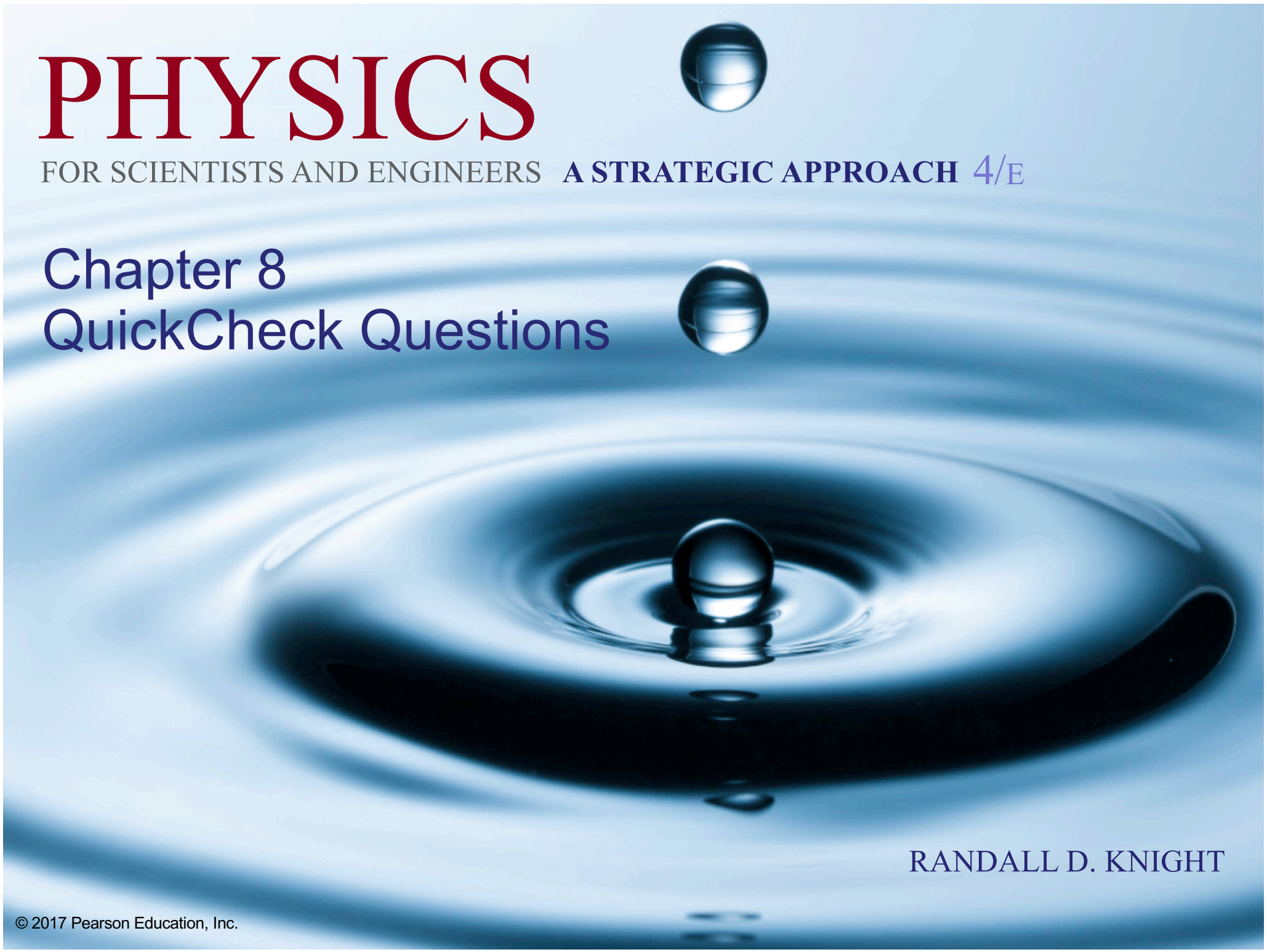
PHYSICS

FOR SCIENTISTS AND ENGINEERS **A STRATEGIC APPROACH** 4/E

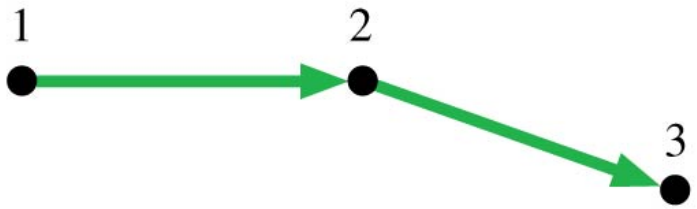
Chapter 8
QuickCheck Questions



RANDALL D. KNIGHT

QuickCheck 8.1

The diagram shows three points of a motion diagram. The particle changes direction with no change of speed. What is the acceleration at point 2?



A. B. C. D. E.

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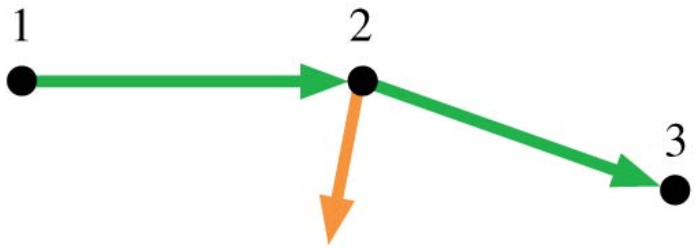
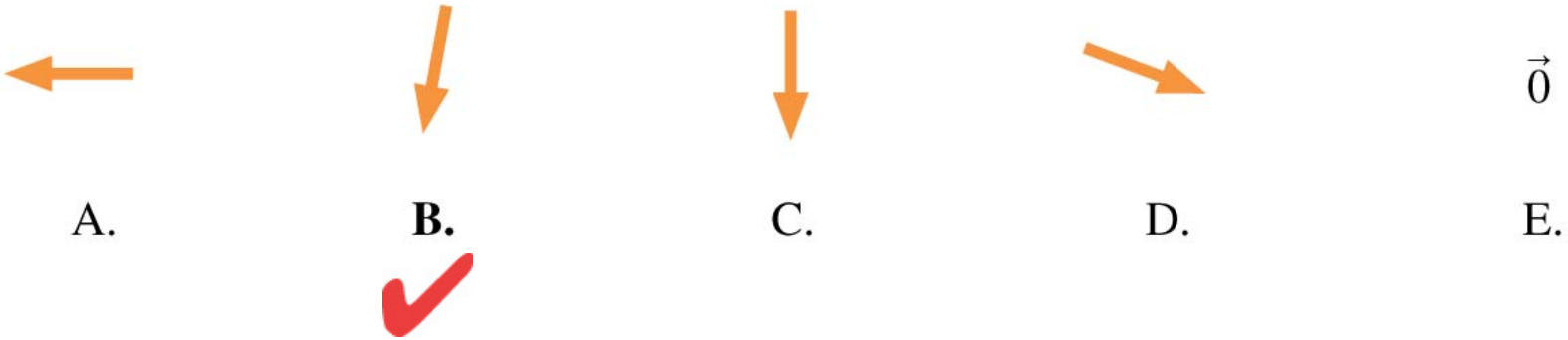


