

Rolling Into Radians

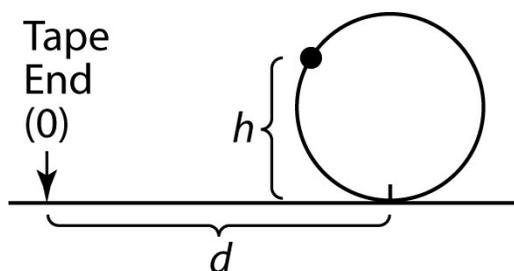
NAME _____

Decide on roles for the members of your group.

- **Ruler:** Supervises setup.
- **Writer:** Decides on units of measure, fill out the data sheet.
- **Roller:** Secures measuring tape to the rolling surface. Place the can with the dot on the ground at the zero mark of the tape measure. Roll the can along the tape measure through one complete turn (watching the dot), and report to the Graphic Artist how far the can rolled. Return the can to the start position.
- **Graphic Artist:** Prepares the first graphing grid by choosing a scale that will allow for all heights on the can to appear on the vertical axis and three full rotation lengths on the horizontal axis. The origin of the coordinate system should be near the bottom of the grid, about one rotation's length from the left edge.

Data Collection

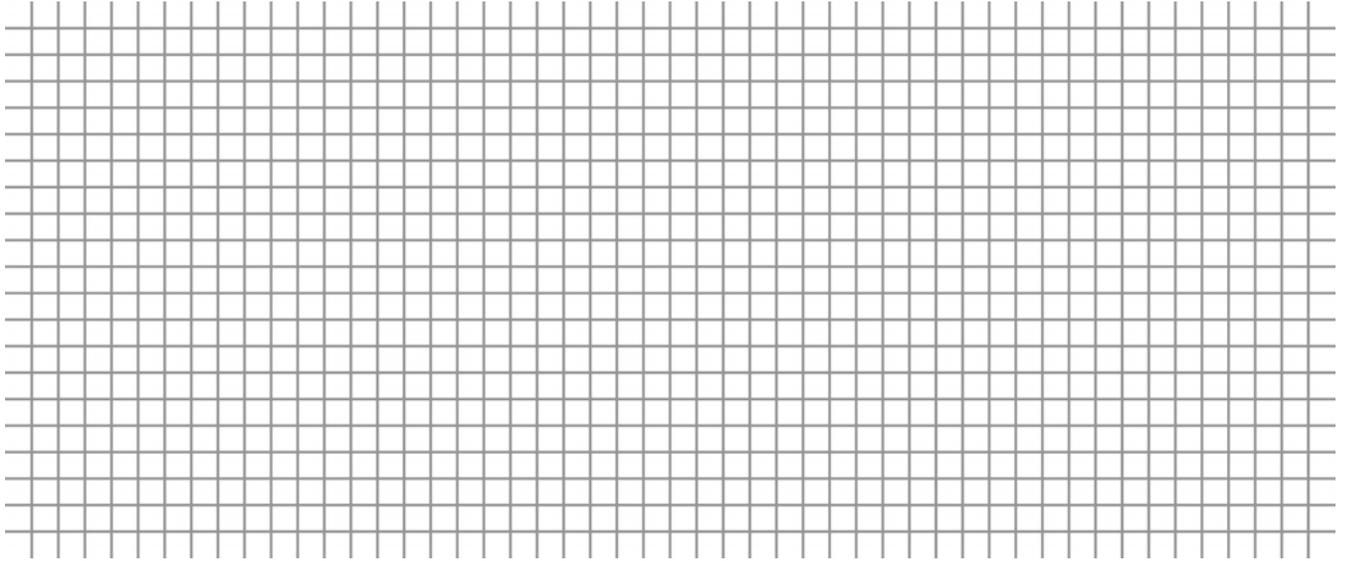
1. Roller rolls the can (ensuring that the can really rolls, instead of sliding) for about an eighth of a turn, then reports the distance rolled, measuring where the bottom of the can is in contact with the measuring tape (d in the diagram at the right and in the data table). Roller holds the can steady while Ruler measures the height of the dot (h in the diagram and data table), and Writer records both measurements.
2. Roller rolls the can another eighth of a turn, then Roller, Ruler, and Writer measure, record, and report as in Step 1. Repeat through two full turns of the can.
3. As soon as there is sufficient data to begin graphing, the Graphic Artist should create a scatterplot on Graph 1. The Graphic Artist might also enter the data on a graphing calculator or spreadsheet.



Data Handling

1. Once the data has been collected, it should be entered into two lists on a graphing calculator or two columns on a spreadsheet. Then have the calculator or spreadsheet produce two new columns by simply dividing each entry by the radius of the can. Round answers to the nearest 0.1 unit.
2. The Graphic Artist should produce a scatterplot on Graph 2, using d/r on the horizontal axis and h/r on the vertical axis. The grid for Graph 2 is already set up with axes and scale.

Graph 1



Graph 2

