

# How To Draw A Regular Polygon

## Introduction:

Many lesson plans require the use of regular polygons such as equilateral triangles, squares, and regular pentagons and hexagons. Students should know how to construct these shapes.

While some of these shapes can be created with a compass and ruler, it is often faster to create them with [our protractor](#). Also, students won't have to erase anything afterward!

## Lesson Objective:

Students will learn how to construct any regular polygon using our protractor.

## Important Terms:

Polygon, regular polygon, angle, central angle, vertex, radius (for polygons), ray

## Supplies:

Barry Scientific protractor ([order here](#))  
Pen or pencil

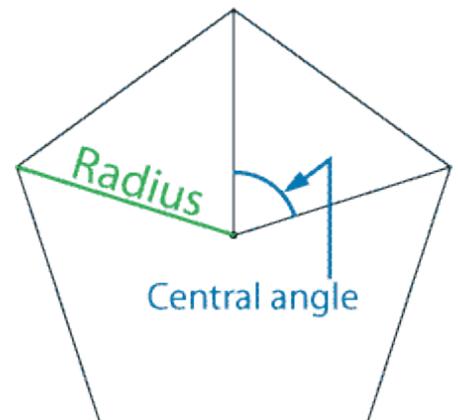
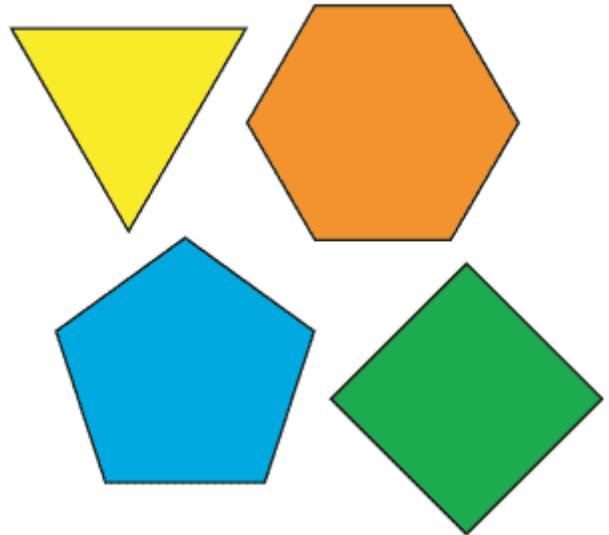
## Instructions:

- (1) Choose what kind of **regular polygon** to create. Calculate the **central angle** you will need. The **vertex** of this angle is at the center of the polygon.

**Question for students:** Given a polygon with  $x$  number of sides, how many degrees is the central angle?

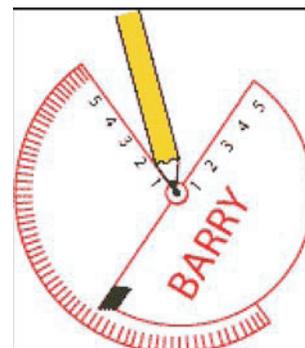
**Answer:** The degree measure of the central angle can be found with this equation: **degrees of central angle** =  $360^\circ / x$   
So for the pentagon at right, the central angle =  $360^\circ / 5 = 72^\circ$ .

- (2) Choose how long you want the **radius** of the polygon to be. The radius of a regular polygon is the line between the polygon's center point and one of its vertices. We will use a radius of 5cm.
- (3) Move the degree pointer on the protractor until the protractor gives the measure calculated above for the central angle of the polygon (e.g.  $72^\circ$ ). Place our protractor on the paper, positioning the grommet hole where you want the center of the polygon to be.



Choose the number of sides, and calculate the central angle. Choose the length of the radius.

Use a pencil to make a dot in the center of the grommet hole. This will be the center of the polygon, and the dot is to make sure you do not lose your place.



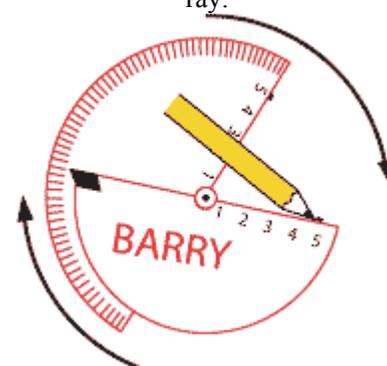
Fill the center of the grommet.

- (4) Draw a dot on each *ray* of the protractor at the length you chose for your polygon's radius (we chose 5cm). These dots will be vertices of the polygon.



Mark points on each protractor ray.

- (5) Rotate the whole protractor  $72^\circ$  around the grommet (the polygon's center point), and draw another dot. (Do not change the degree measure of the protractor when rotating it!) This is a third vertex for the polygon. Continue this process until all the vertices are drawn.

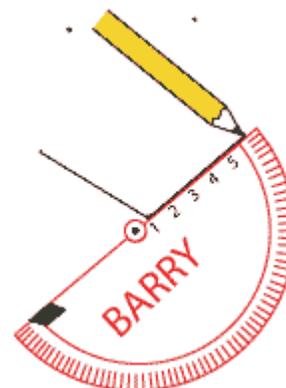


Rotate protractor around grommet. Draw new point. Continue for all points.

- (6) Use the protractor's rays as a straightedge to connect the vertices to each other, and the polygon is complete!

Tips:

- (1) Once the central angle is calculated, it can be very helpful to tape the protractor to itself to prevent the angle from changing while constructing your polygon.
- (2) For a lesson plan requiring a large number regular polygons (such as our [Pentagon Lantern](#) or [Iris Eye](#) lesson plans), it can be a good idea to photocopy the shapes onto pieces of paper so your students can just cut them out.
- (3) The more sides the polygon has, the harder it will be to draw it accurately. We advise against following in Gauss' footsteps by asking for the construction of a 17-gon!



Connect the dots, using the protractor as a straighted