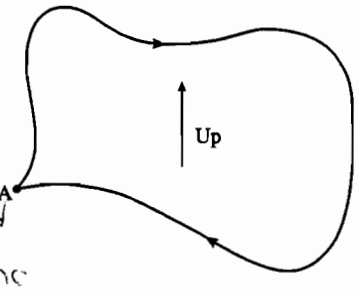
11.5 Force, Work, and Potential Energy

11.6 Finding Force from Potential Energy

15. A particle moves in a vertical plane along a *closed* path, starting at A and eventually returning to its starting point. How much work is done on the particle by gravity? Explain.



None, gravity causes a displacement in the ✗ direction, and the total y displacement of the particle is zero, so no work is done in the direction.

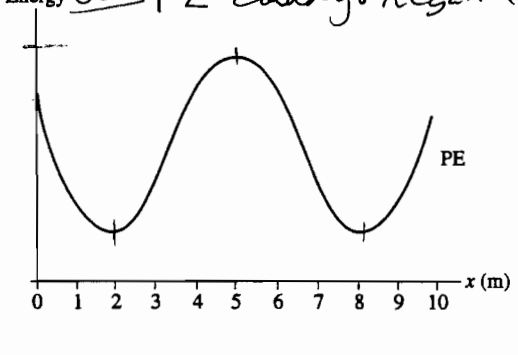
16. a. If the force on a particle at some point in space is zero, must its potential energy also be zero at that point? Explain.

The potential energy doesn't have to be zero because the net force of an object could be zero (normal force and gravity cancel out), but the object still has potential energy due to its position. ✓

b. If the potential energy of a particle at some point in space is zero, must the force on it also be zero at that point? Explain.

The force doesn't have to be zero if the potential energy is because a particle could still experience a force that would cause kinetic energy to change without any potential being present. ✓

17. The graph shows the potential-energy curve of a particle moving along the x-axis under the influence of a conservative force.



Good! PE could go negative

a. In which intervals of x is the force on the particle to the right?

$0 \le x \le 2$

$5 \le x \le 8$

b. In which intervals of x is the force on the particle to the left?

$2 \le x \le 5$

$8 \le x \le 10$

-2

c. At what value or values of x is the magnitude of the force a maximum?

✗ $x = 2$ and $x = 8$