

1. A rope has a length of 1.2 m. At the end of the rope is a 10.5 kg mass.
  - a. Calculate the minimum velocity to swing the mass in a complete vertical circle.
  - b. If the rope breaks under a tension of 750 N, calculate the maximum velocity the mass can travel.
2. The fastest a 350 kg motorcycle can travel is 35 m/s. Calculate the radius of the largest vertical circle that the motorcycle can safely travel around.
3. Many people will blackout under high accelerations, called g-forces. Calculate the velocity of an airplane that would result in the pilot experiencing an acceleration of 7gs while performing a loop-de-loop maneuver that has a radius of 250 m.
4. A rope will break under a tension of 1250 N. The desired speed of a 7.25 kg mass at the bottom of a vertical circle is 16 m/s. What length of rope will result in the rope breaking? Is this the maximum or minimum length of rope to use?