

Objective

- To explore and discover the formula for finding the area of a regular polygon.

Area of a Regular Polygon

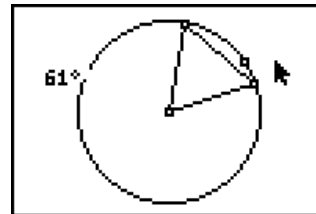
Introduction

Calculating the area of basic shapes such as rectangles and triangles is relatively straightforward, but what about regular polygons such as certain floor tiles in the shapes of octagons. For decorative purposes certain tiles and floors are shaped like regular polygons. In this activity you will explore and develop a formula for calculating the area of a regular polygon.

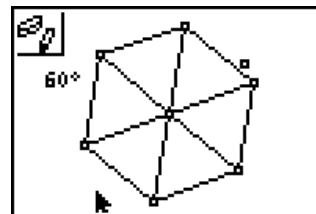
Construction & Exploration

Part I: Constructing a regular polygon.

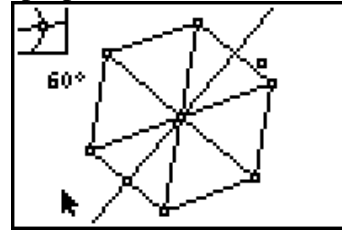
1. Construct a circle just small enough to fit on the screen.
Place two points on the circle.
2. Draw a triangle using the two points constructed on the circle and the center point. Be sure not to use the point on the circle that was used to enlarge the circle.
3. Measure the angle central angle formed by the triangle.
Change the angle so that it is approximately the measurement you need for your polygon.



4. Rotate the triangle about the center point using the degree of the central angle. Repeat so until only one triangle is needed to complete the polygon.
5. Draw a segment to complete the polygon. Hide the circle. An example of a hexagon is shown.



- Construct a perpendicular to the base of the first triangle created through the center point.
- Construct the point of intersection between the base and the perpendicular line.



Part II. Measuring data.

- Measure the distance from the center point to the intersection point found in step 7 above.
- Measure the base of the triangle.
- Calculate the area of the triangle. To do this you must first use the Alph-Num to write the number 2 on the screen.
- Use the area of the triangle to find the area of the polygon.

Questions & Conjectures

- The distance from the center point to a side in a polygon is called the apothem. What does the apothem represent in the triangle?
- Find the perimeter of the polygon you constructed.
- Multiply the perimeter of the polygon by the apothem. What is the result?
- How does the result in question 3 compare the area of the polygon?
- Write a formula for the area of a regular polygon using it's perimeter.