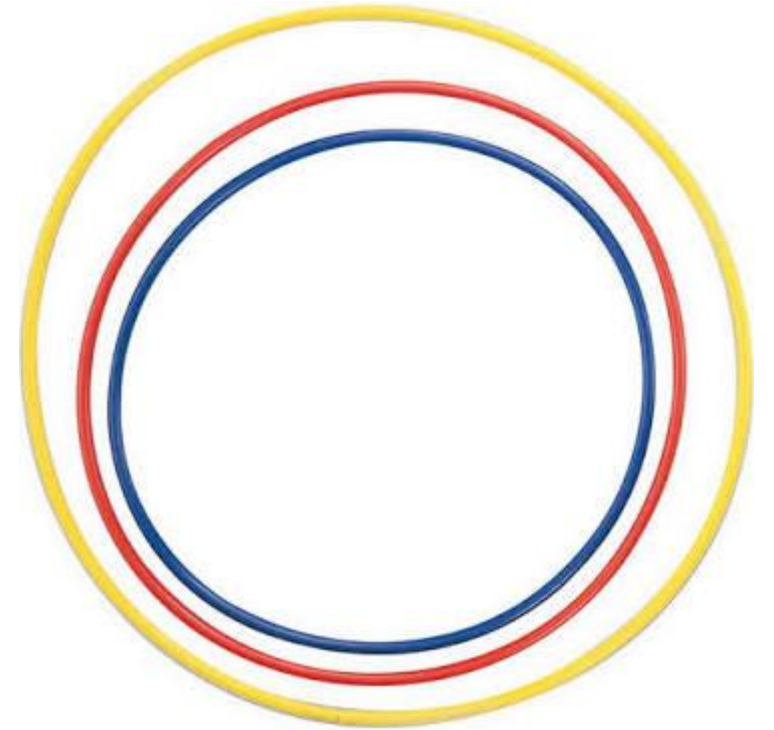


Presentation #42540,
Abbott, Driscoll, Rezac
Using Balls and Hula Hoops to Measure π
NCTM Regional Conference
Friday, November 13, 2015: 01:30 PM - 02:45 PM,
Minneapolis Convention Center, 200 JI

Using Balls and Hula Hoops to Measure π



Regional NCTM Conference

11/13/2015

Lisa Rezac, William Abbott, Michael Driscoll



UNIVERSITY of ST. THOMAS

MINNESOTA

Tennis Ball Canister Question

Which is the greater:
the height of the tube;
the distance around the tube;
or are they the same?
*(assume the canister is as tall as the
stack of three balls without extra space)*



What were the results?

Aug. 25-Labor Day, Sept. 5, 2016

MINNESOTA STATE FAIR



the
works
museum

The logo for the Works Museum is presented in a purple color. It features the word "the" in a smaller, lowercase sans-serif font positioned above the first letter of "works". The word "works" is written in a large, bold, lowercase sans-serif font. The letter "o" in "works" is replaced by a stylized gear icon with a central circle and a ring of teeth. Below the word "works", the word "museum" is written in a smaller, lowercase sans-serif font.

What would you do to test your conjecture?

