AREA OF A CIRCLE: Sequence Overview

Summary of learning goals

Students use their knowledge of the relationship between the circumference and diameter of a circle to see why the area of a circle is πr^2. Guiding questions encourage students to think about issues of accuracy and informally introduce the idea of the circle as a limiting shape. The lesson involves visualisation and explanation.

Australian Curriculum: Mathematics (Year 8)

ACMMG197: Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving circumference and area.

Summary of lessons

Who is this sequence for?

This sequence is for students who know basic properties of circles, the formula for the circumference of a circle, and the formula for the area of a triangle. They should be familiar with π as the ratio of circumference to diameter of a circle.

Lesson 1: Four Demonstrations

Students work in groups to understand one of four demonstrations of the formula $A = \pi r^2$ and explain to others why the formula works. In the process they refine both their own understanding and their explanations.

Reflection on this sequence

Rationale

This sequence emphasises justification and mathematical communication. Students learn that results in mathematics can be proved, rather than only tested from numerical evidence, and that there are frequently many different ways to demonstrate a result.

reSolve Mathematics is Purposeful

- Students are introduced to important mathematical ideas such as approximation and informal ideas of limits and to the importance of proof in mathematics. One of the demonstrations is based on an historical method dating back to Archimedes.

reSolve Tasks are Inclusive and Challenging

- The variety of demonstration methods allows all students to gain an appreciation of the formula for the area of a circle. Visualisation encourages different ways to approximate a circle with shapes of known area.

reSolve Classrooms Have a Knowledge-Building Culture

- Students work together in groups, and explain to each other, in order to increase their own understanding through the comments of others. This develops mathematical communication and reasoning.

We value your feedback after these lessons via our website.

Mathematics by Inquiry is an initiative of, and funded by, the Australian Government Department of Education and Training

Australian Academy of Science

aamt