

PHYSICS

FOR SCIENTISTS AND ENGINEERS A STRATEGIC APPROACH 4/E

Chapter 9 QuickCheck Questions

RANDALL D. KNIGHT

QuickCheck 9.1

A skier is gliding down a slope at a constant speed.
What energy transformation is taking place?

- A. $K \rightarrow U$
- B. $U \rightarrow K$
- C. $E_{\text{th}} \rightarrow K$
- D. $U \rightarrow E_{\text{th}}$
- E. $K \rightarrow E_{\text{th}}$

QuickCheck 9.1

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What energy transformation is taking place?

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B. $U \rightarrow K$

C. $E_{\text{th}} \rightarrow K$

 D. $U \rightarrow E_{\text{th}}$

E. $K \rightarrow E_{\text{th}}$


QuickCheck 9.2

Ball A has half the mass and eight times the kinetic energy of ball B. What is the speed ratio v_A/v_B ?

- A. 16
- B. 4
- C. 2
- D. 1/4
- E. 1/16

QuickCheck 9.2

Ball A has half the mass and eight times the kinetic energy of ball B. What is the speed ratio v_A/v_B ?

- A. 16
-  B. 4
- C. 2
- D. 1/4
- E. 1/16

QuickCheck 9.3

A crane lowers a girder into place at constant speed. Consider the work W_G done by gravity and the work W_T done by the tension in the cable. Which is true?

- A. $W_G > 0$ and $W_T > 0$
- B. $W_G > 0$ and $W_T < 0$
- C. $W_G < 0$ and $W_T > 0$
- D. $W_G < 0$ and $W_T < 0$
- E. $W_G = 0$ and $W_T = 0$

QuickCheck 9.3

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- ✓ B. **$W_G > 0$ and $W_T < 0$**
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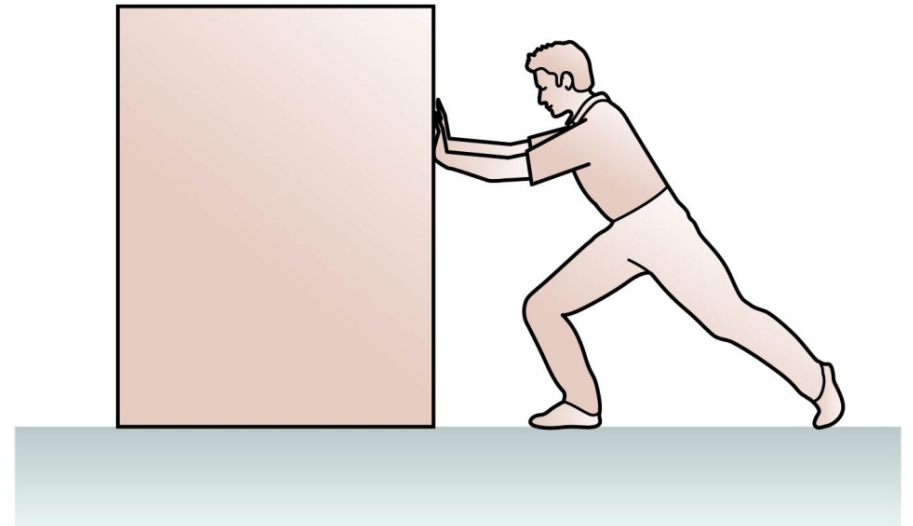
The downward force of gravity is in the direction of motion → positive work.

The upward tension is in the direction opposite the motion → negative work.

QuickCheck 9.4

Robert pushes the box to the left at constant speed. In doing so, Robert does _____ work on the box.