Acceleration of changing direction



A. **B.** C. D. E.

QuickCheck 8.2

A toy car moves around a circular track at constant speed. It suddenly doubles its speed—a change of a factor of 2. As a result, the centripetal acceleration changes by a factor of

A. 1/4.
B. 1/2.
C. No change since the radius doesn't change.
D. 2.
E. 4.

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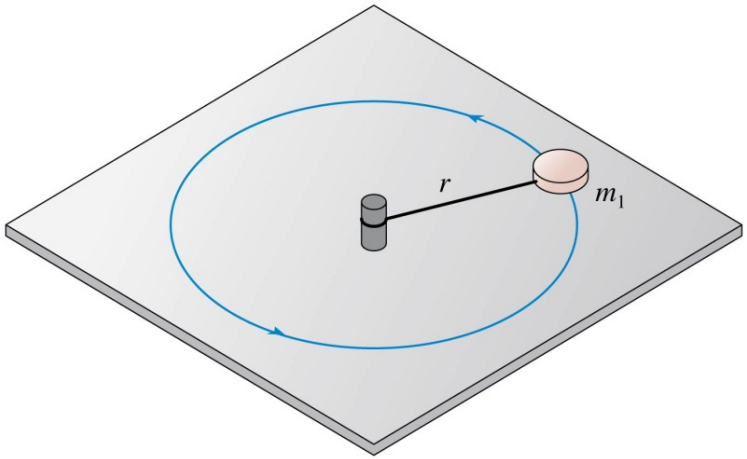
QuickCheck 8.3

An ice hockey puck is tied by a string to a stake in the ice. The puck is then swung in a circle. What force or forces does the puck feel?



A. A new force: the centripetal force.
B. A new force: the centrifugal force.
C. One or more of our familiar forces pushing outward.
D. One or more of our familiar forces pulling inward.
E. I have no clue.

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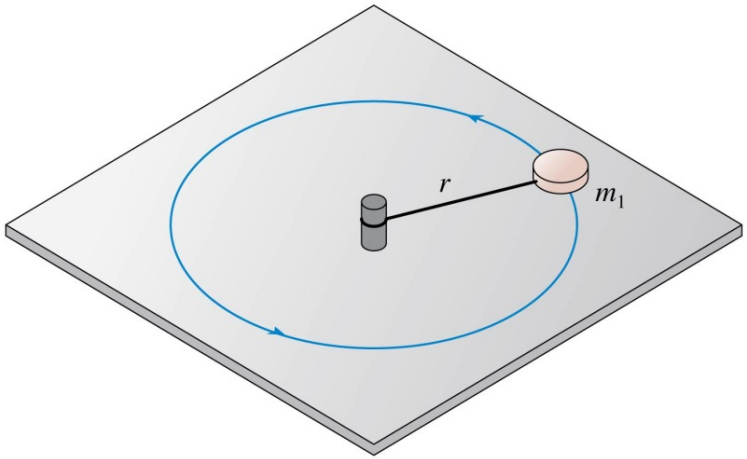

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E. I have no clue.

The rules about what is or is not a force haven't changed.

1. Force must be exerted at a point of contact (except for gravity).
2. Force must have an identifiable agent doing the pushing or pulling.
3. The net force must point in the direction of acceleration (Newton's second law).

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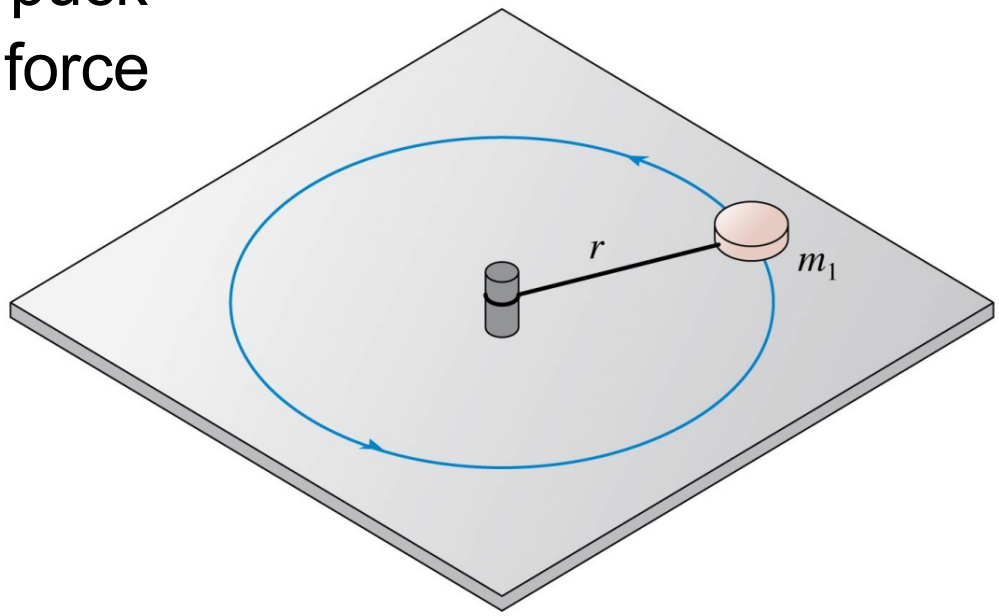

A. Gravity
B. Air resistance
C. Friction
D. Normal force
E. Tension in the string

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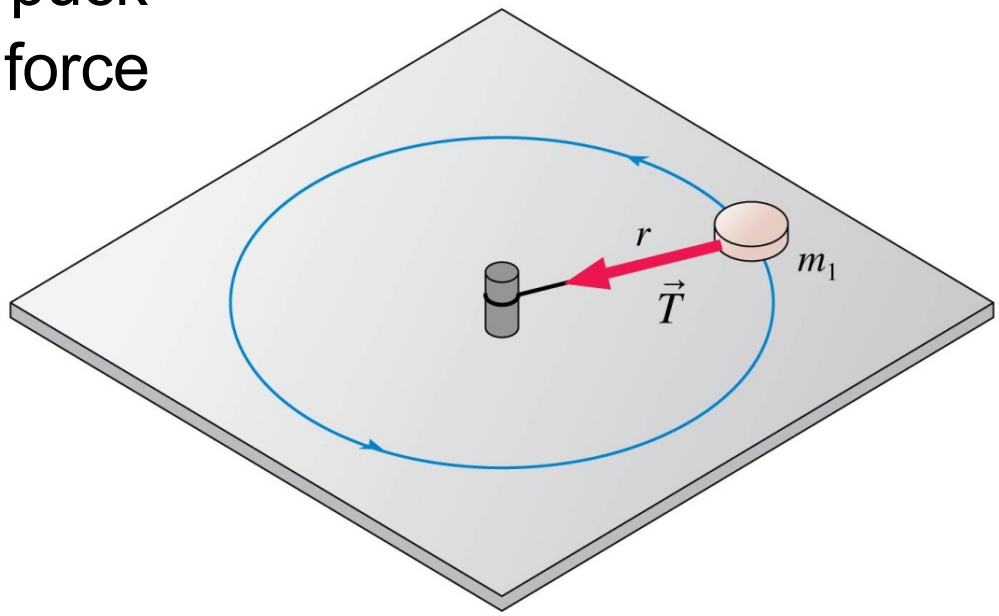

