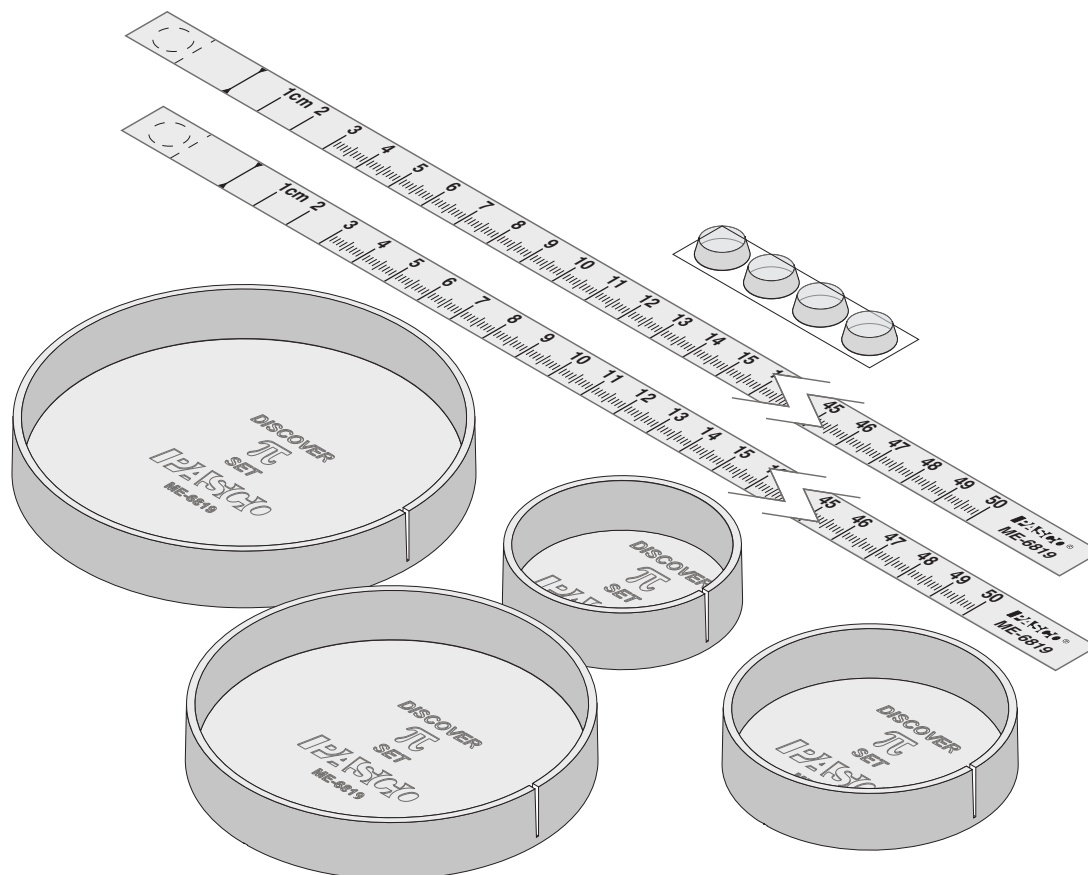


# Discover $\pi$ Set

ME-6806



| Equipment Included   | Quantity |
|--|----------|
| Disks of different diameters<br>(5.15 cm, 6.35 cm, 8.85 cm, and 9.95 cm) | 4        |
| 50 cm Transparent Measuring Tapes  | 2        |
| Adhesive Stops   | 4        |

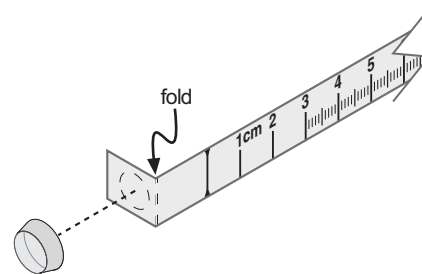
## Introduction

The Discover  $\pi$  Set allows students to empirically determine the ratio  $\pi$ . Students measure the diameter and circumference of each disk using the included measuring tape. The index marks of the measuring tape are printed on the back, so the actual circumference of the disk (not including the thickness of the tape) is measured. A slot on the side of each disk holds the tape while the circumference is measured. A line marked on the face of each disk, passing through the center allows for accurate measurement of the diameter.

## Equipment Set Up

Each disk has a slot designed to hold the tape in place while you measure the circumference. To keep the tape from slipping, follow these steps.