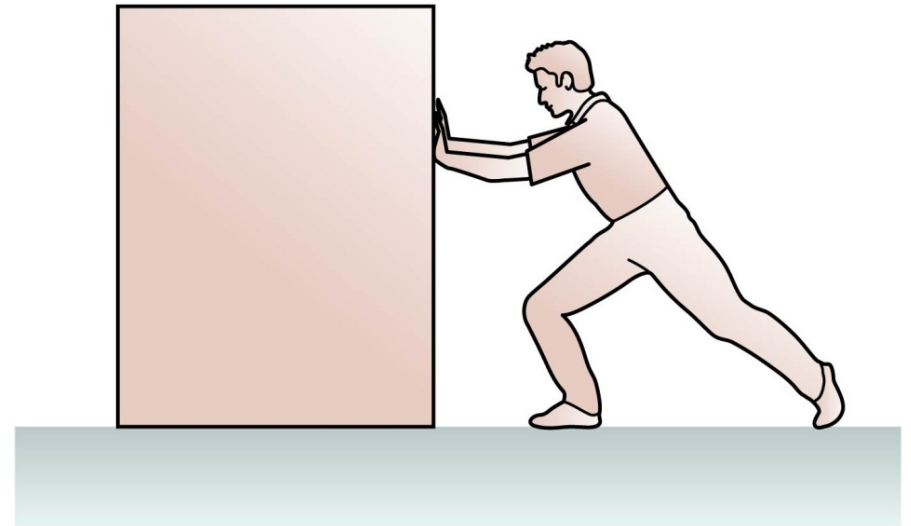
- A. positive
- B. negative
- C. zero



QuickCheck 9.4

Robert pushes the box to the left at constant speed. In doing so, Robert does _____ work on the box.

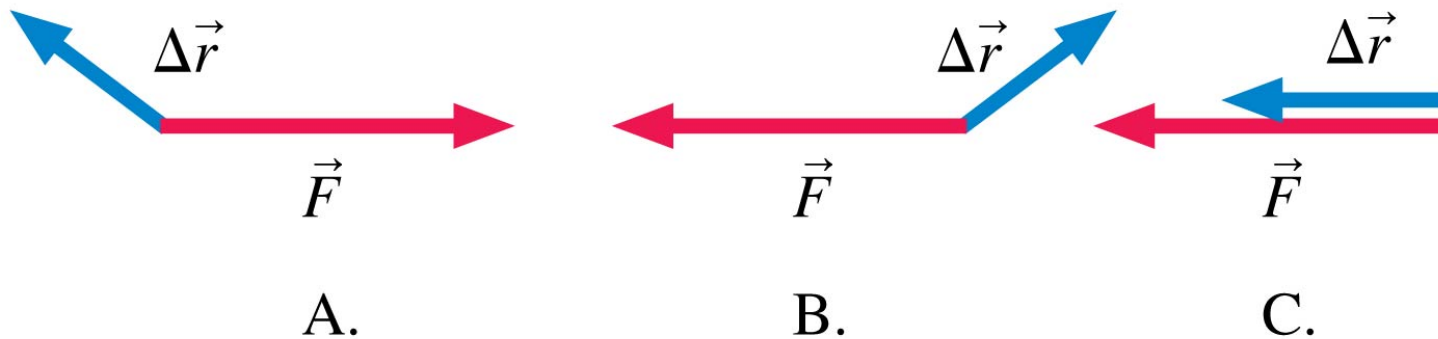
- ✓ **A. positive**
- B. negative
- C. zero



Force is in the direction of displacement → positive work

QuickCheck 9.5

A constant force \vec{F} pushes a particle through a displacement $\Delta\vec{r}$. In which of these three cases does the force do negative work?

