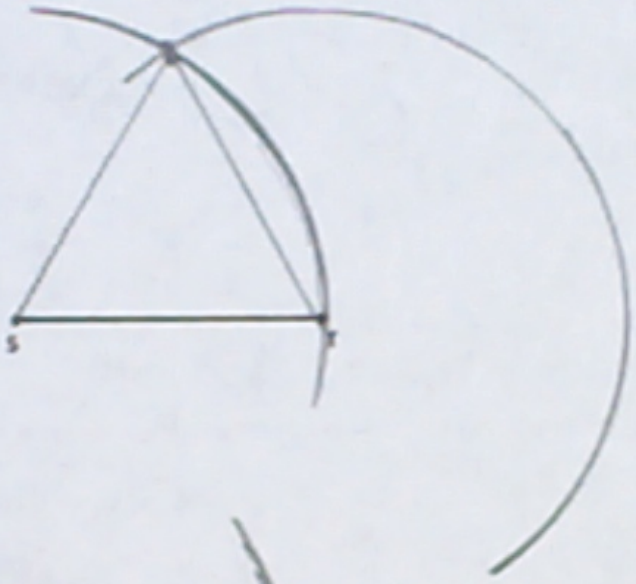
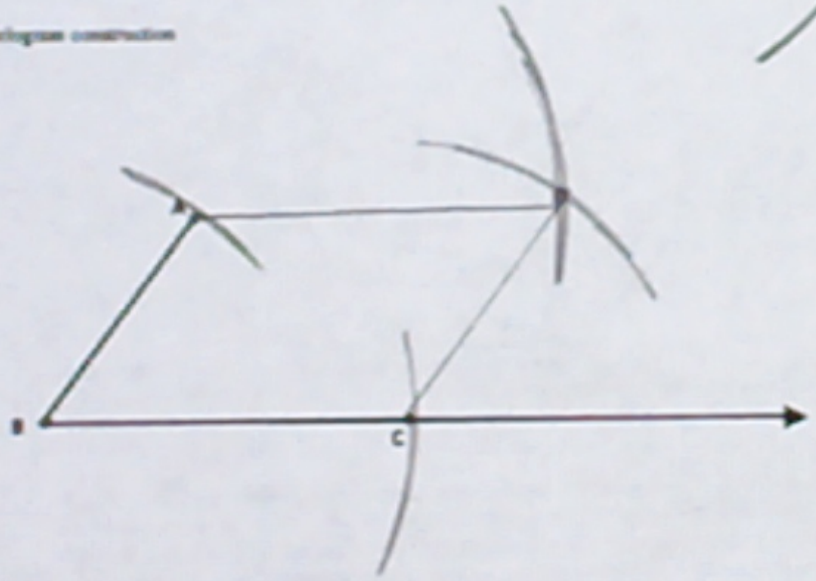
equilateral triangle construction



parallelogram construction



two pairs of congruent opposite sides

Constructing a Hexagon Inscribed in a Circle

Because *regular polygons* have *rotational symmetry*, they can be *inscribed* in a circle. The *circumscribed circle* has its *center* at the *center of rotation* and passes through all of the *vertices* of the *regular polygon*.

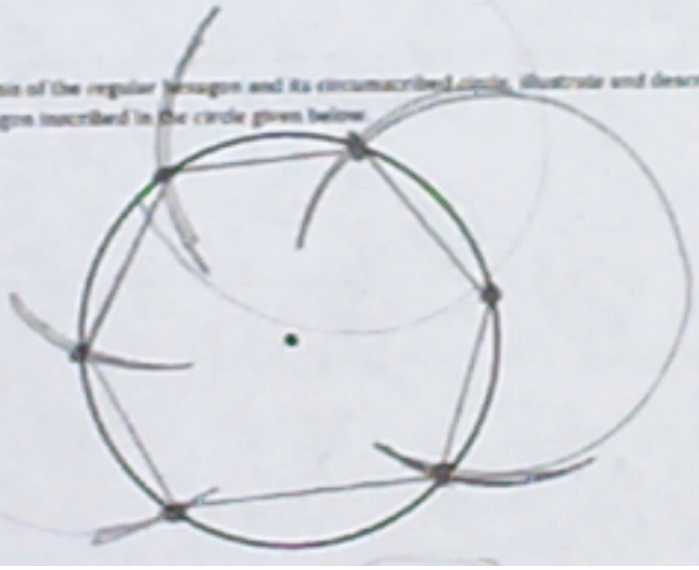
We might begin constructing a hexagon by noticing that a hexagon can be decomposed into six congruent equilateral triangles, formed by three of its lines of symmetry.

1. Sketch a diagram of such a decomposition.

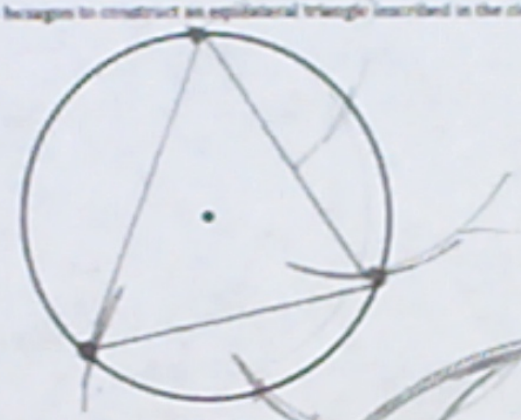
2. Based on your sketch, where is the center of the circle that would circumscribe the hexagon?

3. The six vertices of the hexagon lie on the circle in which the regular hexagon is inscribed. The six sides of the hexagon are *chords* of the circle. How are the lengths of these chords related to the lengths of the radii from the center of the circle to the vertices of the hexagon? That is, how do you know that the six triangles formed by drawing the three lines of symmetry are equiangular/equilateral triangles? (Hint: You might want to consider the other three lines of symmetry.)

4. Based on this analysis of the regular hexagon and its circumscribed circle, illustrate and describe a process for constructing a hexagon inscribed in the circle given below.



5. Modify your work with the hexagon to construct an equilateral triangle inscribed in the circle given below.



6. Describe how you might construct a square inscribed in a circle.