

**Answers!!** Work Section Review 5-1 pg. 171

1) For each of the following situations, identify whether the everyday or scientific meaning of work is intended

- a) Jack had to work against time as the deadline neared. **everyday**
- b) Jill had to work on her homework before she went to bed. **everyday**
- c) Jack did work carrying water up the hill. **scientific**

2) If a neighbor pushes a lawnmower four times as far as you, but exerts only half the force, which one of you does more work? By how much?

$$\frac{1}{2} F * 4D = \text{neighbor work} = 2 FD, \text{ so neighbor does twice as much work}$$

3) For each of the following cases indicate whether the work done on a second object in each example will have a positive or negative value.

- a) The road exerts a friction force on a speeding car skidding to a stop. **neg**
- b) A rope exerts a force on a bucket as the bucket is raised up a well **pos**
- c) Air exerts a force on a parachute as the parachutist slowly falls to Earth. **neg**
- d) The Earth exerts a force on a bobsled as it moves down a track. **pos**

4) Determine whether work is being done in each of the following examples.

- a) A train engine pulling a loaded boxcar initially at rest. **yes**
- b) A tug of war that is evenly matched. **no**
- c) A crane lifting a car. **yes**

5) A worker pushed a 1500 N crate with a horizontal force of 345 N a distance of 24 m. Assume the coefficient of kinetic friction between the crate and the floor is 0.22

a) How much work is done by the worker on the crate?  $W=FD=345*24=8280 \text{ J}$

b) How much work is done by the floor on the crate?

$$W=Ff * D=.22(1500)*24=330*24=- 7920 \text{ J}$$

c) What is the net work done on the crate?  $8280-7920=360 \text{ Joules}$

6) A .075 kg ball in a kinetic sculpture is raised 1.33 m off the ground by a motorized vertical conveyor belt. A constant frictional force of .35 N acts in the direction opposite the conveyor belt's motion. How much total work is done in raising the ball??

**Work done by gravity =  $mgh = .075 (9.8) 1.33 = .9775 \text{ J}$**

**Work done by friction =  $.35 \text{ N} * 1.33\text{m} = -.4655 \text{ J}$**

**Total Work done =  $.9775 \text{ J} + .4655 \text{ J} = 1.44305 \text{ J} =$**

**Or  $F_{\text{net}} * \text{Dist} = (\text{Weight} + \text{Fric}) * \text{Dis} = 1.085 \text{ J} * 1.33 \text{ m} = 1.44305 \text{ Joules}$**