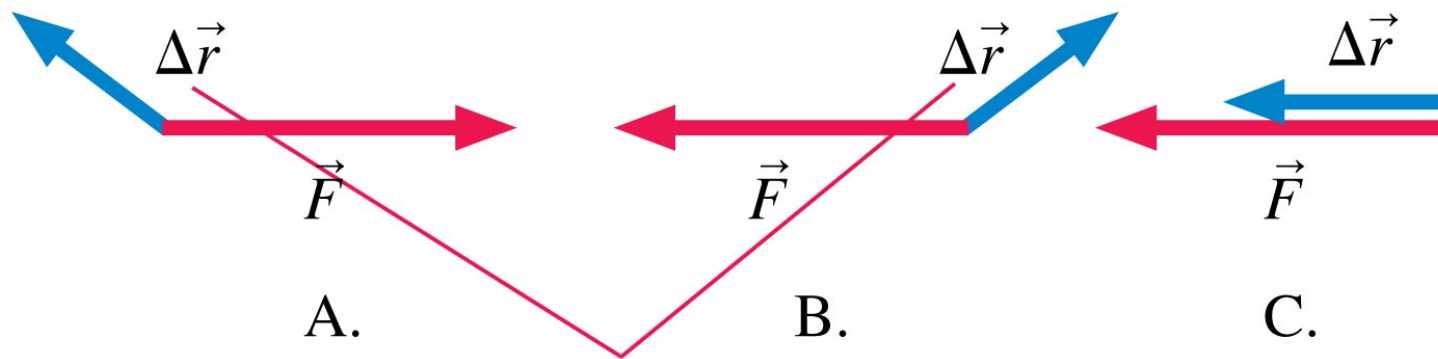


D. Both A and B

E. Both A and C

QuickCheck 9.5

A constant force \vec{F} pushes a particle through a displacement $\Delta\vec{r}$. In which of these three cases does the force do negative work?



- ✓ **D. Both A and B**
E. Both A and C

Negative work is done when the angle between \vec{F} and $\Delta\vec{r}$ is $>90^\circ$.

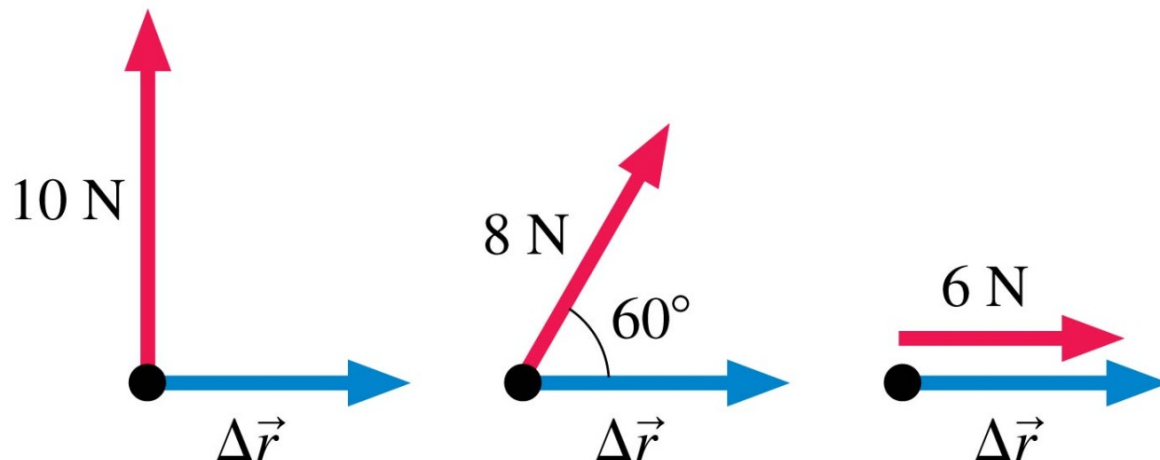
QuickCheck 9.6

Which force below does the most work? All three displacements are the same.

- A. The 10 N force.
- B. The 8 N force
- C. The 6 N force.
- D. They all do the same work.

$$\sin 60^\circ = 0.87$$

$$\cos 60^\circ = 0.50$$



QuickCheck 9.6

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A. The 10 N force.

