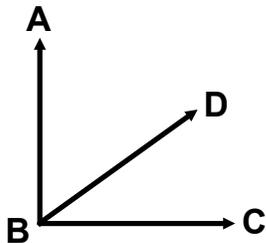


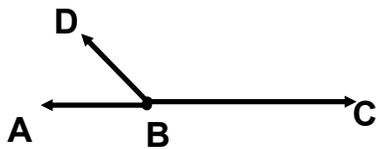
## Geometry Unit Notes

**Complementary angles add up to  $90^\circ$**



$$\angle ABD + \angle DBC = 90^\circ$$

**Supplementary angles add up to  $180^\circ$**



$$\angle ABD + \angle DBC = 180^\circ$$

## Types of Angles

### **Adjacent**

- Share a vertex
- Next to each other

i.e.  $\angle 1$  and  $\angle 2$ ,  $\angle 2$  and  $\angle 4$ ,  $\angle 4$  and  $\angle 3$ ,  $\angle 3$  and  $\angle 1$ ,  $\angle 5$  and  $\angle 6$ ,  $\angle 6$  and  $\angle 8$ ,  $\angle 8$  and  $\angle 7$ ,  $\angle 7$  and  $\angle 5$ .

### **Vertically opposite**

- the opposite angles formed when 2 lines intersect.
- vertically opposite angles are congruent

i.e.  $\angle 1$  and  $\angle 4$ ,  $\angle 2$  and  $\angle 3$ ,  $\angle 5$  and  $\angle 8$ ,  $\angle 6$  and  $\angle 7$ .

### **Alternate exterior**

- on opposite sides of the transversal and on the outside of the parallel lines
- Alternate exterior angles are equal

i.e.  $\angle 1$  and  $\angle 8$  and  $\angle 2$  and  $\angle 7$

### **Alternate interior**

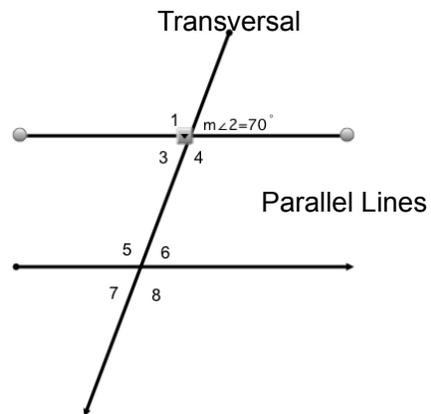
- on opposite sides of the transversal and on the inside of the parallel lines
- Alternate interior angles are equal

i.e.  $\angle 3$  and  $\angle 6$  and  $\angle 4$  and  $\angle 5$

### **Corresponding**

- they are in the same position from one line to the other
- usually one of them is inside and one outside the parallel lines
- corresponding angles are equal.

i.e.  $\angle 1$  and  $\angle 5$ ,  $\angle 2$  and  $\angle 6$ ,  $\angle 3$  and  $\angle 7$ ,  $\angle 4$  and  $\angle 8$ .



## Interior Angles of a Polygon

The sum of the angles in a triangle is equal to  $180^\circ$ .

The sum of the angles in other polygons is based on the number of triangles that can be drawn from 1 vertex. The number of triangles times  $180^\circ$  is the sum of the interior angles.

The rule is  $(n-2) \times 180^\circ$  where  $n$ =the number of sides in the polygon.

\*\*In a triangle  $n=3$  so

$$(n-2) \times 180^\circ$$

$$=(3-2) \times 180^\circ$$

$$=(1) \times 180^\circ$$

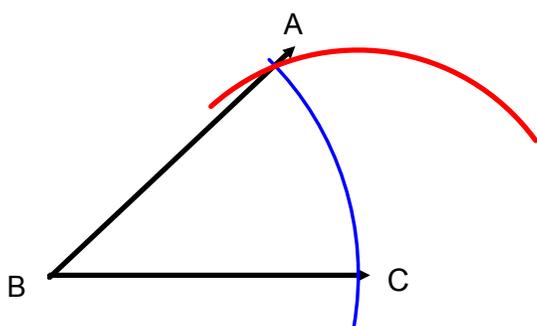
$$=180^\circ$$

## Interior Angles of a Polygon

Name of Polygon	Sum of Angles $(n-2) \times 180^\circ$
Triangle	180°
Quadrilateral	360°
Pentagon	540°
Hexagon	720°
Septagon	900°
Octagon	1080°
Nonagon	1260°
Decagon	1440°

