

Name: \_\_\_\_\_

Class Period: \_\_\_\_\_

**AP Physics 1: Work, Power, & Energy**  
**Work HW**

Conceptual Questions

1. A soccer player is coming in to kick the ball. 1) He brings his leg back, 2) his foot comes in contact with the ball, and 3) the ball flies through the air. During which part or parts (1, 2, 3) does the soccer player do work on the ball? Explain your answer.
  
2. Can a normal force every do work? Explain your solution.

Mathematical Questions

3. A person lifts a 4.50 kg cement block with a constant velocity a distance of 1.20 m off the ground.
  - A. What is the work done by the person's upward force?
  - B. What is the work done by gravity?This person then carries the cement block horizontally 7.30 m. \*Consider the angle between the force and movement.
  - C. What is the work done by the person's upward force?
  - D. What is the work done by gravity?
  
4. A worker pushes a crate with a mass of 153 kg with a horizontal force of 345 N through a distance of 24.0 m. Assume a coefficient of kinetic friction of 0.220 exists between the floor and the crate.  
Going though the forces acting on the crate one at a time, calculate the net or total work done on the crate.

5. Baby Landon's wagon from our last incline problem has slid down a driveway inclined by  $9.00^\circ$ . What minimum amount of work would need to come from Landon himself to push his 9.50 kg wagon 8.10 m back up the incline?
- A. Solve the problem first assuming friction is negligible.
  - B. Solve the problem again with a force of friction ( $\mu_k = 0.25$ ) slowing Landon's motion.
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6. A.) A Harrier Jump Jet has the ability to take off and land vertically – a rare ability of a combat jet. Derive a formula that shows the minimum amount of lift force needed to give the jet with a mass  $M$  an upward acceleration of  $0.10 g$ .
- B.) What is the minimum amount of work needed to move the jet a distance  $h$  upwards?