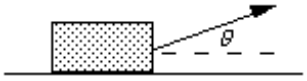
1. A block is pulled 8 m to the right by a 40 N force making an angle of 37° as shown in figure. Determine the work done by the force.



2. A block is pulled 20 m to the right by a 50 N force. The work done by the force is 750 J. Determine the angle θ.

3. A 100 N force pulls a 5 kg mass initially at rest to the right.
   (a) Determine the work done on the mass by the force after it moves 10 m.
   (b) Determine the speed of the mass after it moves 10 m.

4. A 100 kg mass is moving with a speed of 20 m/s. The coefficient of friction between the mass and the surface is $\mu_k = 0.5$. Using the work-kinetic energy theorem determine the distance traveled by the mass before it speed reduces to 10 m/s starting speed.

5. A 10 kg mass is moving with a speed of 15 m/s. The coefficient of friction between the mass and the surface is $\mu_k = 0.4$. Using the work-kinetic energy theorem determine the distance traveled by the mass before it comes to rest.

6. Determine the kinetic energy of a 500 g mass moving with a speed of 25 m/s.

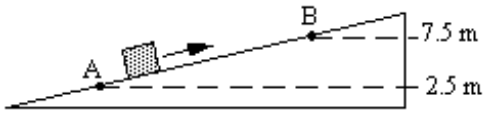
7. Determine the speed of a 10 g bullet whose kinetic energy is 100 J.

8. Determine the change in the kinetic energy of an object if the speed of the object is doubled.

9. Determine the amount of work done in stopping a 3000 kg vehicle moving with a speed of 20 m/s.

10. Determine the amount of work required to accelerate a 1500 kg vehicle from 5 m/s to 15 m/s.

11. Determine the amount of work done by the force of gravity in moving a 10 kg object from point A to B as shown in figure below.



12. Determine the potential energy of a 25 kg block on top of a 20 m high hill.

13. The potential energy of a 15 kg mass on top of a hill is 2000 J. Determine the height of the hill.

14. A 150 g ball is moving with a speed of 35 m/s at a height of 10 m. Determine the mechanical energy of the ball.

15. The mechanical energy of a 1000 kg vehicle on top of a 25 m high hill is 4.9×10^5 J. Determine the speed of the vehicle.

16. The mechanical energy of a 2000 kg vehicle moving with a speed of 20 m/s is 1.0×10^6 J. Determine the height of the vehicle.

17. A 1000 kg roller coaster starts from rest on top of a 50 m high hill.
   (a) Determine the mechanical energy of the roller coaster.
   (b) Determine the speed of the roller coaster at the bottom of the hill.
   (c) At what height is the speed of roller coaster 20 m/s.

18. A force of magnitude 125 N compresses a spring by 0.28 m. Determine the spring constant. Determine the energy stored in the spring.

19. The force constant of a spring is 50 N/m. Determine the force required to stretch the spring by 0.12 m. Determine the energy stored in the spring.

20. A block of mass 0.08 m is pushed against a spring of spring constant 150 N/m. The spring is compressed by an amount 0.12 m and the block is initially at rest. The block is now released. Determine the speed with which the block moves once it leaves the spring. If the spring is now compressed by the same amount but the gun is pointed vertically upward, determine the maximum height reached by the ball from its initial position.

21. A block of mass 0.15 m is pushed against a spring of spring constant 250 N/m. The spring is compressed by an amount 0.2 m and the block is initially at rest. The block is now released. Determine the speed with which the block moves once it leaves the spring. If the spring is now compressed by the same amount but the gun is pointed vertically upward, determine the maximum height reached by the ball from its initial position.

22. A block of mass 150 kg is moving with a speed of 12 m/s at the top of a 20 m high hill as shown in figure below. Determine the speed of the block at the points A and B. At what height is the object moving with a speed of 25 m/s.