Name: _____

Class: _____

Due Date: _____

Physics Topic 15C – Work-Energy Theorem

Answer the following questions. The solutions to this worksheet can be found on the YouTube channel Go Physics Go.

1. C: State the equation for the work-energy theorem.

2. E: A car with a mass of 1250 kg slows down from 35.0 m/s to rest over a distance of 60.0 m. Calculate the magnitude of the average force of friction on the car.

3. E: The front of a car with a mass of 955 kg and moving at 25.0 m/s to the right is compressed by 0.255 m when it collides with a wall. Calculate the average force on the front of the car from the wall.

4. E: A box with a mass of $m = 8.00$ kg is moving horizontally with a constant speed of 0.200 m/s.

   a. Calculate the kinetic energy of the box.

The box is then pushed horizontally with a force of 60.0 N with a friction force of 7.00 N. During this time the box moves 3.25 m.

   b. Calculate the net work done on the box.

   c. Calculate the work done by the normal force, the force of gravity, the pushing force, and the friction force.

   d. Calculate the speed of the box after 3.25 m.

5. E: An elevator with a mass of 425 kg moves down with a speed of 3.75 m/s. The elevator then begins to accelerate down with a constant acceleration of $6.25\ \frac{\mathrm{m}}{\mathrm{s}^2}$ for 15.5 m.

   a. Calculate the work done on the elevator by the force of gravity.

   b. Calculate the work done on the elevator by the force of tension.

   c. Calculate the net work done on the elevator.

   d. Calculate the final speed of the elevator after it has fallen 15.5 m.

6. E: An elevator with a mass of 1,250 kg moves up 35.0 m with a constant speed of 8.00 m/s. There is a friction force of 85.0 N.

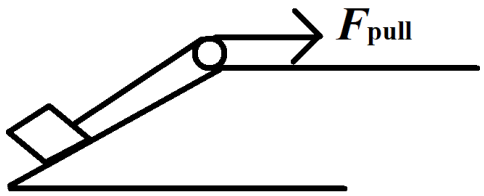
   a. What is the total work done on the elevator?

   b. Calculate the work done by the force of tension.

   c. Calculate the work done by the force of gravity.

   d. Calculate the work done by the force of friction.

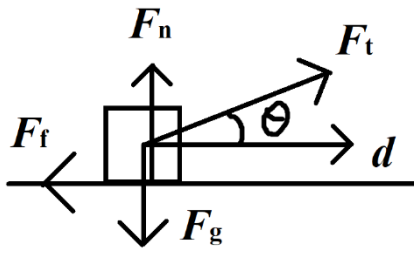
7. E: A 50.0 kg object is pulled 40.0 m up a frictionless incline which is 30.0° above the horizontal. The object starts and ends at rest.



a. Calculate the work done by the force of gravity.

b. Calculate the work done by the pulling force.

8. E: E: A man is pulling a block. The forces are shown below.

	$F_T = 1460$ N $F_N = 240$ N $F_f = 20$ N $F_g = 1200$ N $\theta = 41.11°$ $d = 50$ m

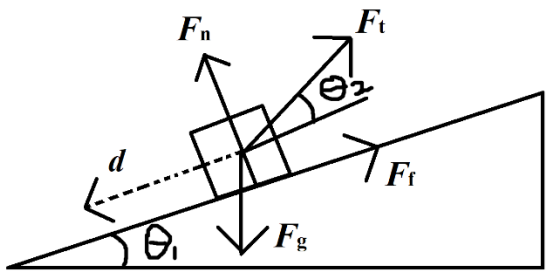
a. Calculate the work done by each force.

b. Calculate the total work done on the block.

c. Calculate the change in kinetic energy of the block.

d. The initial velocity of the block is 16 m/s. Calculate its final velocity.

9. E: A block slides down an incline while a man is pulling it up the incline. The forces are shown below.



$F_T = 106$ N
$F_N = 344$ N
$F_f = 110$ N
$F_g = 500$ N
$\theta_1 = 36.87°$
$\theta_2 = 31.89°$
$d = 144$ m

a. Calculate the work done by each force.

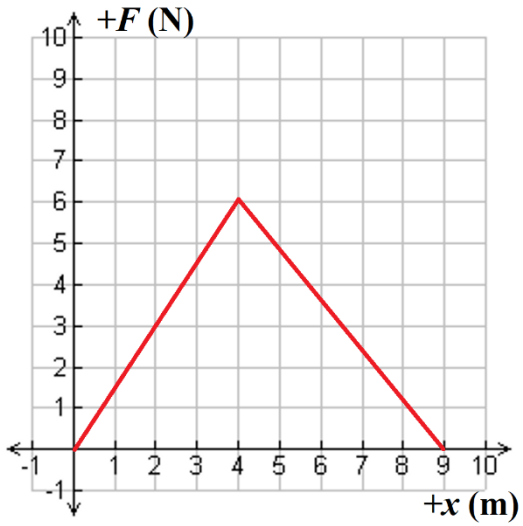
b. Calculate the total work done on the block.

c. Calculate the change in kinetic energy of the brick.

d. The initial velocity of the block is 10 m/s. Calculate its final velocity.

10. E: Draw a graph of the *kinetic energy* of an object *vs. the work done* on the object E_k vs. W when a constant force acts on a mass which is initially at rest on a frictionless surface.

11. E: The graph below shows how the net force F acting on an object varies with the distance it has traveled. Determine the change in kinetic energy of an object after it has traveled 8 m.



12. E: An object is pushed from rest along a smooth horizontal surface with a constant acceleration. Draw a graph of how the kinetic energy E_{k} of the object varies with the distance s traveled.