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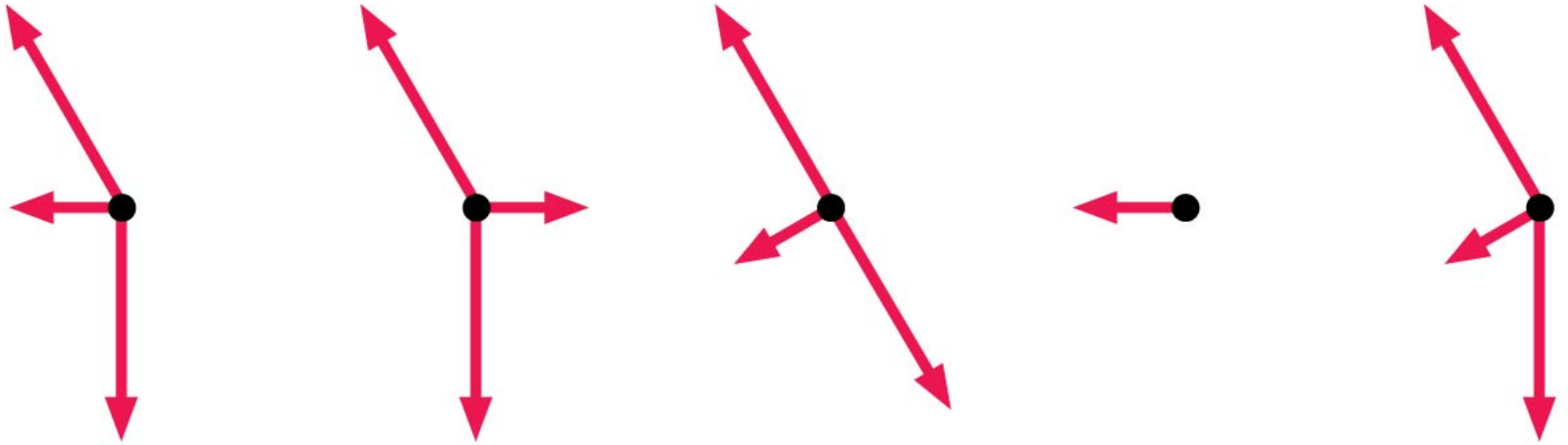
QuickCheck 8.5

A car turns a corner on a banked road. Which of the diagrams could be the car's free-body diagram?



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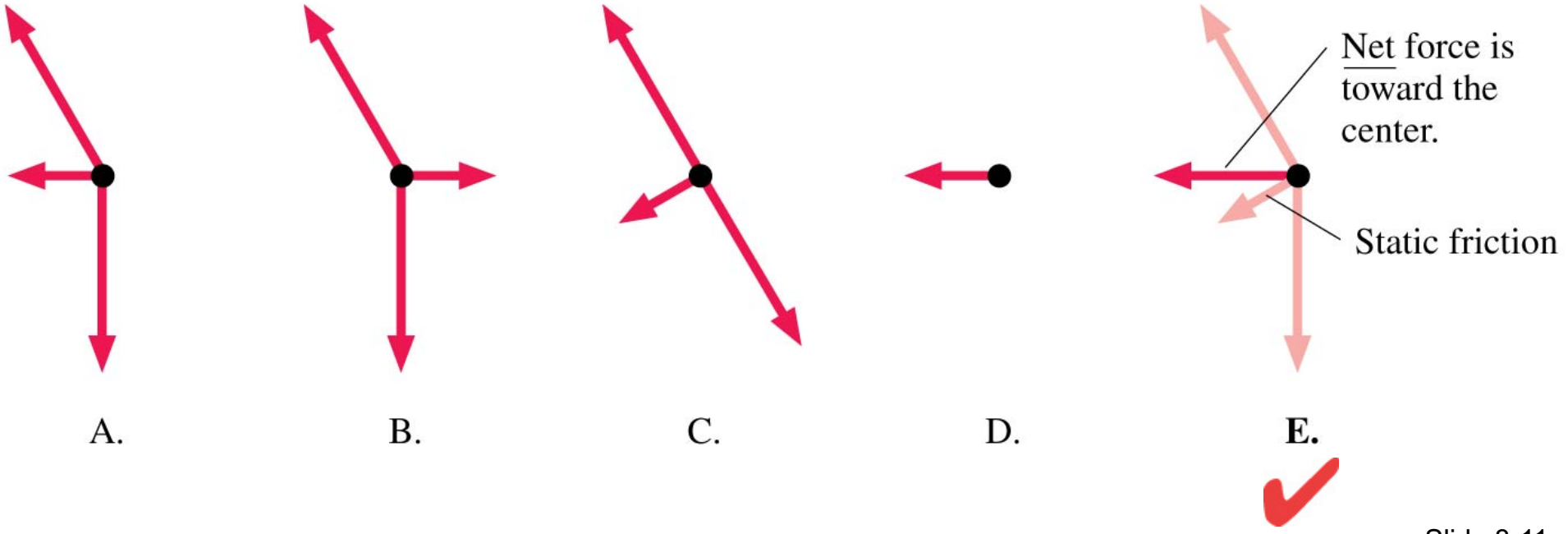
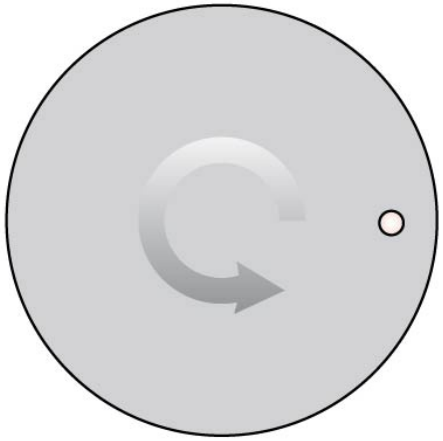
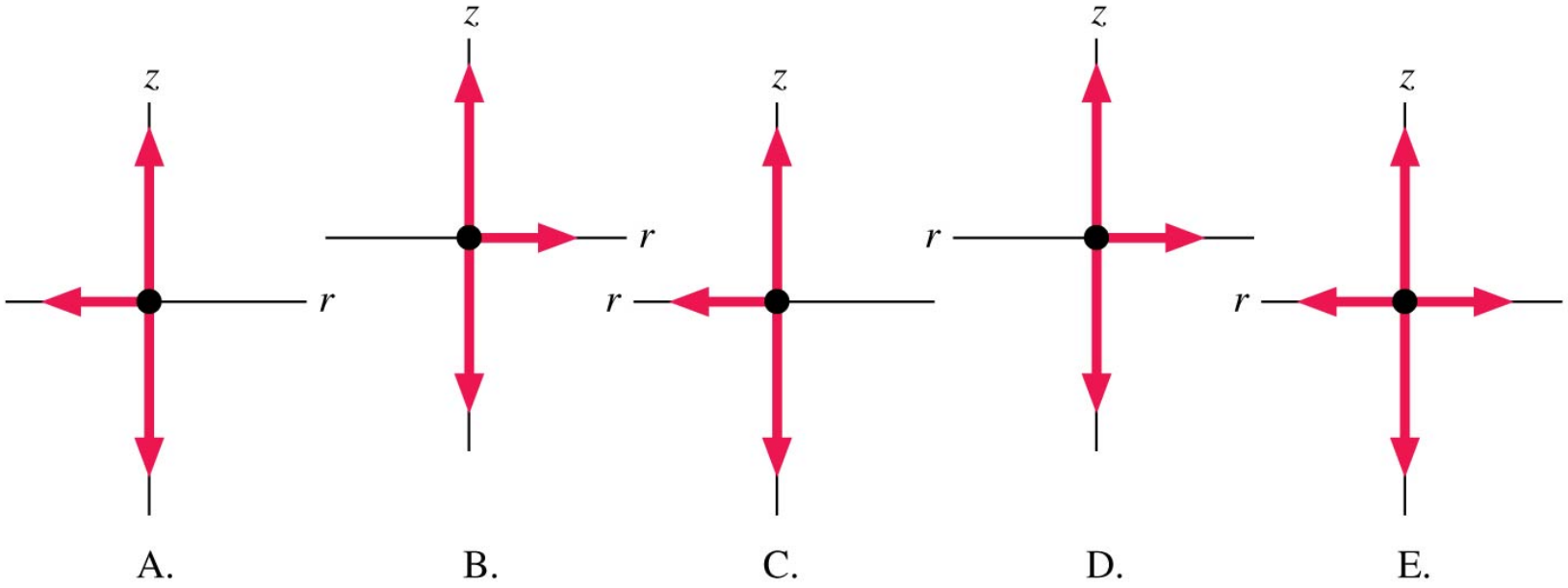


