

# CIRCULAR MOTION WORKSHEET

1. A cord 0.65 m long exerts a centripetal force of 11.6 N on a whirling 0.10 kg mass tied to the end of the cord. What is the velocity of the whirling mass? (8.7 m/s)
2. A 13 500 N car traveling at 50.0 km/h rounds a curve of radius  $2.00 \times 10^2$  m. Find:
  - (A) the centripetal acceleration of the car (0.965 m/s<sup>2</sup>)
  - (B) the centripetal force (1330 N)
  - (C) the minimum coefficient of friction between (0.0985)
  - (D) On a rainy day, the coefficient of friction is 0.050. What is the maximum safe speed of the car under these conditions? (35.6 km/h)
3. A looping roller coaster ride at an amusement park has a radius of curvature of 7.50 m. At what minimum speed must the coaster be traveling at the top of the curve so the passengers will not fall out? (8.57 m/s)
4. A physics student is twirling a 50.0 g rubber stopper attached to a 0.950 m length of cord at a uniform speed in a vertical circle. If its speed is 3.50 m/s, what is the tension in the cord at
  - (A) the top of the circle (0.155 N)
  - (B) the bottom of the circle (1.13 N)
5. A pilot pulls her jet out a dive by swing up in an arc of radius 3.80 km at a speed of 450.0 m/s.
  - (A) What is the plane's centripetal acceleration? (53.3 m/s<sup>2</sup>)
  - (B) How many g's does the pilot experience? (5.44 g)

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