Pre-Lab: Centripetal Force [5 pts]

Directions: Read this sheet carefully and answer the questions to the best of your ability. It is essential that you understand the theory discussed here before you begin the associated experiment. Use your answers in the Theory section of your formal report.

In the above diagram, an object of mass $M$ is moving at constant speed in a circular path of radius $R$. The object’s period of revolution is $T$.

Use Newton’s laws and error propagation formulas to answer the following questions:

1. Show that the centripetal force acting on the object in the above diagram may be written as
   \[ F_c = \frac{4\pi^2 MR}{T^2} \]

2. Given that the mass $M$, radius $R$, and period $T$ have errors $\delta M$, $\delta R$, and $\delta T$, respectively, derive an expression for the propagated error in $F_c$. 