QuickCheck 8.6

A coin sits on a turntable as the table steadily rotates ccw. The free-body diagrams below show the coin from behind, moving away from you. Which is the correct diagram?





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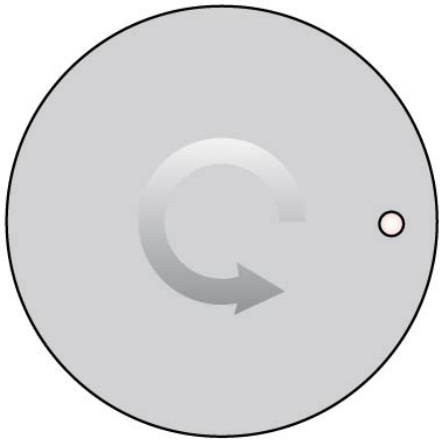

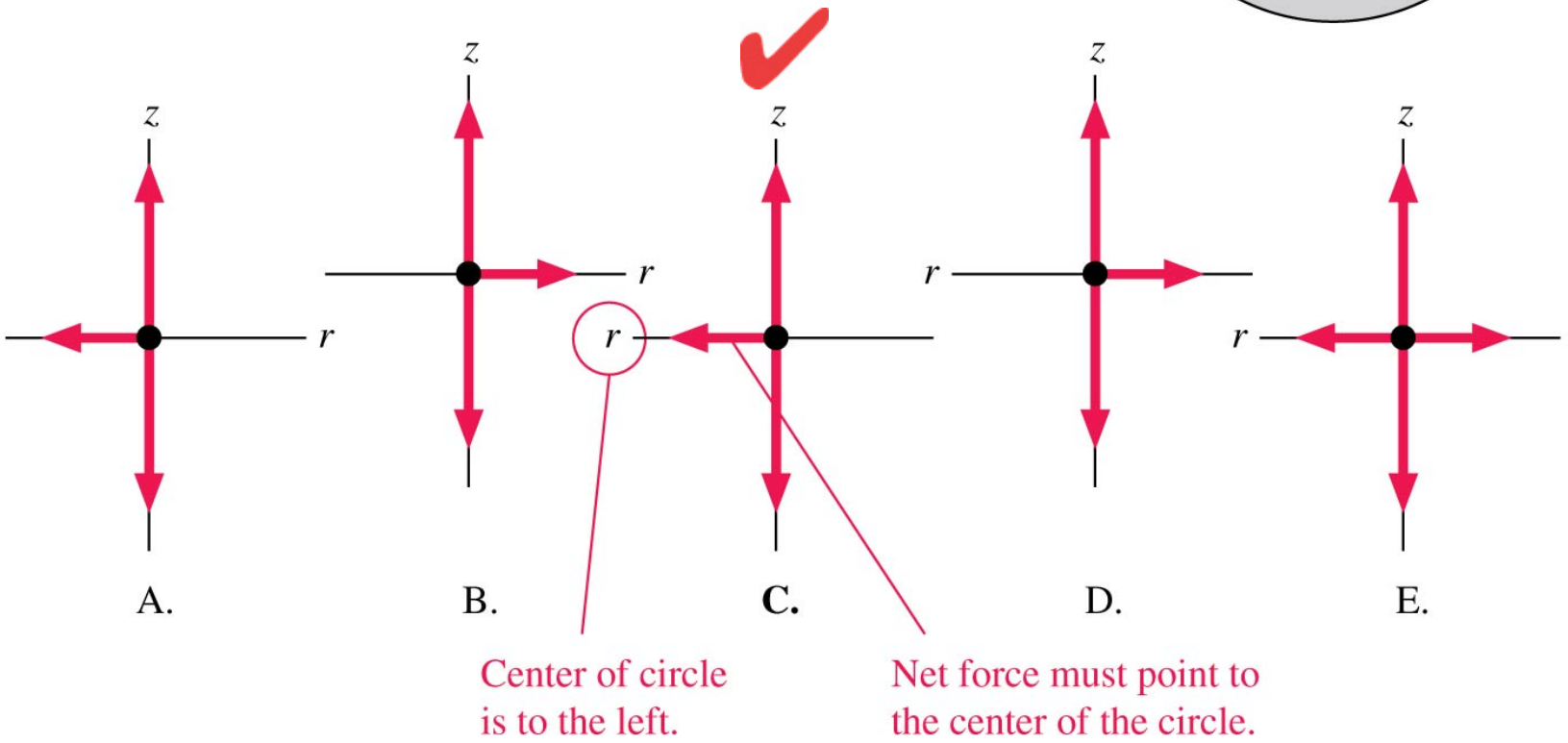

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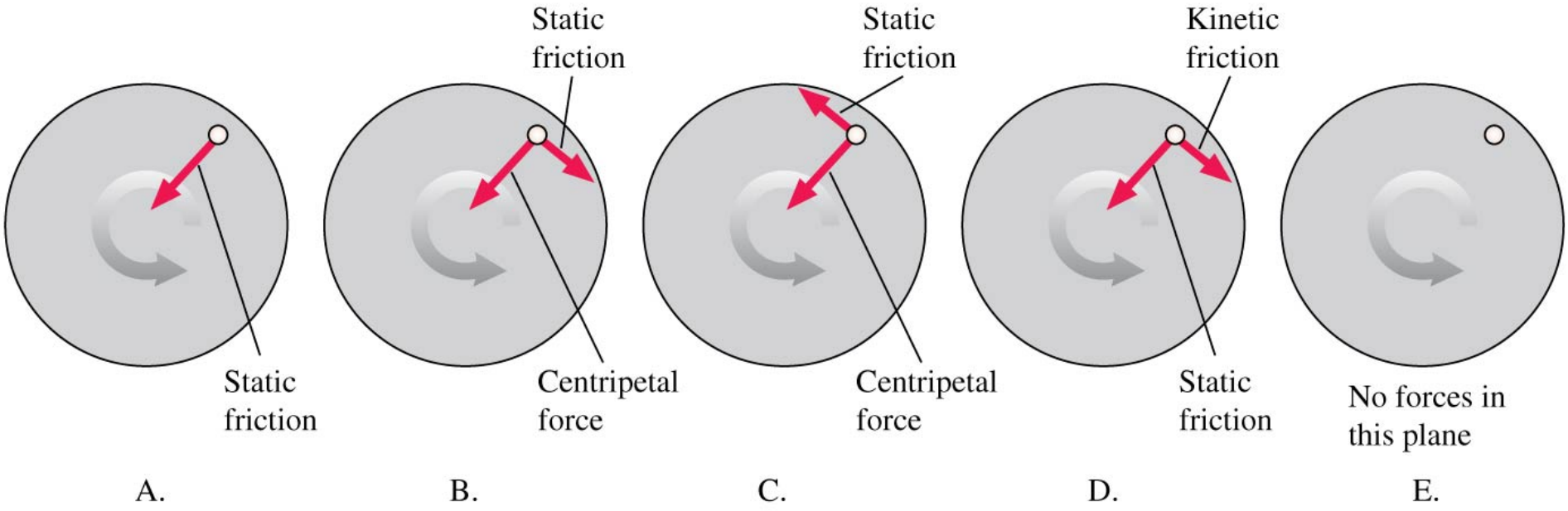
A coin sits on a turntable as the table steadily rotates ccw. What force or forces act in the plane of the turntable?



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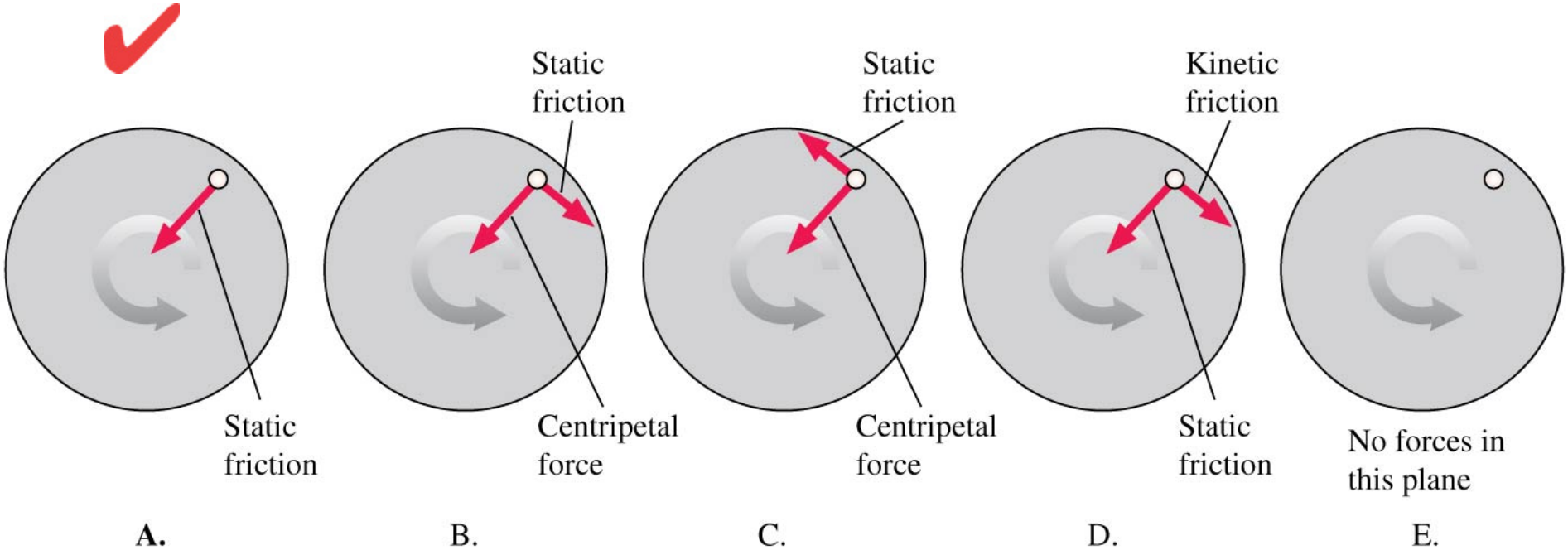
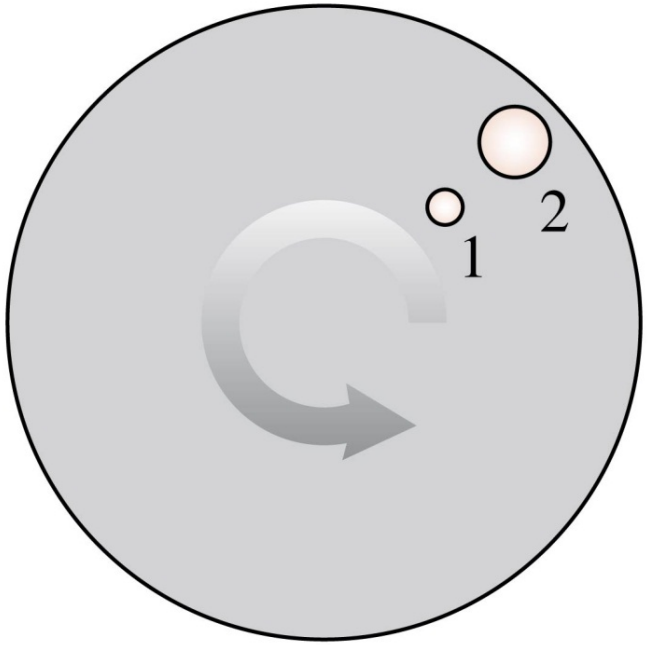


QuickCheck 8.8

Two coins are on a turntable that steadily speeds up, starting from rest, with a ccw rotation. Which coin flies off the turntable first?



A. Coin 1 flies off first.

B. Coin 2 flies off first.

C. Both coins fly off at the same time.

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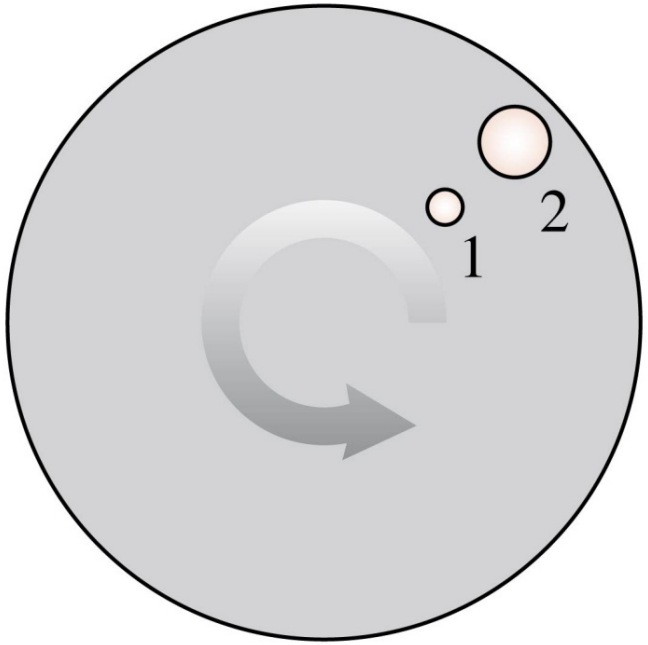