## How to Copy an Angle using a Compass and Ruler

Create  $\angle DEF \cong$  to  $\angle ABC$

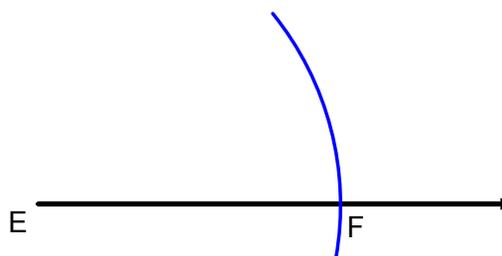


### Steps

1-Draw a ray and label one end point E



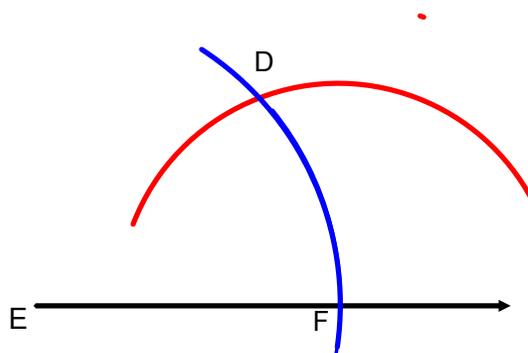
2- use your compass to measure the length of BC and then make an arc of the same length from point E. This intersection point becomes point F.



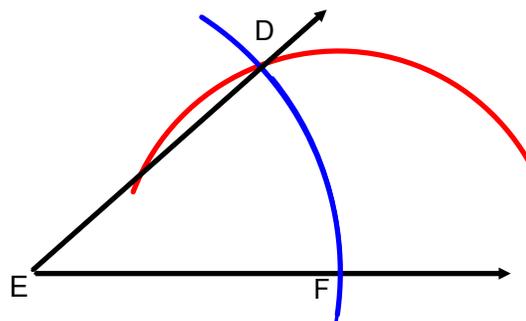
Steps

3-use your compass to measure the distance between points A and C on the arc that you drew.

4-Keep your compass set at the same distance and place the compass tip at point F. Make an arc. The intersection point of the two arcs is point D.



5- Join Point D to Point E to create  $\angle DEF$



## How to Bisect an Angle using a Compass and Ruler

Bisecting an angle using the geometry tools cuts an angle exactly in half without having to measure or calculate

### Steps

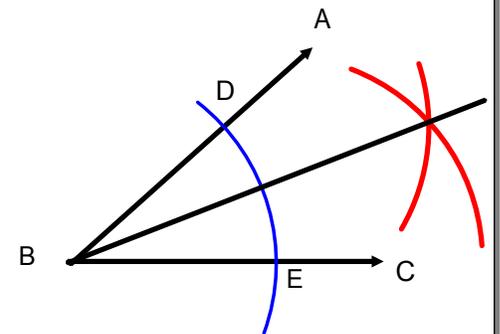
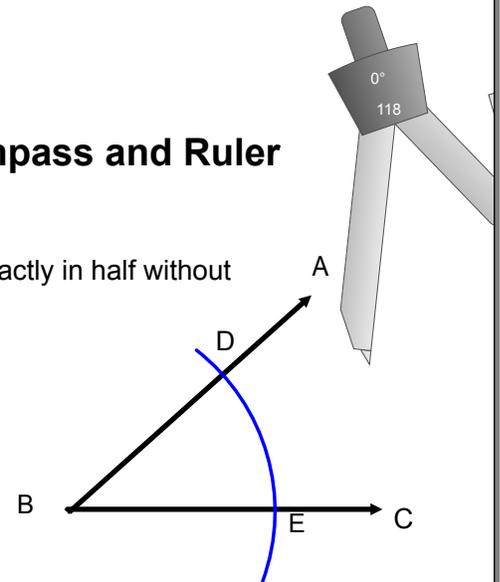
1-From Point B create an arc of any size that crosses both arms of the angle. Label the points of intersection as Point D and E.