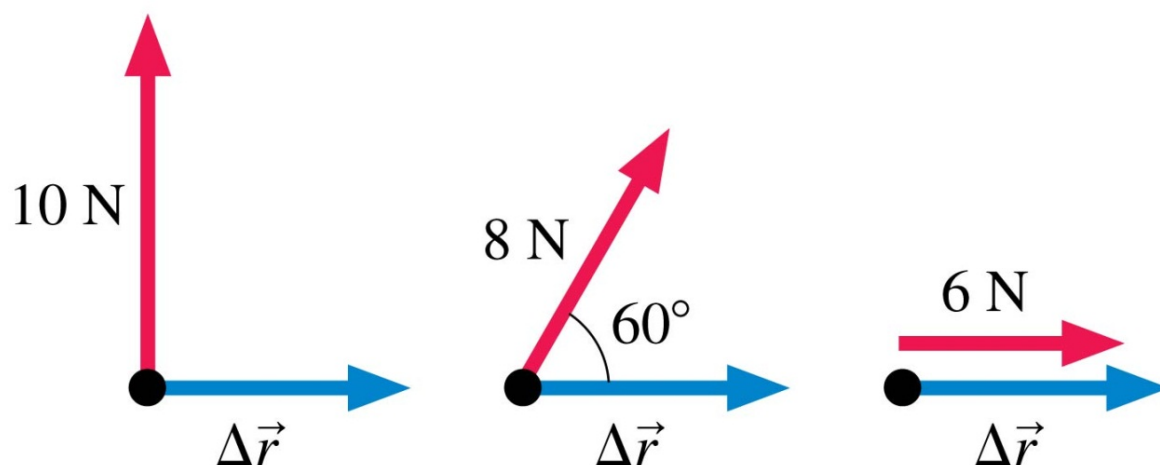
B. The 8 N force

✓ C. **The 6 N force.**

D. They all do the same work.

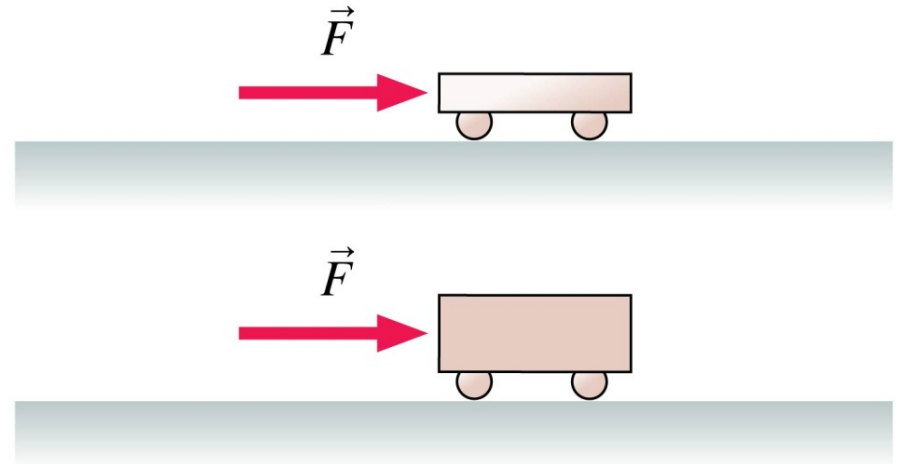
$$\sin 60^\circ = 0.87$$

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QuickCheck 9.7

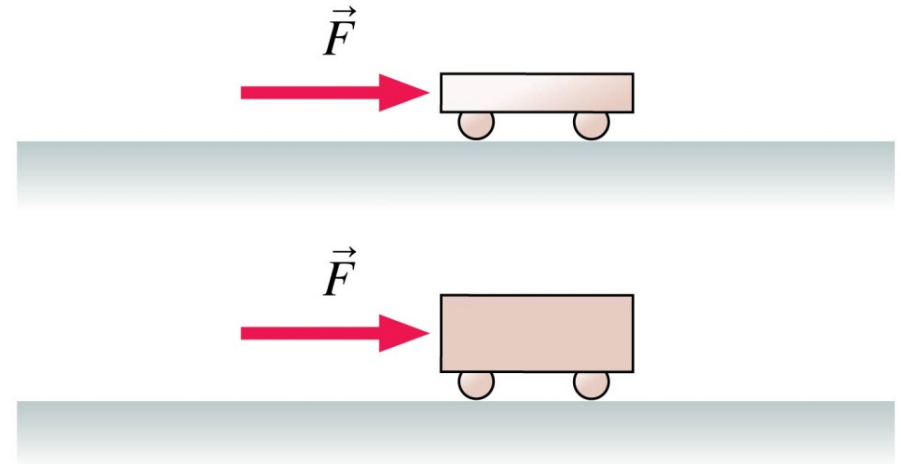
A light plastic cart and a heavy steel cart are both pushed with the same force for a distance of 1.0 m, starting from rest. After the force is removed, the kinetic energy of the light plastic cart is _____ that of the heavy steel cart.



