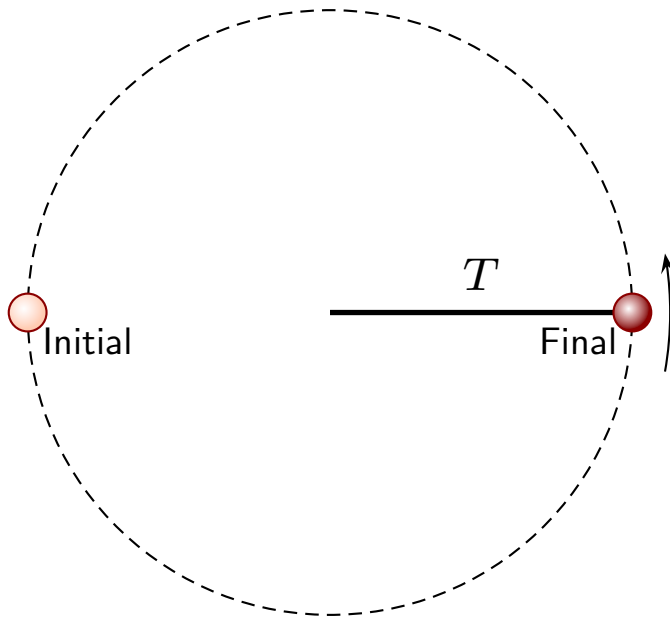# Question 1

A ball swings in a horizontal circle with a constant speed.

Which of the following is true regarding the work done by the tension as the ball moves from the initial to the final location?

1. $W = 0$.

2. $W > 0$.

3. $W < 0$.

Warm Up Question 1

An object slides down a curved track (which stays fixed). Is the work done by the normal force, while it slides zero or not? Explain your answer.

1. Zero. In this case the normal force is perpendicular to the motion.

2. Zero. There is no vertical motion.

3. Not zero. Against motion.

4. Not zero. Distance is non-zero.

5. Not zero. Force is non-zero.

Question 2

A ball with mass m moves along the illustrated straight path (partly horizontal, partly vertical). Grid units are meters.
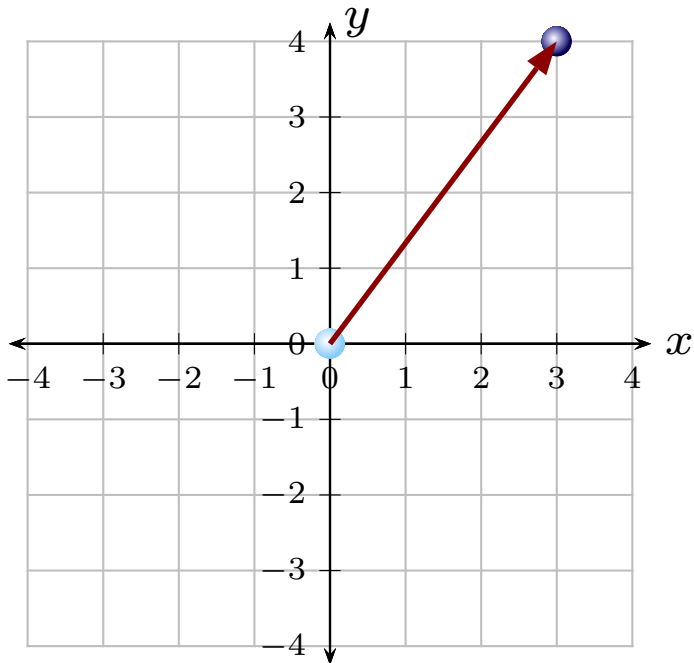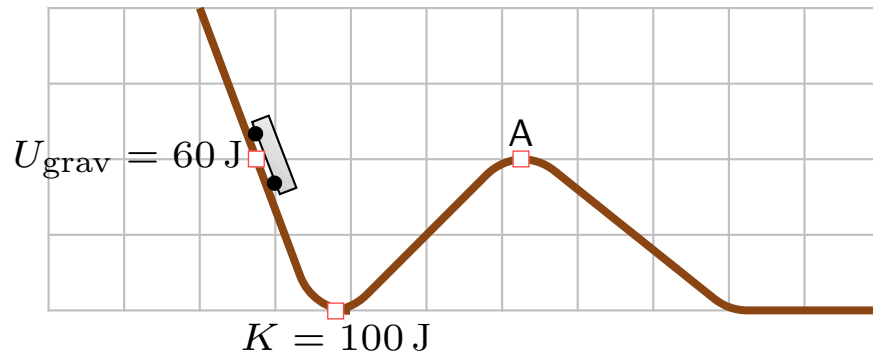
Which of the following is the work done by gravity?