2- Place the point of your compass at Point E and open the compass to a distance of more than half the distance between D and E. Make an arc.

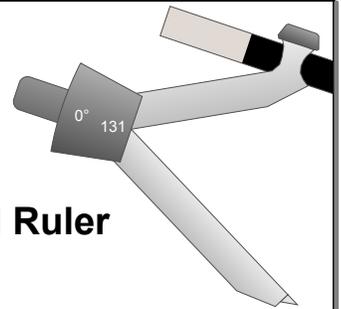
3-Keeping your compass open the same distance place the point of the compass at Point D and make an arc. Make sure it crosses the first one.

4-Join the point of intersection of the two arcs back to Point B to create 2 equal angles.

\*\* you can verify if you are correct using a protractor.



## How to Create a 60° Angle using a Compass and Ruler

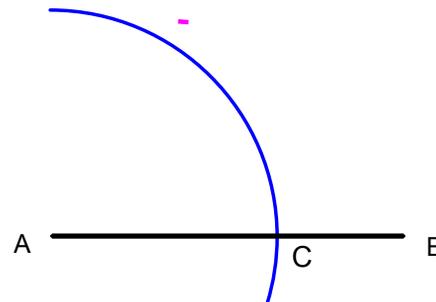


### Steps

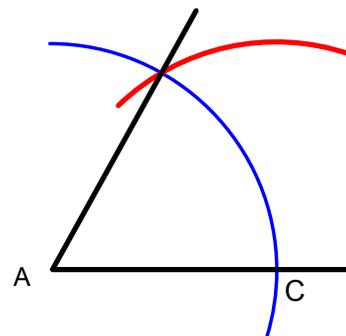
1-Draw Line Segment AB



2-Place your compass on Point A and make an arc. Label the point of intersection of the arc and the line as C

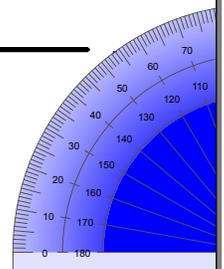


3-Keep your compass the same width and make an arc from C. Make sure that it intersects the arc you just made.

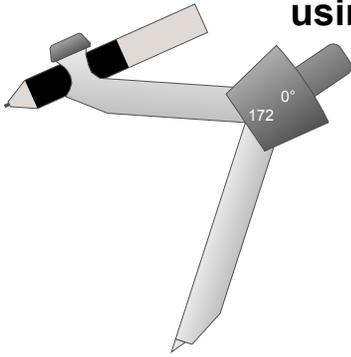


4-Join the point of intersection of the 2 arcs back to the point A. This will create a 60° angle

\*\* you can verify if you are correct using a protractor.



## How to Create a 90° Angle (Right Bisector) using a Compass and Ruler (The FISH)

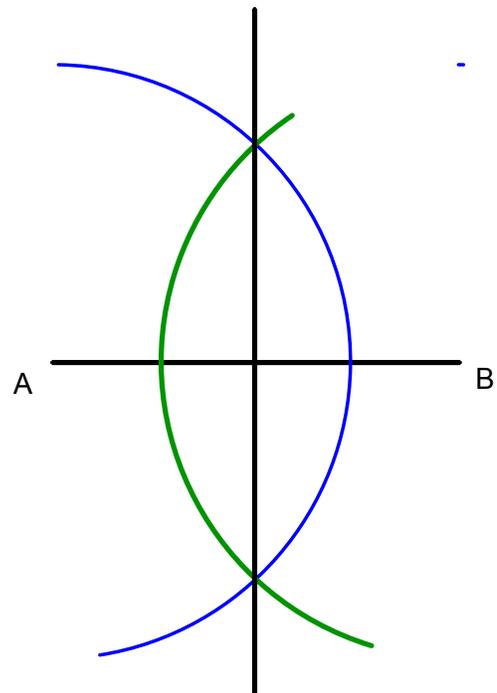


A right bisector will cut a line in half at a 90° angle.