- A. greater than
- B. equal to
- C. less than
- D. Can't say. It depends on how big the force is.

QuickCheck 9.7

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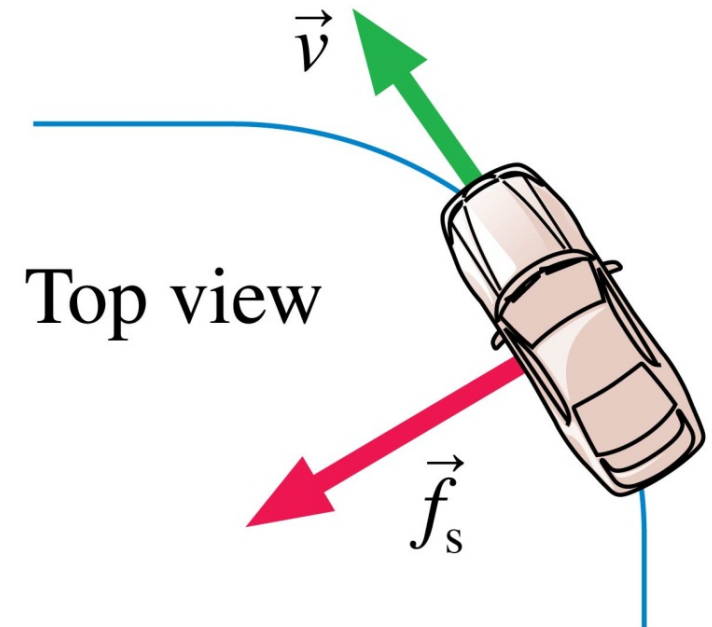
Same force, same distance \rightarrow same work done
Same work \rightarrow change of kinetic energy

- D. Can't say. It depends on how big the force is.

QuickCheck 9.8

A car on a level road turns a quarter circle ccw. You learned in Chapter 8 that static friction causes the centripetal acceleration. The work done by static friction is _____.

- A. positive
- B. negative
- C. zero

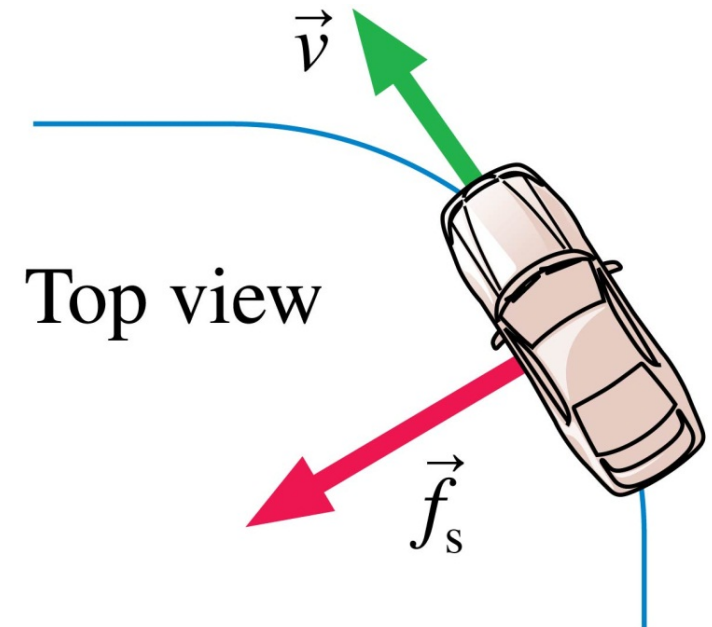


QuickCheck 9.8

A car on a level road turns a quarter circle ccw. You learned in Chapter 8 that static friction causes the centripetal acceleration. The work done by static friction is _____.