1. $W_{\text{grav}} = 5mg$

2. $W_{\text{grav}} = 4mg$

3. $W_{\text{grav}} = 3mg$

4. $W_{\text{grav}} = -3mg$

5. $W_{\text{grav}} = -4mg$

6. $W_{\text{grav}} = -5mg$

Question 3

A cart slides along a track as illustrated. The reference $y = 0$ is taken at the lowest point on the track. Various energies are shown at the indicated points.

$U_{\mathrm{grav}} = 60\,\mathrm{J}$

$K = 100\,\mathrm{J}$

A

Which of the following is true regarding the total energy of the cart?

1. $E = 40\,\mathrm{J}$

2. $E = 60\,\mathrm{J}$

3. $E = 100\,\mathrm{J}$

4. $E = 160\,\mathrm{J}$

Question 4

A cart slides along a track as illustrated. The reference $y = 0$ is taken at the lowest point on the track. Various energies are shown at the indicated points.
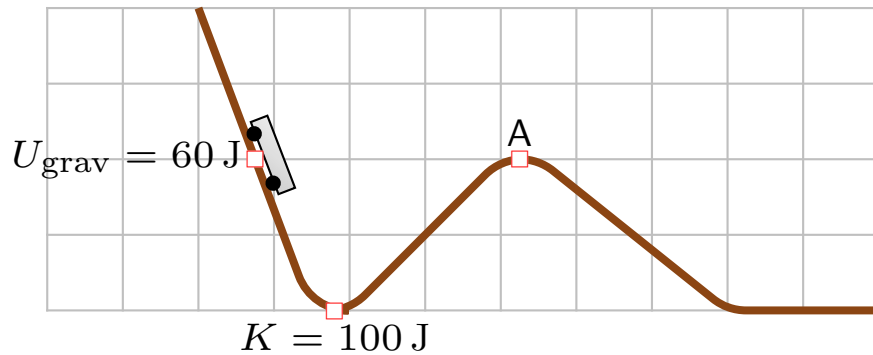
$U_{\text{grav}} = 60\,\text{J}$

$K = 100\,\text{J}$

Which of the following is true at point A?

1. $U_{\text{grav}} = 100\,\text{J}$ $K = 0\,\text{J}$

2. $U_{\text{grav}} = 100\,\text{J}$ $K = 60\,\text{J}$

3. $U_{\text{grav}} = 60\,\text{J}$ $K = 0\,\text{J}$

4. $U_{\text{grav}} = 60\,\text{J}$ $K = 40\,\text{J}$

5. $U_{\text{grav}} = 40\,\text{J}$ $K = 60\,\text{J}$

Warm Up Question 2

A dog takes a ride in two different elevators. The first elevator lifts the dog though height $20\,\mathrm{m}$ at a constant speed; this takes $3\,\mathrm{s}$. The second elevator also lifts the the dog though height $20\,\mathrm{m}$ at a constant speed; this takes $9\,\mathrm{s}$. How does the power delivered in lifting the dog for the second elevator compare to that of the first? Explain your answer.

1. Second elevator gives $1/3$ power. Takes three times as long.

2. Same. Force is the same.

3. Same. Distance is the same.