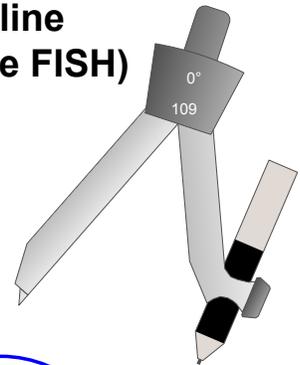
### Steps

- 1-From A, set your compass to a distance of over half the line length, and draw an arc above and below the line (A half circle).
- 2-Keep your compass at the same width and repeat step 1 but from point B
- 3-Draw a line using a ruler to connect the points of intersection of the arcs. Make sure to connect the point of intersection above and below the line AB.

\*\* you can verify if you are correct using a protractor.

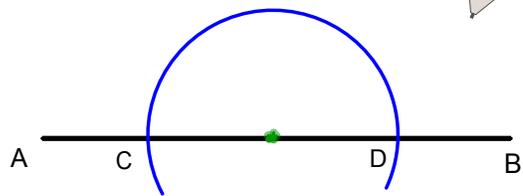


## How to Create a 90° Angle from a point on a line using a Compass and Ruler (The Frown then the FISH)

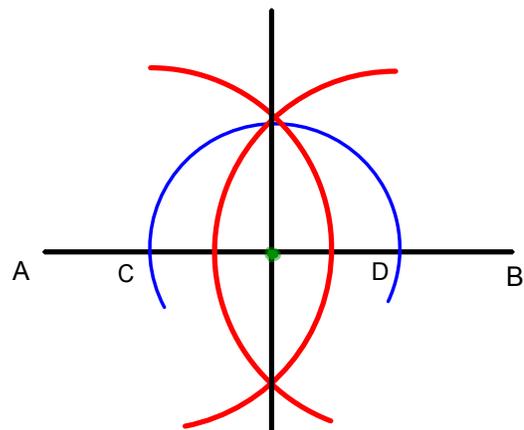


### Steps

1-From the Point on AB, make an arc that crosses line AB in 2 places.



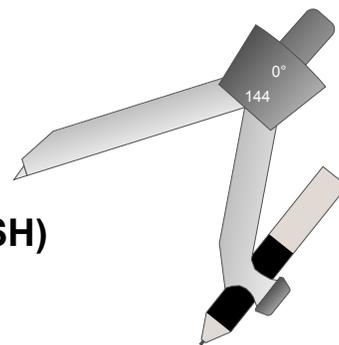
2- From the point of intersection c open your compass to more than half the distance between C and D. Make arcs that go above and below the line.



3- Join the two points of intersections of the arcs through the points using a ruler

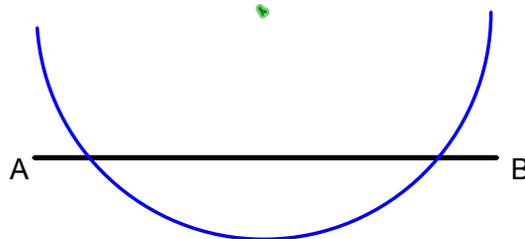
\*\* you can verify if you are correct using a protractor.

## How to Create a 90° Angle from a point off a line using a Compass and Ruler (The Smile then the FISH)



### Steps

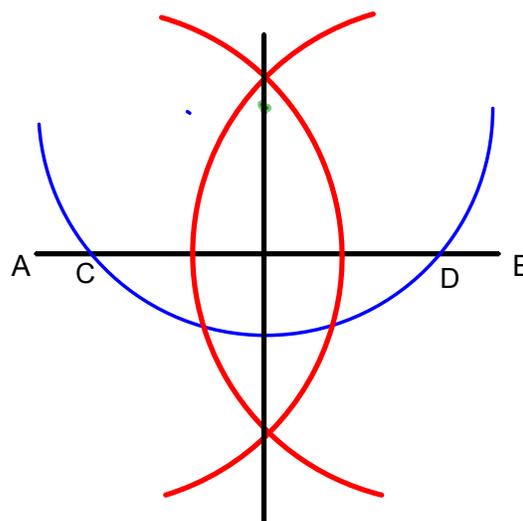
1- From the Point, make an arc that crosses line AB in 2 places.



2- From the point of intersection c open your compass to more than half the distance between C and D. Make arcs that go above and below the line.

3- Repeat Step 2 from Point D

4- Join the two points of intersections of the arcs through the points using a ruler



\*\* you can verify if you are correct using a protractor.