1. The 10kg crate is being pulled 5m along a floor by an 80N force 30 degrees above the horizontal. The $\mu_k$ between the floor and the crate is 0.1. Determine the work done on the crate by each of the following forces: a) the 80N force, b) the gravity, c) the normal force, d) the friction, e) the net force. f) Find the change in the kinetic energy of the crate.

   a.) 346.4 J  
b.) 0  
c.) 0  
d.) -29 J  
e.) 317.4 J  
f.) 317.4 J

2. A car weighing 1000kg accelerates from 20m/s to 30m/s over a distance 500m. Find the average force on the truck.

   $F = 500$ N

3. You are designing a roller coaster with a loop that comes after a large drop. If the peak of the drop has a height of 120m what is the maximum radius the loop can have if the carts are to maintain a velocity of 15m/s?

   $R = 54.3$ N

4. A football traveling at 25.5m/s moves a receiver’s hands backward 0.2m when the ball is caught. What was the average amount of force exerted by the ball on the receiver’s hands? (m=0.4kg)

   $F = 650.25$ N
5. A ball starting at rest is kicked along a frictionless surface at a constant velocity of 5m/s.

After traveling 12m on the surface the ball drops from a height of ‘h’ and impacts the ground at a speed of 9m/s. Find h.

\[ h = 2.85 \text{ m} \]