A. Coin 1 flies off first.

✔ **B. Coin 2 flies off first.**

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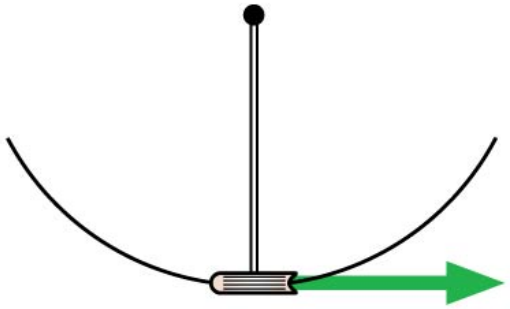
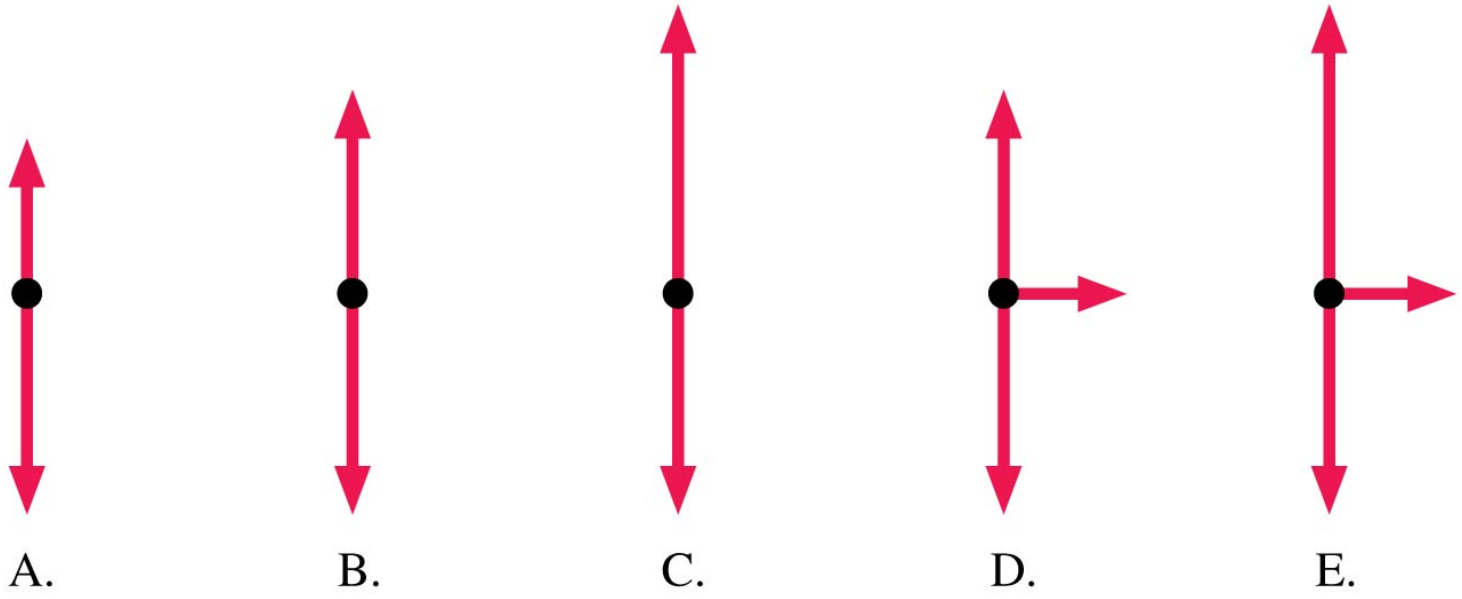
QuickCheck 8.9

A physics textbook swings back and forth as a pendulum. Which is the correct free-body diagram when the book is at the bottom and moving to the right?





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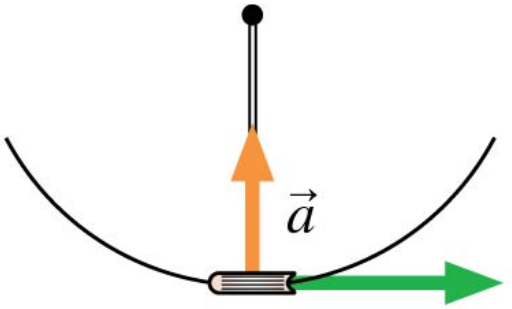
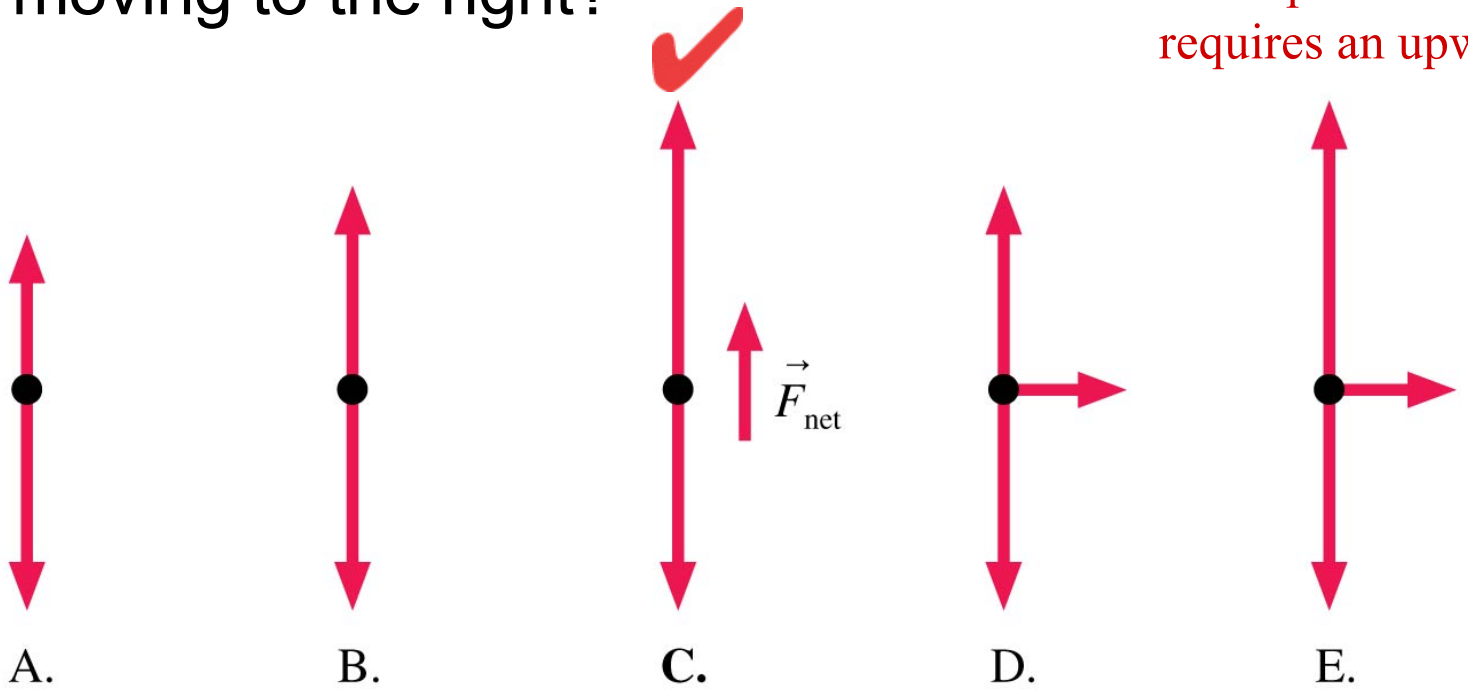
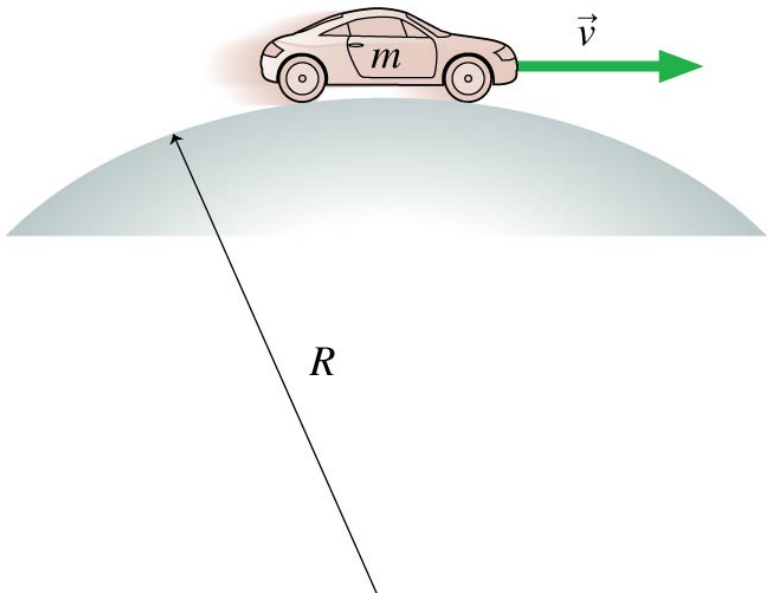