Measure

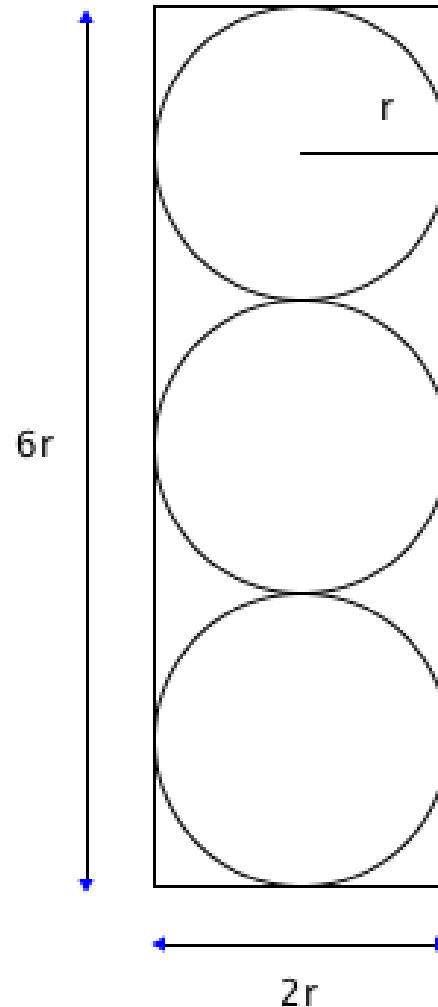
Using rulers

Using measuring tapes

Using string

Remember formulas

Draw pictures



Consider a stack of three hula hoops:

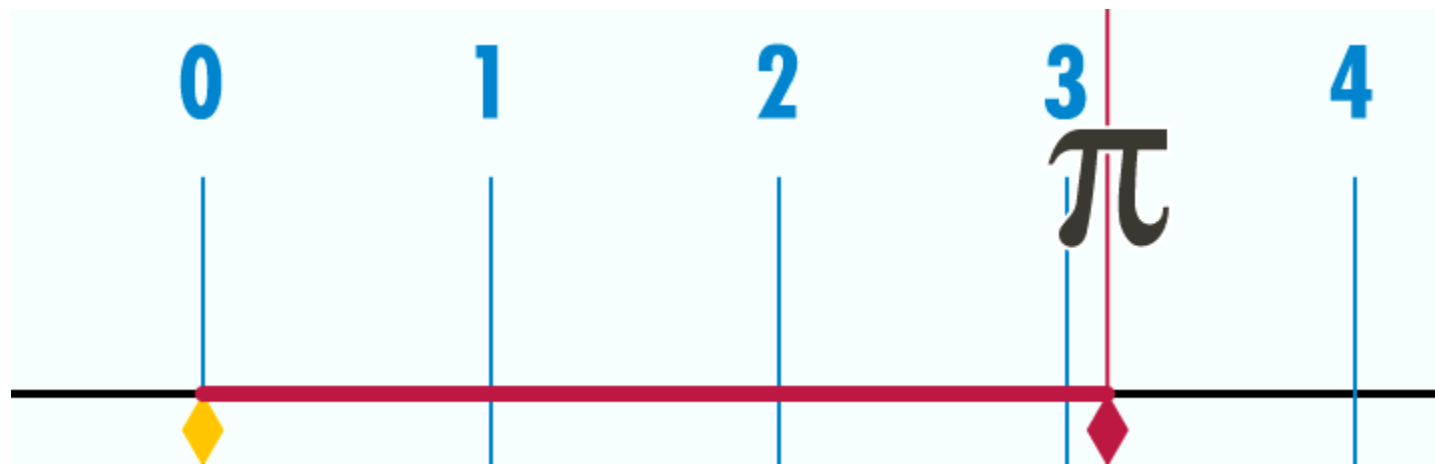
Which would be greater:

the height of the stack of three hula hoops, or
the distance around a hula hoop,
or would they be the same?

Ideas of measurement

- What units would you use?
- Would it matter?
- What if you made up your own unit, say, a radius, or a diameter.
- Measure the circumference of circles on your new “ruler.”
- Hula Hoop Diameter Ruler Activity
- Toilet Roll Activity
- Conclusions about distance around a circle?
- $C = \pi d$

