# Uniform Circular Motion

As you work through the steps in the lab procedure, record your experimental values and the results on this worksheet. Use the exact values you record for your data to make later calculations.

## Procedure A: Measuring the period of rotation

Use the balance to find the mass $M_{\mathrm{R}}$ of the rotating object. Enter the value and the uncertainty below.

Complete the table below.

**Data Table 1**

| **Trial** | $r$ **(m)** | $\sigma_{\mathrm{r}}$ **(m)** | $m_{\mathrm{h}}$ **(kg)** | $m_{\mathrm{h}}g$ **(N)** | $t$ **(s)** |
|---|---|---|---|---|---|
| **1** | | | | | |
| **2** | | | | | |
| **3** | | | | | |
| **4** | | | | | |
| **5** | | | | | |

**CHECKPOINT 1: Ask your TA to check your Data Table 1 values before proceeding.**

Complete the data table below using values from Data Table 1. (Percent differences should not be rounded to one significant figure.)

**Data Table 2**

| Trial | $T$ (s) | $\sigma_T$ (s) | $a_c$ (m/s$^2$) | $\sigma_{ac}$ (m/s$^2$) | $F_c$ (N) | % diff. |
|---|---|---|---|---|---|---|
| **1** | | | | | | |
| **2** | | | | | | |
| **3** | | | | | | |
| **4** | | | | | | |
| **5** | | | | | | |

**CHECKPOINT 2: Ask your TA to check your Data Table 2 values and calculations.**

## Procedure B: Plot of $m_h g$ versus $a_c$

What is the experimental value of $M_R$ from the slope of the graph of $m_h g$ versus $a_c$?

Which determination has the largest uncertainty?

What is the percent uncertainty in the mass determined from slope?

What is the percent uncertainty in the mass from weighing?

What is the percent difference in the values of the mass determined from the slope and from weighing?

Do the two values of $M_{\mathrm{R}}$ agree within the range of experimental uncertainty? (Consider your two values of $M_{\mathrm{R}}$ and their uncertainties exactly as you have entered them.)

**CHECKPOINT 3: Ask your TA to check your graph and calculations.**