Worksheet 12: Uniform Circular Motion

1. The French high-speed train, the TGV, routinely attains speeds of 320 km/h.
   a. What is this speed in m/s?

   b. On a curve, suppose we wish to keep the train's sideways acceleration to 0.50 m/s^2 or less. What radius of curvature would be needed to achieve this at 320 km/h?

2. The Earth's radius is 6378 km. The latitude of Laramie is 41.3°. The period of Earth's rotation is 23:54:04.0905 (h:m:s).
   a. What is the distance from Laramie to the Earth's axis of rotation?

   b. What is Laramie's (centripetal) acceleration toward the Earth's axis of rotation?

3. What would Earth's period of rotation need to be for the centripetal acceleration at the equator to equal the gravitational acceleration of 9.8 m/s^2?