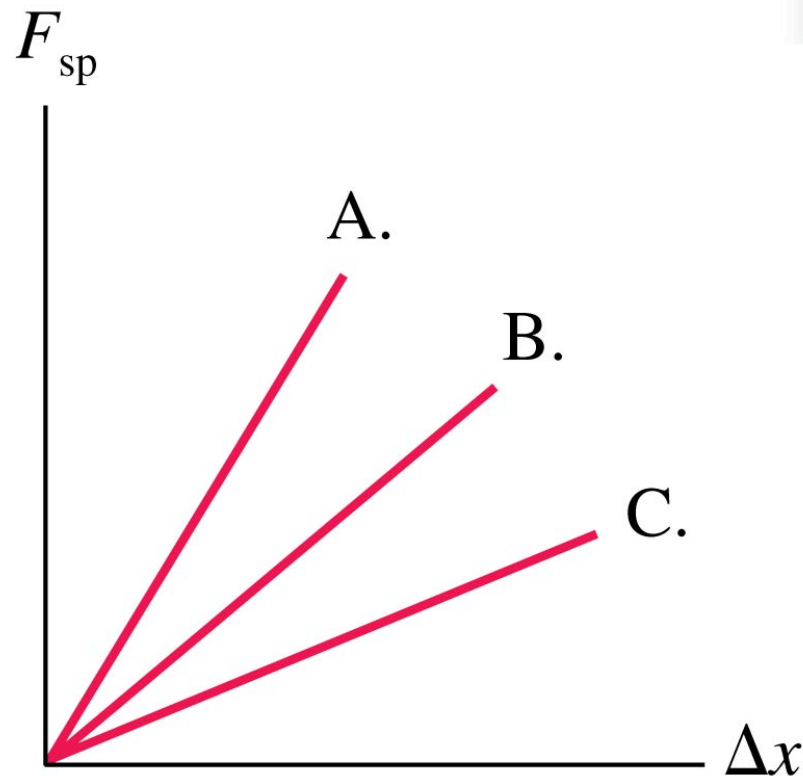
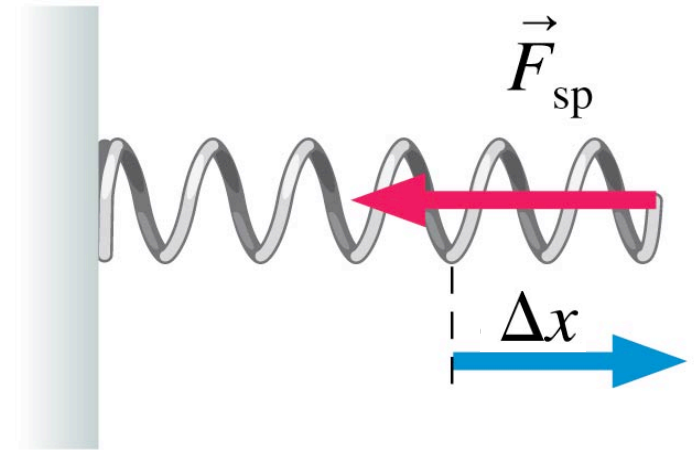
- A. positive
- B. negative