Wikipedia's Picture of the Day 14 March 2012



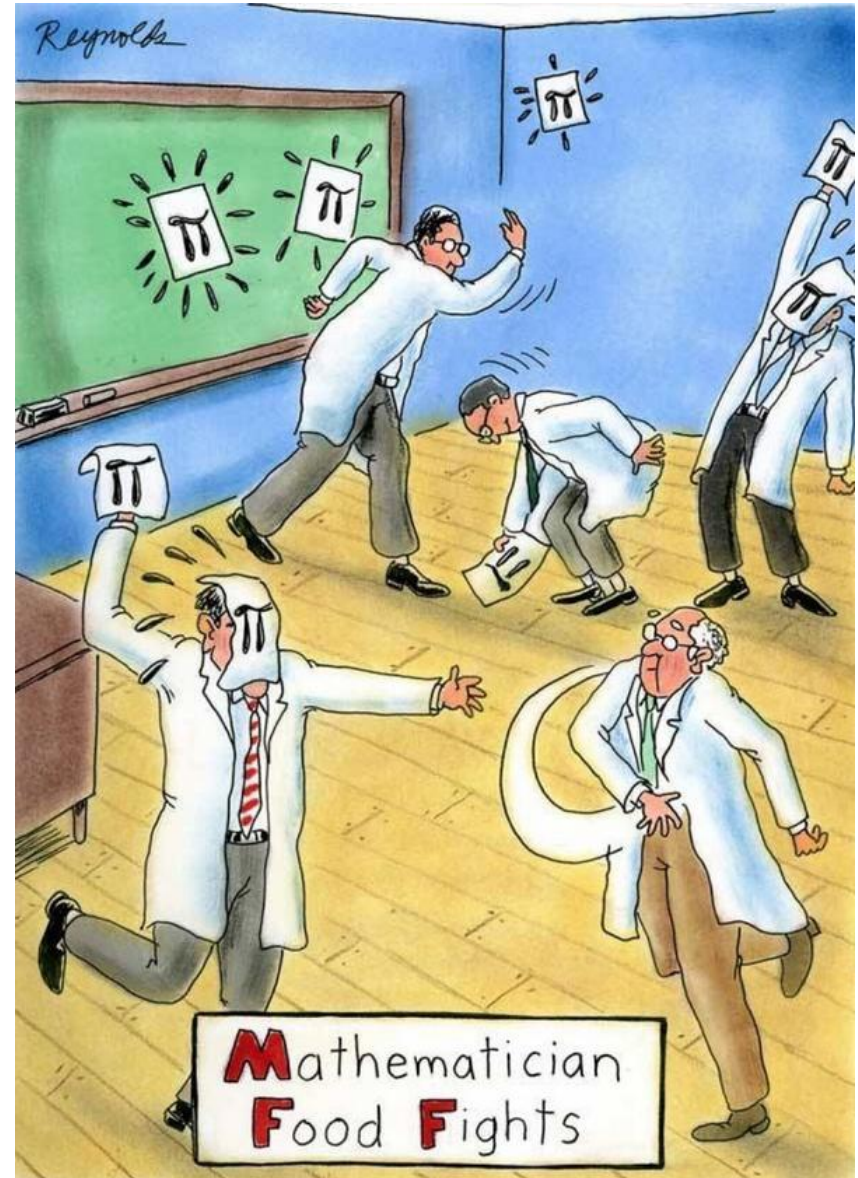
NCTM Illuminations

- Apple Pi Unit by Christopher Johnston
 - <http://illuminations.nctm.org/Unit.aspx?id=6483>
- The Ratio of Circumference to Diameter
- Discovering the Area Formula for Circles

History of Pi

- ca. 1900–1680 BC Babylonian tablet: 3.125
- *Rhind Papyrus* (ca.1650 BC): 3.1625
- Archimedes of Syracuse (287–212 BC): between $3 \frac{1}{7}$ and $3 \frac{10}{71}$
- Zu Chongzhi (429–501): $355/113$
- 1706: Greek symbol π first used for the ratio

http://www.exploratorium.edu/pi/history_of_pi/



Other fun Pi

- What is the probability you will hit a certain area on a typical dartboard?
- http://en.wikipedia.org/wiki/Darts#mediaviewer/File:Dartboard_diagram.svg
- Stella's Stunners: <http://ohiorc.org/for/math/stella/problems/problem.aspx?id=612#>
 - In a can of tennis balls that is exactly three balls high, which is greater, the volume of the balls or the volume of the air around the balls? (Disregard the thickness of the balls.)
- Lucy Kaplansky's Pi song: <https://www.youtube.com/watch?v=nJkwlnN7VII>
- http://www.exploratorium.edu/pi/history_of_pi/
- Slope and Pi: Illuminations <https://illuminations.nctm.org/Lesson.aspx?id=1860>