

Further investigations:

Show your child how to use a tape measure or a piece of string to measure the circumference of cans in the cupboard. Together, measure the diameter of each can. Let your child make a table that shows the measurements, and compare the circumference and diameter for each can. Ask your child, "How many times bigger is the circumference than the diameter? Is the relationship between the circumference and the diameter of each can the same?"

Suggest that your child use parallelograms, squares, rectangles, and triangles to make a picture. Let him use a ruler to measure the side lengths of each of the shapes to the nearest millimeter and then find the total area of his picture.

Terminology:

Congruence (congruent): Having the same size and shape

Polygon: A plane shape having three or more straight sides

Irregular polygon: A polygon with all sides not equal and all angles not equal

Regular polygon: A polygon with all sides equal and all angles equal

Circumference: The distance around a circle

Diameter: A line segment passing through the center of the circle with both ends touching the circle

Pi (π): The ratio of a circle's circumference to its diameter; when used in calculations, pi is typically approximated as 3.14

Tiling A repeating pattern of closed figures that covers a surface with no gaps and no overlaps

Clues:

The area of a rectangle is typically written as $A = l \times w$ (area equals length times width) and the area of a square is typically written as $A = s^2$ (area equals side squared). However, the base-times-height formula can be generalized for all parallelograms (including squares and rectangles) and used to find the formulas for triangles, trapezoids, and circles.

Book'em:

Spaghetti and Meatballs for All

by Marilyn Burns

A Light in the Attic (Shapes)

by Shel Silverstein

Related Files:

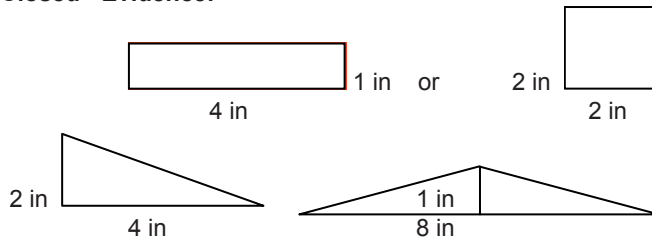
www.ceismc.gatech.edu/csi

Positively Perfect Plane Figures**Students will:**

- Derive the formulas for the area of a parallelogram and a triangle
- Find the areas of regular and irregular polygons
- Estimate and find the areas of circles
- Understand congruence of geometric figures and the correspondence of their parts
- Understand the relationship of a circle's circumference, its diameter, and pi
- Use variables to represent unknown quantities
- Use formulas to represent the relationship between quantities

Fifth Grade 4 of 5**Classroom Cases:**

1. Draw a rectangle that has an area of 4 in². Draw a triangle with the same area.

Case Closed - Evidence:

2. Estimate circumference and area of the clock face.

Then calculate the measures using appropriate formulas.

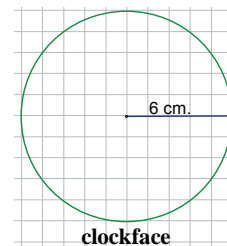
**Case Closed - Evidence:**

Since the radius is 6 cm, the diameter would be 2×6 or 12 cm. The circumference would be about three times the diameter, or 36 cm. To estimate the area of the clockface, I put a centimeter grid over it and counted the squares. I got about 110 cm squares for an estimated area of 110 cm².

My actual calculations are:

$$C = \pi d \approx 3.14 \times 12 = 37.68 \text{ cm}$$

$$A = \pi r^2 \approx 3.14 \times 6^2 = 113.04 \text{ cm}^2$$



Shape	Base	Height	Area	Formula
Rectangle	5 in	3 in		$A = b \times h$
Square			36 cm ²	
Triangle		2.2 m	3.96 m ²	
Parallelogram		3 ½ cm	8 ¾ cm ²	

Case Closed - Evidence:

Shape	Base	Height	Area	Formula
Rectangle	5 in.	3 in.	15 in ²	$A = b \times h$
Square	6 cm	6 cm	36 cm ²	$A = b \times h$
Triangle	3.6 m	2.2 m	3.96 m ²	$A = \frac{1}{2}(b \times h)$
Parallelogram	2 ½ cm	3 ½ cm	8 ¾ cm ²	$A = b \times h$