

Math 6 - Act. 17: Pi

Summary

Students will complete a variety of activities to discover the formula for finding the area of a circle and for understanding the concept of pi better.

Materials

Metersticks

Round objects found naturally in the environment

Background for Teachers

Pi is the distance around the outside of an object (the circumference) divided by the distance across the middle (the diameter). 3.14 is actually a rounded number. Pi actually goes on, and on, and on.... The notation of pi was introduced by Euler in 1737. Archimedes was the first to show that $\text{Area} = \pi r^2$.

Intended Learning Outcomes

4. Communicate mathematically.

Instructional Procedures

Invitation to Learn

Read *Sir Cumference and Knights of the Round Table*. This book will help remind students of the vocabulary used during the next lesson. It is also a good reinforcement to access previous knowledge. Have metric measuring tapes ready for the students to use. Students think that the symbol pi, is some magical symbol that is associated with numbers invented by a brilliant mathematician. During this activity, they will see that they too can come up with the formula, and the numbers behind it. Mathematicians today are still coming up with computer programs that will calculate the value of pi to the last digit.

Questions to ask students:

What is the circumference, radius, and diameter of a circle?

Where did pi or 3.14 come from?

Can we be as smart as historical mathematicians?

Can we relive their experience and come up with our own formula?

Instructional Procedures

Find ten different items in our classroom that are round.

Record the distance around the object (the circumference) and its diameter (the distance across the middle passing through the center).

After having measured the 10 different objects, divide the distance around the object by the diameter.

Record answers on recording sheet.

Take all of your answers and find the average (add up your ten numbers and divide by ten).

What was your average?

Have each group tell you the average they came up with. Then find the average in the class.

How close to pi is this?

What do you think would happen if we had every class in the school do this and found the average of all their numbers?

Curriculum Integration

Math/Science--How will knowing the relationship of diameter, radius, circumference, and pi help us in

real life? Has there ever been a time when you couldn't measure all the way around an object? How could we use the formula circumference divided by diameter, if we only knew half of the diameter?

Extensions

Possible Extensions/Adaptations

Algebra and Number Patterns Connections

--Go over the first thirty digits in pi. How many 0's, 1's, 2's, 3's . . . 9's are there? Tally the results. Go over the next twenty digits, doing the same thing. Are there any patterns you can find? What is the mode for this set of data?

Writing Connections--Use the "Interesting Pi Facts" worksheet. After reading "Pi Jokes" have the students create their own pi joke.

Pi day celebration--On March 14th, (3/14) celebrate Pi Day, and have the students eat a piece of pie at exactly 1:59 (Pi=3.14159 . . .).

Homework & Family Connections

Have the students go home with their metersticks, and find three different objects at home that they can measure with their metersticks.

Have them use their recording sheet to find the circumference and the diameter. Then have them divide the circumference by the diameter, record the results, and find the average. Have the students bring this information to class the following day, and combine it with the information they have already accumulated. How close are they to pi?

Assessment Plan

As the students are measuring, ask them the following questions: How do I find the diameter of the round object? How will knowing the relationship of diameter, radius, circumference, and pi help us in real life? Has there ever been a time when you couldn't measure all the way around an object? How could we use the formula circumference divided by diameter if we only knew half of the radius?

Rubric:

As you are listening to their responses, use the following rubric to show understanding:

1= Is still unsure of what measurements you are asking for, or is unsure how to measure.

2= Can show you how to measure the radius, diameter, and circumference, but mixes them up or doesn't measure accurately. Also doesn't use vocabulary terms.

3= Can show you how to measure, but is unsure of the reasoning behind it. Can verbalize some of the reasoning, but not all.

4= Can verbalize and show the measurements and reasoning behind it.

Authors

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