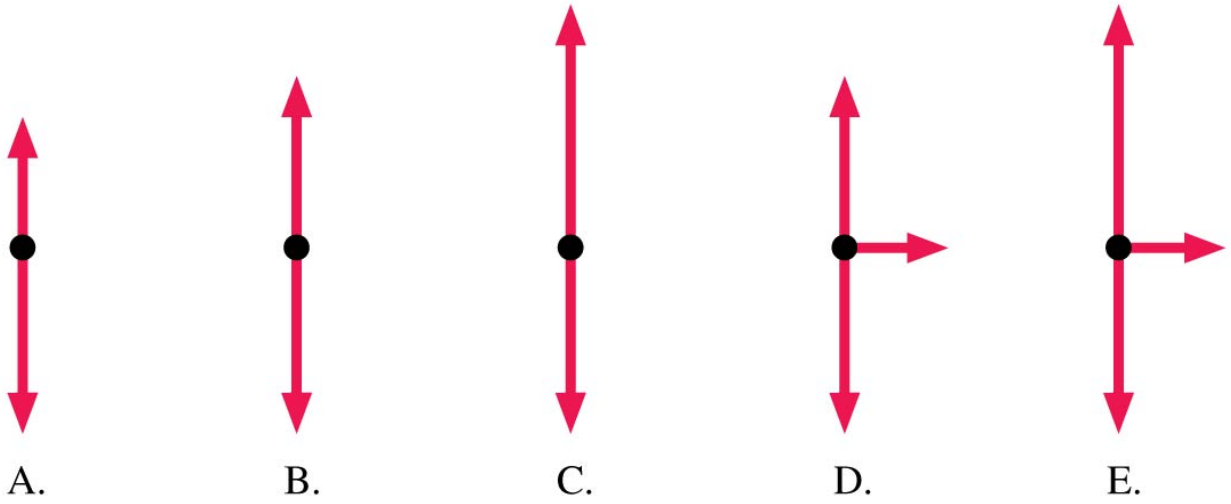
Centripetal acceleration requires an upward force.



QuickCheck 8.10

A car that's out of gas coasts over the top of a hill at a steady 20 m/s. Assume air resistance is negligible. Which free-body diagram describes the car at this instant?





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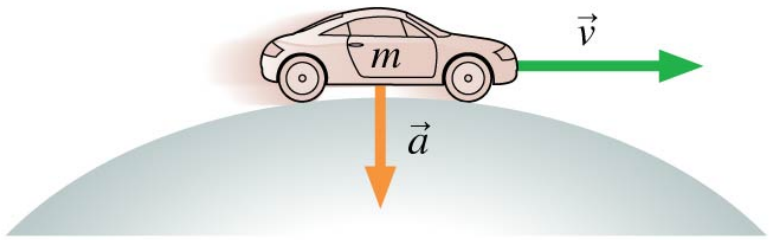
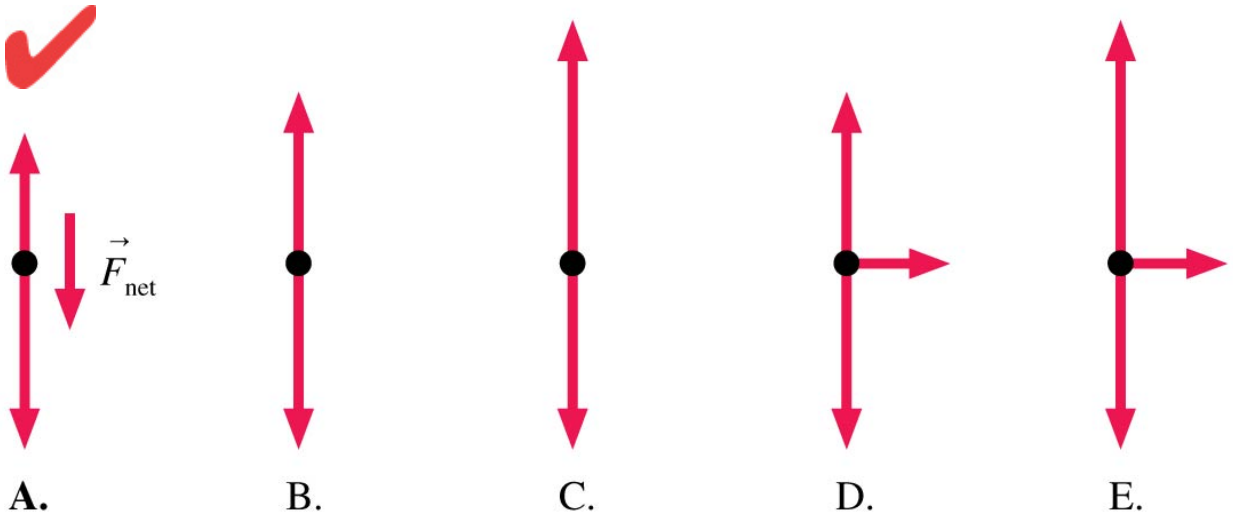
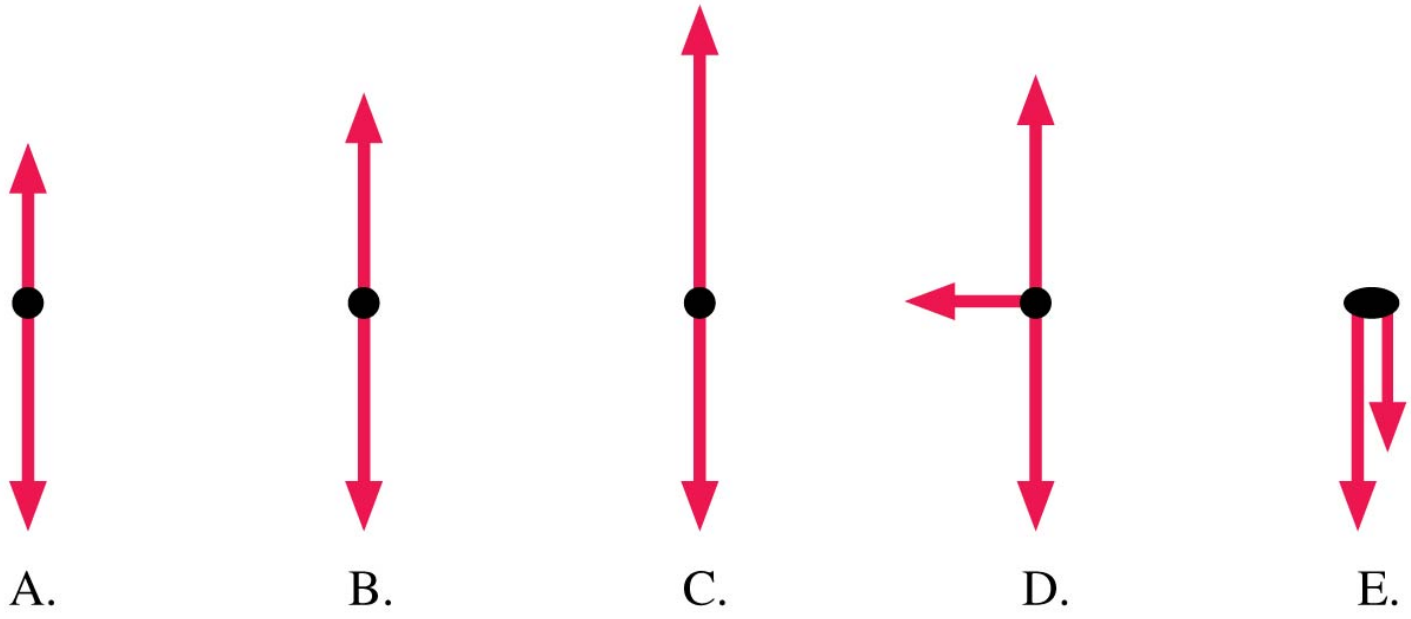


