Name: _____

Date: _____

MCHS Honors Physics 2014-2015

Work and Energy 1

Work is only done on an object when a force causes a displacement, and only when components of the force are applied parallel to the displacement.

Work = Force x Distance → $\boldsymbol{W = F_{net} \cdot d \cdot cos(\theta)}$

- The SI unit for force is the Newton (N).
- The SI unit for distance is the meter (m).
- The SI unit for work is therefore the Newton-meter, which we call Joule (J).

1. How much work is done on a vacuum cleaner pulled 4.0 meters by a force of 60.0 Newtons at an angle of $25.0°$ above the horizontal?

2. A tugboat pulls a ship with a constant horizontal force of 5.00×10^3 N and causes the ship to move through a harbor. How much work is done on the ship if it moves a distance of 3.00 km?

3. A weightlifter lifts a set of weights a vertical distance of 2.00 meters. If a constant net force of 350 Newtons is exerted on the weights, what is the net work done on the weights?

4. A shopper in a supermarket pushes a cart with a force of $35\ N$ directed at an angle of $25°$ downward from horizontal. Find the work done by the shopper on the cart as the shopper moves along the produce aisle which is $50\ m$ in length of aisle.

5. If $2.0\ J$ of work is done in raising a $180g$ apple, how many meters is it lifted?