1. Fold the tape at the dashed line.
2. Stick the adhesive stop on the dashed circular outline.



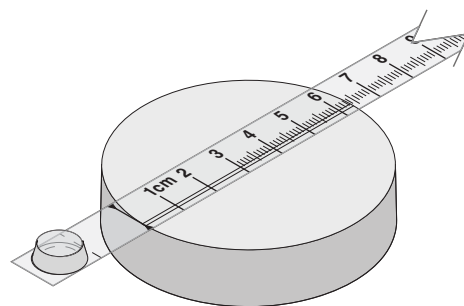
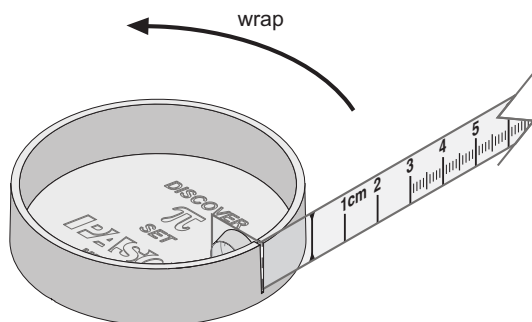
## Experiment

What is the relationship between the circumference and diameter of a circle? Is the ratio of circumference to diameter different for different-sized circles?

In this experiment, you will measure the circumference and diameter of four different circles and make a graph of circumference versus diameter.

### Procedure

1. Slip the folded end of the measuring tape into the slot on the side of one of the disks.
2. Wrap the tape once around the disk so that it overlaps the zero-line marker.
3. Record the circumference.
4. Measure the diameter along the line marked on the face of the disk. Record the diameter.
5. Repeat steps 1 through 4 for the other disks.



### Analysis

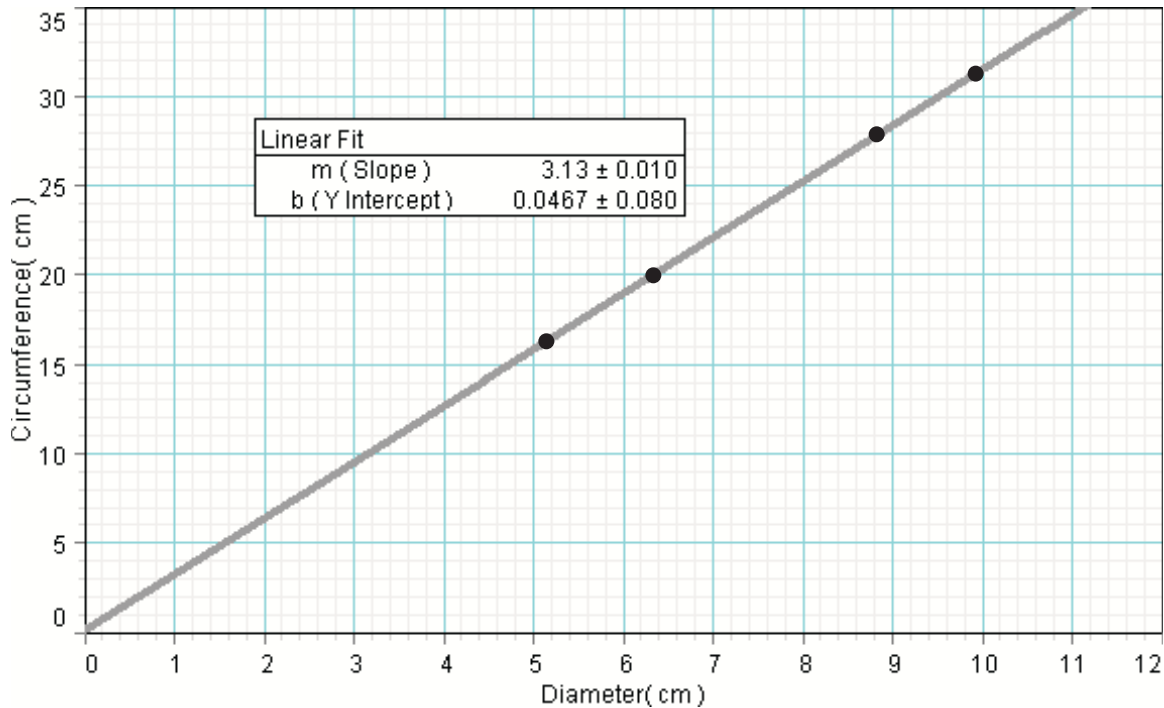
1. Use your measurements from all four disks to make a graph. Plot circumference on the vertical axis and diameter on the horizontal axis.
2. Place an appropriate fit on the graph.

### Questions

1. Write an equation for your graph.
2. What is the physical meaning of the slope of your graph?
3. What is the physical meaning of the vertical intercept of your graph?
4. A truck tire measures 1.0 m in diameter. Based on your experimental data, what is the circumference? (Show your work and explain your reasoning.)

## Sample Data

| Diameter (cm) | Circumference (cm) |
|---------------|--------------------|
| 5.15          | 16.2               |
| 6.35          | 19.9               |
| 8.85          | 27.8               |
| 9.95          | 31.2               |



## Technical Support

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### Limited Warranty

For a description of the product warranty, see the PASCO catalog.

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