**Amusement Park Physics Problems**

1. Anna Litical is riding on The Shock Wave at Great America. Anna experiences a downward acceleration of 12.5 m/s2 at the top of the loop and an upward acceleration of 24.0 m/s2 at the bottom of the loop. What is the normal force acting upon Anna's 50-kg body at the top and at the bottom of the loop?
2. Noah Formula is riding a roller coaster and encounters a loop. Noah is traveling 6 m/s at the top of the loop and 18.0 m/s at the bottom of the loop. The top of the loop has a radius of curvature of 3.2 m and the bottom of the loop has a radius of curvature of 16.0 m. Determine the normal force acting upon Noah's 80-kg body at the top and at the bottom of the loop.
3. Noah Formula is riding a roller coaster. If the roller coaster has a radius of 19 m, what minimum velocity does the roller coaster car need to make it safely around the loop?
4. Sally (m = 60 kg) is riding the Ferris wheel at the Santa Monica Pier. The Ferris wheel, which has a **height** of 85 ft, travels at a constant 2.5 revolutions per minute. What normal force does Sally experience at the bottom of the Ferris wheel? At the top? 1 m = 3.281 ft.
5. Billy is riding the “Spin Out” ride at Six Flags. If the coefficient of friction between Billy and the wall of the ride is 0.4, how many revolutions per minute are required to pin Billy’s 70 kg body to the wall? The radius of the room is 2.5 m.
6. If L = 15 m and θ = 40o, determine the minimum and maximum tension in the rope if the person oscillates back and forth. The person has a mass of 85 kg.

Answers: 1. 135 N, 1690 N 2. 116 N, 2404 N 3. 13.6 m/s 4. 641 N, 535 N 5. 29.9 Rev/min 6. 1223 N, 638 N

**Amusement Park Physics Notes**

Roller Coaster Loop:

Spin Out:

Ferris Wheel:

Swing: