## 8.7 Honors Notes – More Constructions

**Bisectors**

What does "Bisect" mean? **Cut into 2 equal pieces**

**Constructing a Perpendicular Bisector- Highly Useful!!!**
- Anchor compass at one endpoint, stretch to create arc that is greater than half the length of the line segment
- Use the same distance to create the same arc from the other endpoint
- Use straightedge to draw a line through the two points where the arcs intersect
- This line perfectly <u>bisects</u> the line segment, AND it forms a perpendicular line to the given line segment. You may mark the midpoint of the line, and show the lines are perpendicular by forming a small square

**Practice:** Create a perpendicular bisector to the given lines     90°    2 = pieces
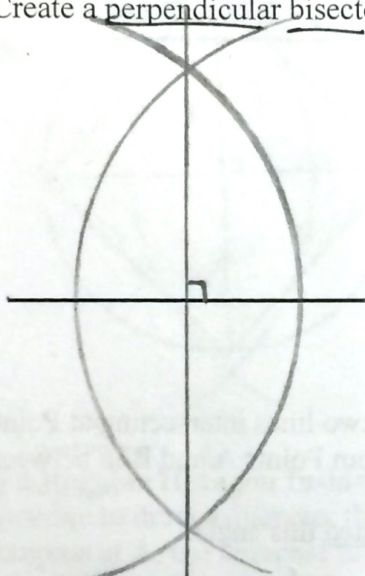
**Create a perpendicular line through a point on the line**   90°
- Use the point as the anchor for the compass. Choose an equal distance on either side of the point and use the compass to make arcs intersecting the line
- These new intersections are now like endpoints. Construct a perpendicular bisector using arcs greater than the distance between the point and your intersections. Draw a line through the arc intersection and the point on the line.
- Make a small square to show it is perpendicular

A          C          B
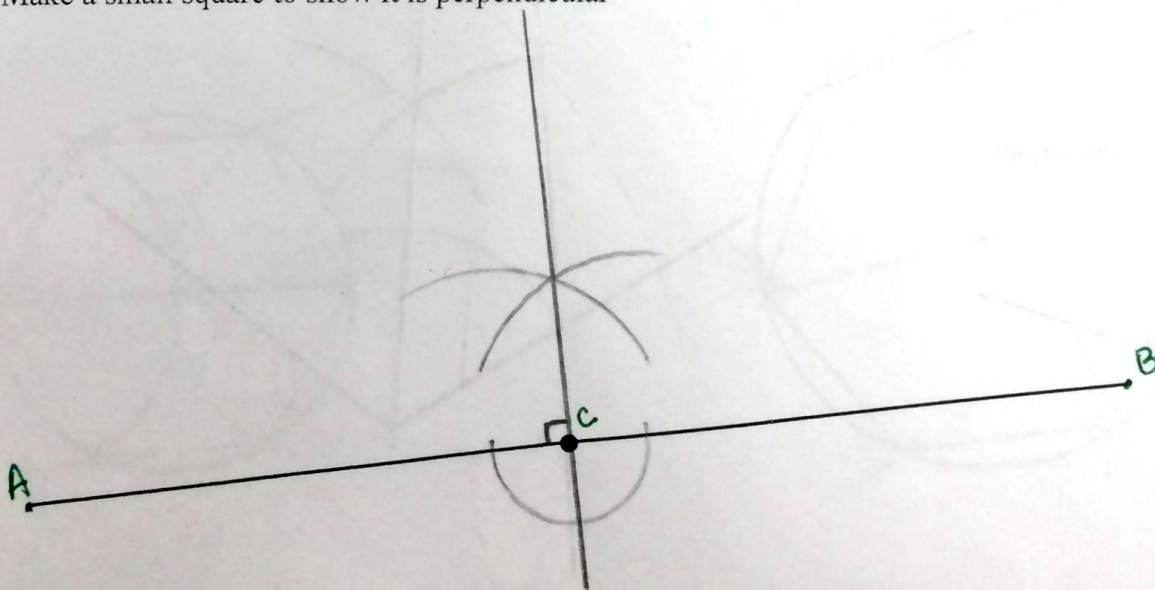
## Create a perpendicular line through a point not on the line

- Use the point as the anchor for the compass. Choose a wide enough distance and use the compass to make arcs intersecting the line
- These new intersections are now like endpoints. Construct a perpendicular bisector using arcs greater than the distance between the point and your intersections. Draw a line through the arc intersection and the point on the line.
- Make a small square to show it is perpendicular
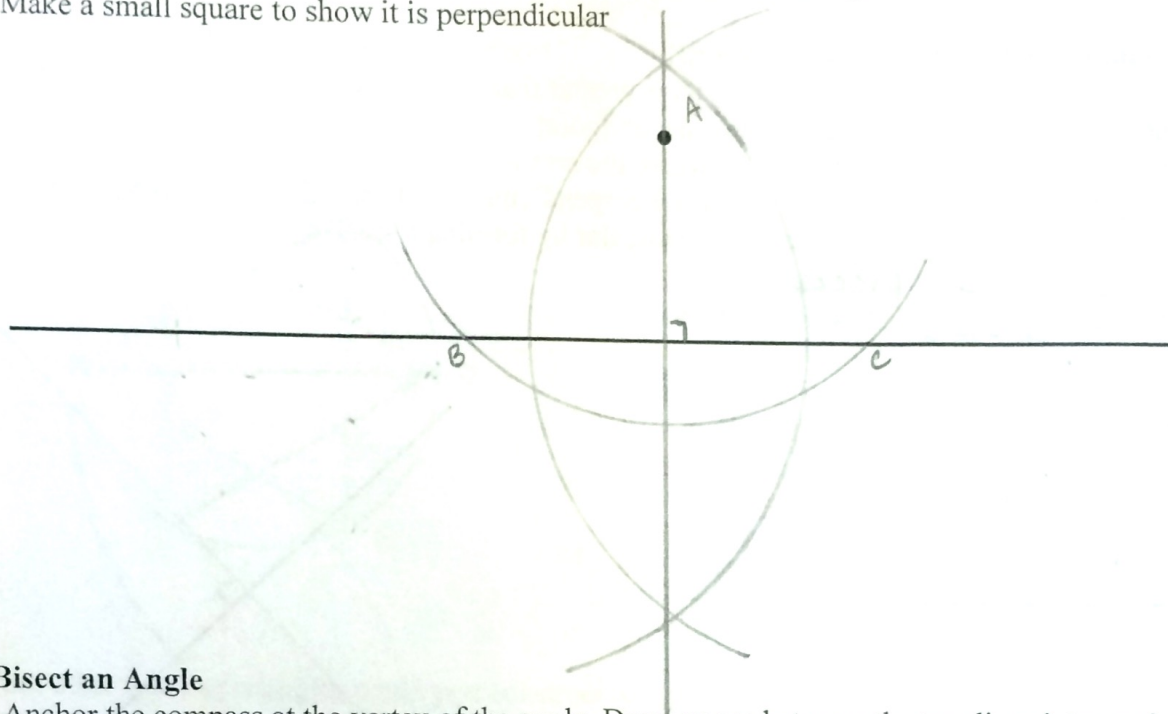
## Bisect an Angle

-Anchor the compass at the vertex of the angle. Draw an arc between the two lines intersecting at Points A and B
-Use points A and B as new anchors. Draw a new arc of equal distance from Points A and B in between the angle lines. Mark the point where they intersect as Point C
-Use straightedge to connect the vertex with Point C. You have now bisected this angle.
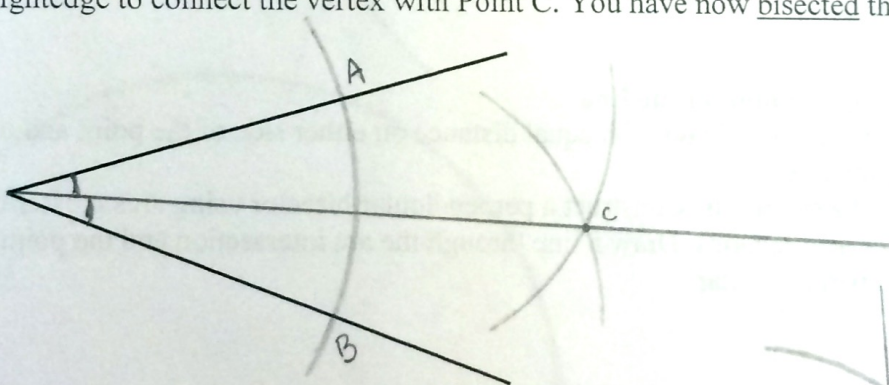
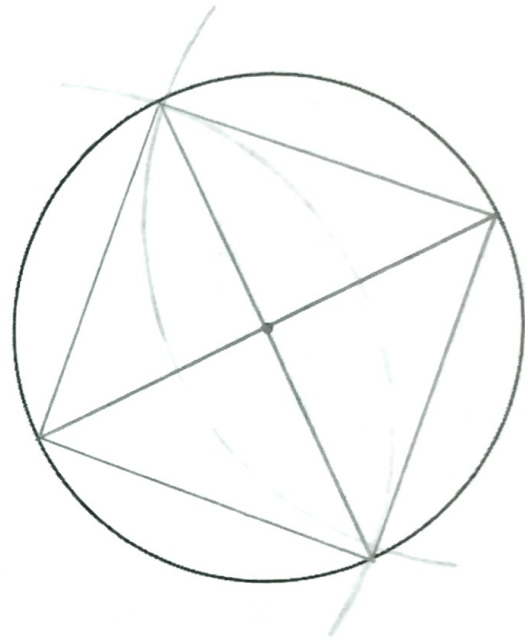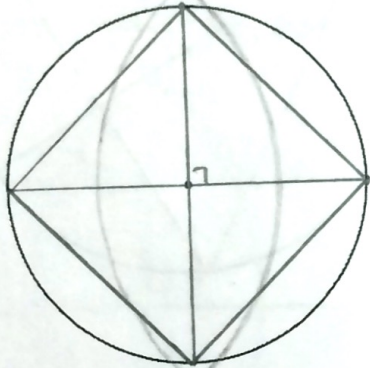**Practice:** Bisect the given angles
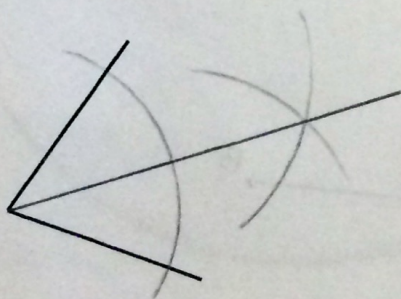
## Inscribing a Square Inside a Circle

-Use straightedge to draw a diameter through the center of the circle, label Points on the edge of circle A and C
-Use compass to construct a Perpendicular Bisector of that diameter, extending the line through the edge of the circle. Label the points of intersection with the edge as B and D
-Connect the points to form Square ABCD.

How do you know that it is a square?
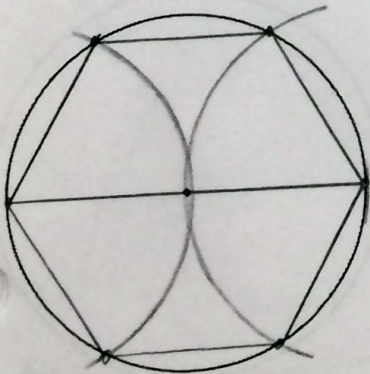
$$\frac{360}{4} = 90°$$

① Draw
   a diameter

② Perpendicular
   Bisector

## Inscribing a Regular Hexagon Inside a Circle

-Use straightedge to draw a diameter through the center of the circle, label Points on the edge of circle A and D
-Anchor compass at A, use compass to measure the radius of the circle with center and drag to form semicircle that intersects the circle at points B and F
- Anchor compass at D, use compass to measure the radius of the circle with center and drag to form semicircle that intersects the circle at points C and E
-Use straightedge to connect Points to form Hexagon ABCDEF

How can you tell it is a Regular Hexagon?

# Inscribing an Equilateral Triangle Inside a Circle

-Use straightedge to draw a diameter through the center of the circle, label Points on the edge of circle A and D
-Anchor compass at A, use compass to measure the radius of the circle with center and drag to form semicircle that intersects the circle at points B and F
- Anchor compass at D, use compass to measure the radius of the circle with center and drag to form semicircle that intersects the circle at points C and E
-Use straightedge to connect points to form either Triangle ACE or Triangle BDF

How can you tell it is an Equilateral Triangle?
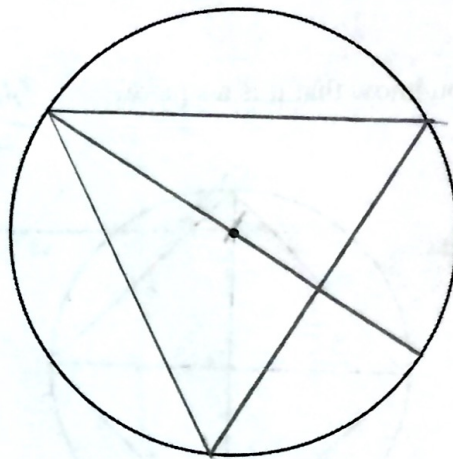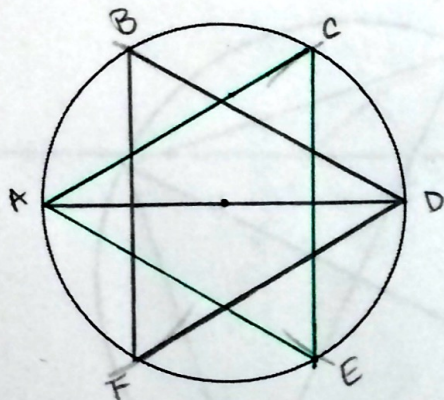


What other types of triangles could you construct using the six Points you found on the edge of the circle? Construct two more unique triangles and classify them.