Racing Line Lab Worksheet 1

$$F = m\frac{V^2}{R}$$

F = Centripetal force
m = mass of the object going in a circle
v = Object's velocity
R = Radius of circle of curve
a_c = centripetal acceleration

$$a_c = \frac{V^2}{R}$$

$$V = (2*pi*r)/T$$

$$F_s = \mu_s N$$

F_s = Force of static friction.

μ_s = Coefficient of static friction.

N = Normal force.

Part 1: Video

Watch Episode 4 of 'The Racing Line' on the Motor Trend youtube channel.

Part 2: Force Diagram of a turning RC Car

Sketch the force diagram of a turning RC Car on a horizontal surface. Take the perspective of looking at the RC Car head on. Label all the forces on your diagram. Hint: There is a minimum of three forces.

Part 3: Collecting Data (g = 9.8 m/s/s)

The instructor will control the car and have it make circles at maximum velocity.

Measure the following quantities:

Mass of the RC Car: _____ kg

Radius of the Circle made by the RC Car at maximum velocity: _____ meters

Frequency of the RC Car in Hertz: _____ Hz

Period of the RC Car in seconds: _____ seconds

Part 4: Calculate the following. Show your work on the right.

Tangential Velocity: _____ m/s

Centripetal Force: _____ N

Centripetal Acceleration: _____ m/s/s

Force Friction: _____ N

Force Gravity: _____ N

Coefficient of Friction: _____

Part 5: Take the 'Episode 4 of Racing Line Quiz' on CANVAS.