✓ C. zero



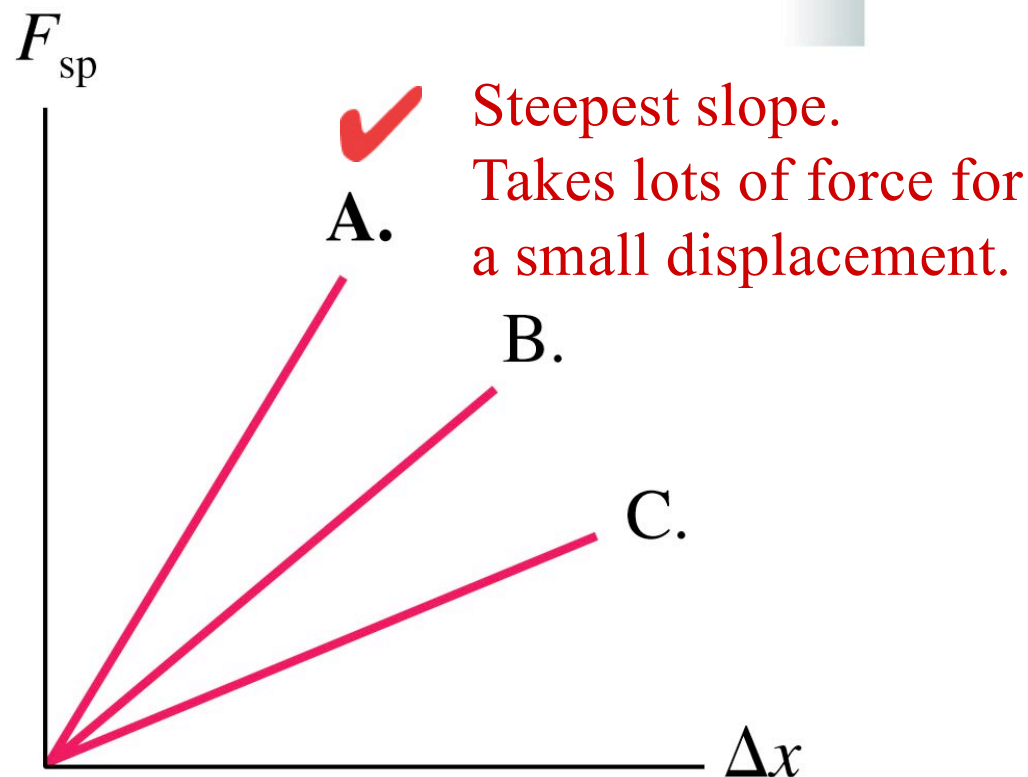
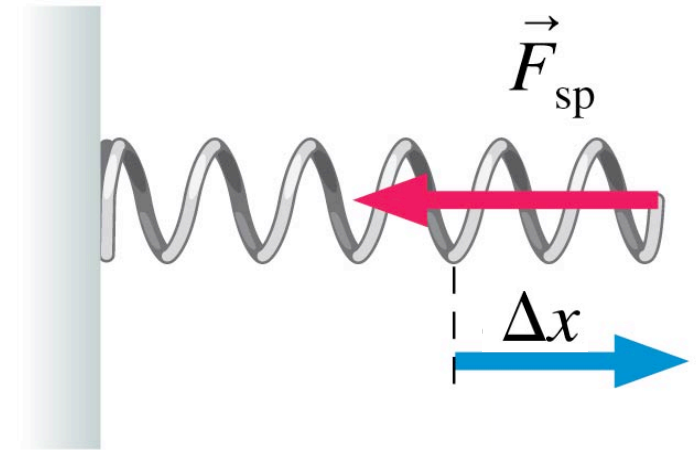
QuickCheck 9.9

The restoring force of three springs is measured as they are stretched. Which spring has the largest spring constant?



QuickCheck 9.9

The restoring force of three springs is measured as they are stretched. Which spring has the largest spring constant?



QuickCheck 9.10

A tow rope pulls a skier up the slope at constant speed. What energy transfer (or transfers) is taking place?

- A. $W \rightarrow U$
- B. $W \rightarrow K$
- C. $W \rightarrow E_{\text{th}}$
- D. Both A and B
- E. Both A and C

QuickCheck 9.10

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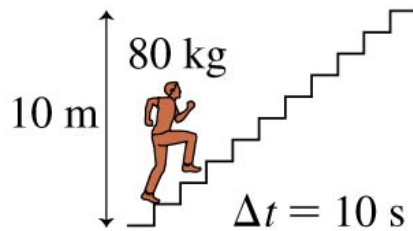
C. $W \rightarrow E_{\text{th}}$

D. Both A and B

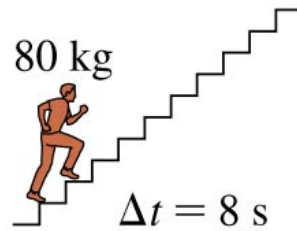
 E. **Both A and C**

QuickCheck 9.11

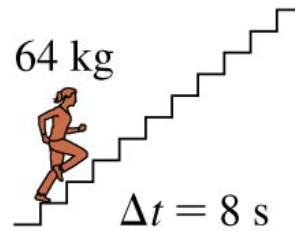
Four students run up the stairs in the time shown.
Which student has the largest power output?



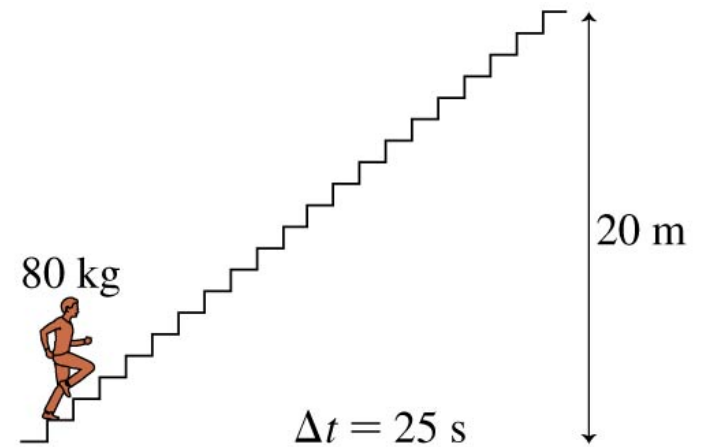
A.



B.



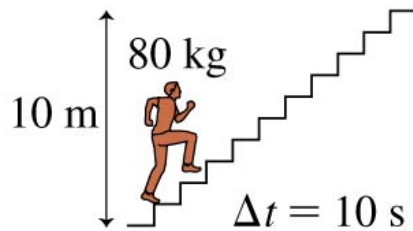
C.



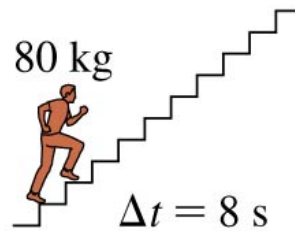
D.

QuickCheck 9.11

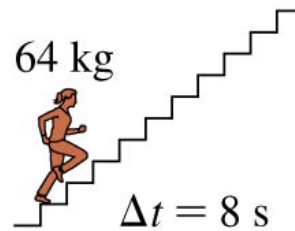
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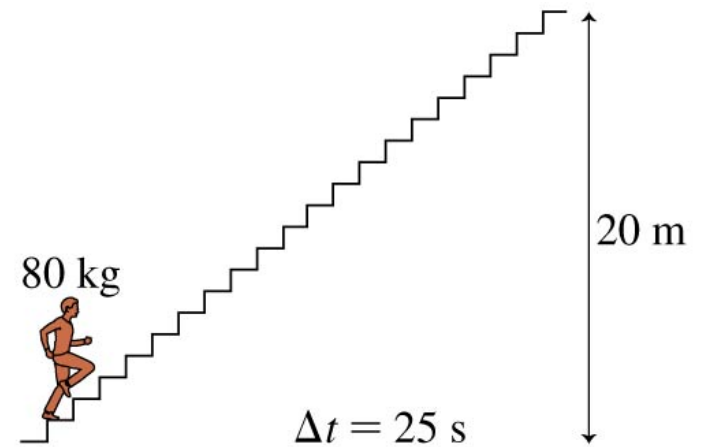
A.



B.



C.



D.