Now the centripetal acceleration points down.



QuickCheck 8.11

A roller coaster car does a loop-the-loop. Which of the free-body diagrams shows the forces on the car at the top of the loop? Rolling friction can be neglected.



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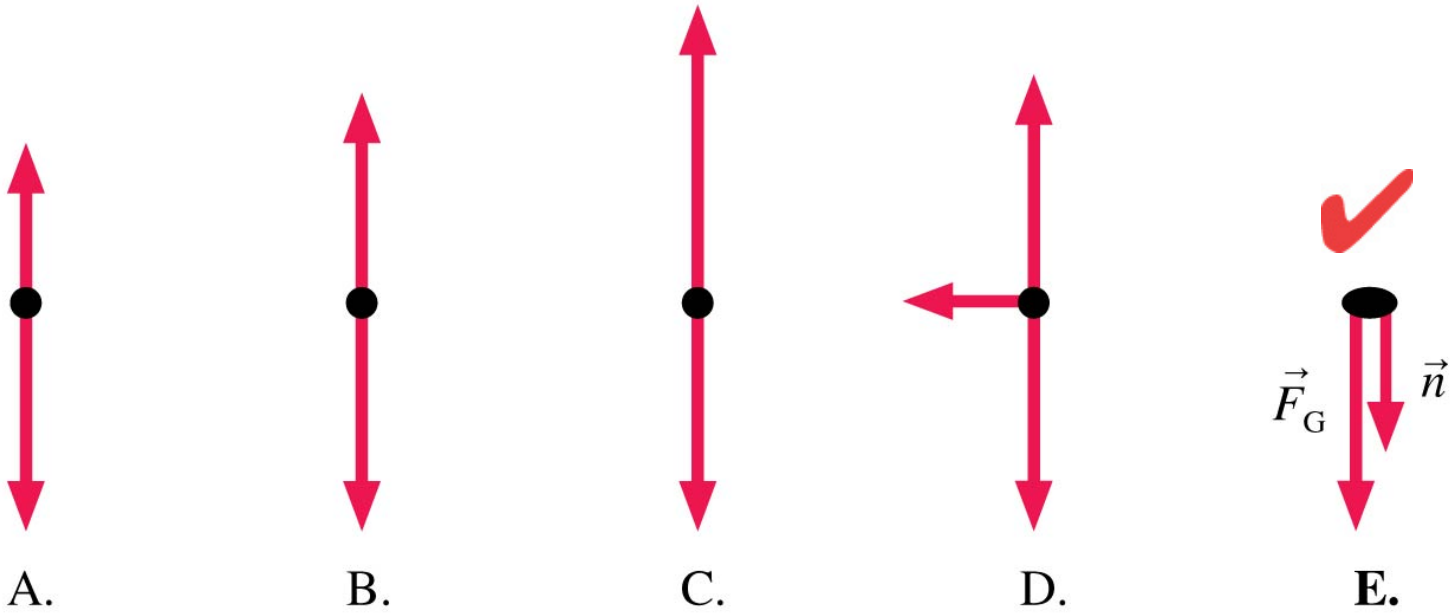
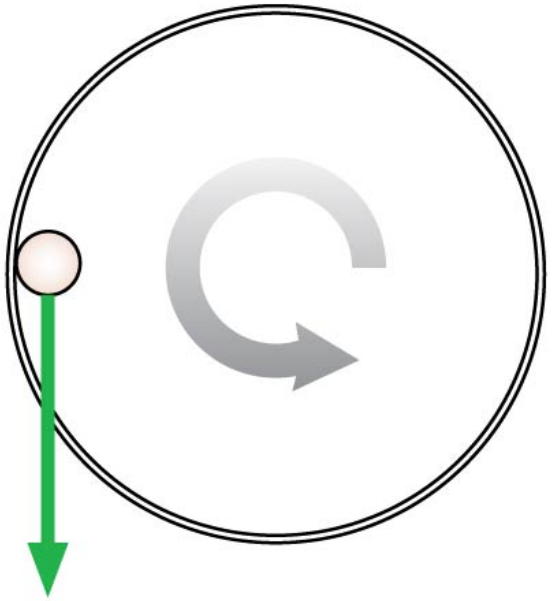


The track is *above* the car, so the normal force of the track pushes down.

QuickCheck 8.12

A ball rolls ccw around the inside of a horizontal pipe. The ball is fastest at the lowest point, slowest at the highest point. At the point shown, with the ball moving down, what is the direction of the net force on the ball?



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