

Part 1:

Get two different size balls and measure the radius of each.

Ball 1	Ball 2
Radius (r_1):	Radius (r_2):

Determine the following ratios:

Radius of ball 1 to the radius of ball 2:	
Radius of ball 2 to the radius of ball 1:	
Diameter of ball 1 to the radius of ball 2:	
Diameter of ball 2 to the radius of ball 1:	
Circumference of ball 1 to the radius of ball 2:	
Circumference of ball 2 to the radius of ball 1:	

Determine the Experimental by counting or using Technique.

Situation	Theoretical	Experimental	Percent Difference
How far will each ball go in 8 full rotations?			
How many rotations would each ball make if it rolled 2.5 meters?			
How far will each ball roll if it rolled a total of 37.7 radians?			

Part 2:

Set up a ramp using two meter sticks and measure how far from the base of the ramp each ball comes to stop.

Ball 1:

Ball 2:

Using this distance, calculate the following numbers:

Number of rotations it took to stop:	
Total angular distance it took to stop (rads):	
Total angular distance it took to stop (degrees):	

Sample Problems:

1. A record player spins a record 75 times in 20 seconds.

- What is the angular displacement of the record ($\Delta\theta$, in radians)?
- What is the average angular velocity of the record (rad/sec)?
- If a ladybug sits 0.21 m away from the center of the record. What is the distance that the ladybug travels?
- What is the tangential velocity of the ladybug?

2. A rolling pin with a radius of 0.02 m rolls 1.2 m across a counter top.

- How many rotations did it achieve?
- What is the angular displacement of the rolling pin in radians? In degrees?
- If it covered this distance in 0.5 seconds, what was the pin's linear velocity?
- What was its angular velocity (rad/sec)?