Planet Holloway **websheet 7.1**
Cp Physics Rotation and Gravity
You may print this out and write on it or work on your own paper.
Show all work.

1. A child rides a bicycle in a circular path with radius 4 meters. The tangential speed (linear) is 6 m/s. The combined mass of the child and bike is 52 kg. What is the magnitude of the bicycles centripetal acceleration?

2. In the problem above, what is the magnitude of the force on the bicycle and girl?

3. In problem #1, what is causing the force on the bicycle and what direction is it acting?

4. A rollercoaster loaded with passengers has a mass of 1500 kg. At the lowest point of the track, the radius of curvature is 32 m and the rollercoaster has a speed of 22 m/s. What is the centripetal acceleration?

5. In the above problem, what is the centripetal force?

6. A satellite in a circular orbit experiences a centripetal acceleration of 7.1 m/s/s. The tangential speed of the satellite is 8.4×10^3 m/s. What is the altitude (height above the surface of the earth) of the satellite if the radius of the earth is 6.4×10^6 m?

Answers:

1. 9 m/s/s
2. 468 N
3. Friction, toward the center of the circle
4. 15.125 m/s/s
5. 2.27×10^4 N.
6. 3.5×10^6 m.