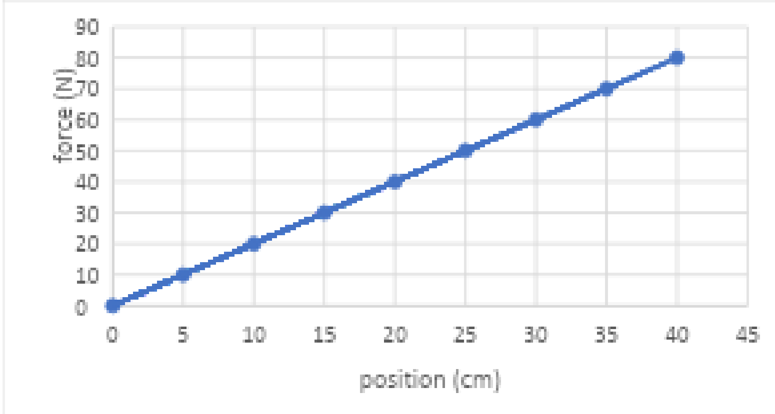
Name: ____ Period: _______ Assigned on Tuesday, November 12, 2024

14.2 Work-Energy Theorem Practice **Due Wednesday, November 13, 2024**

1. A spring exerts a force as shown on the graph below. How much work is done as the spring stretches from 20 to 40 cm? (12J)

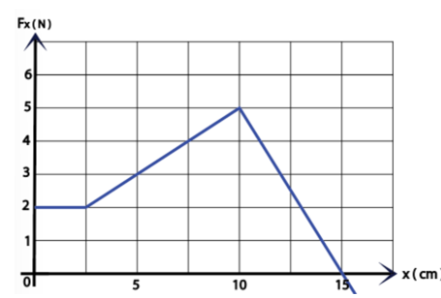


2. A 2 kg toy car moves at a speed of 5 m/s.
   a. What is the kinetic energy of the car?
   b. If a child applies a 3 N force for 2 m in the same direction the car is already moving, how much work is done on the car?
   c. What is the change in the car's kinetic energy from the applied force?
   d. What is the final kinetic energy of the car?
   e. What is the velocity of the car after the child applies the 3 N force?

3. A 75 kg baseball player runs at a velocity of 6 m/s before sliding to a stop at second base.
   a. What is the kinetic energy of the runner before he begins his slide?
   b. What is the kinetic energy of the runner once he reaches the base?
   c. What is the change in the kinetic energy of the runner?
   d. How much work is done by friction in stopping the runner?
   e. If the runner slides for 2 m, what is the force of friction that acts upon him?

4. Runaway truck ramps are common on mountainous highways in case the brakes fail on large trucks. A certain runaway 60,000 kg truck is moving at 27 m/s before it hits the front of the runaway truck ramp.
   a. How much work must be done to stop the truck?
   b. If the net force applied by the truck ramp is -300,000 N, how far along the ramp will the truck move as it stops?

5. How much work is required to accelerate a 1300 kg car from rest to 32 m/s?



6. The force applied to an object moving in the horizontal direction varies with the position, as shown in the figure to the right. Calculate the work done on the object between 0 cm and 15 cm.

7. Sled pulls help athletes develop serious acceleration for sprinting. A sprinter pulls a sled of a mass of 45 kg on a rough horizontal grass surface. The cord makes an angle of 20° with the surface. The coefficient of kinetic friction between the sled and the grass is 0.20. The athlete runs for a distance of 25 m, pulling the cord with a constant force of 120 N. What is the sled's speed at the end of the run? Use the work-energy principle to solve this problem.

8. A 3.0 kg box is pushed across a horizontal surface with a speed of 1.5 m/s. The box travels a distance of 1.25 m before coming to a stop. What is the coefficient of kinetic friction between the box and the surface?