

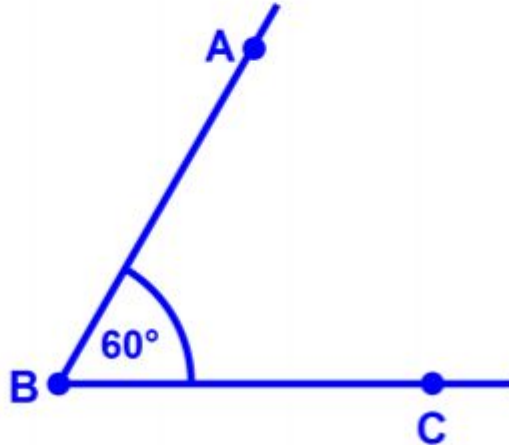
# Special Construction For Lines and Angles

This section will focus on the following Geometric Constructions:

- Constructing an angle with a protractor
- Bisecting an angle with a compass
- Constructing parallel lines with a set square and a ruler
- Constructing perpendicular lines with a set square
- Bisecting a line segment with a compass

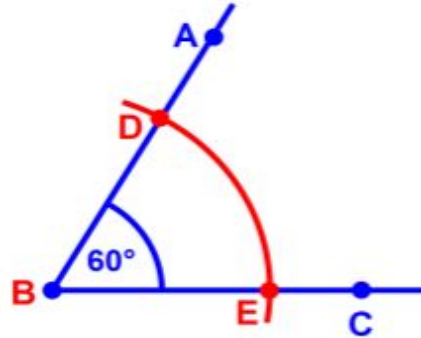
# Part 1: Bisecting an Angle (dividing an Angle into 2 parts)

The following steps will describe how to bisect  $\angle ABC = 60^\circ$  given below.

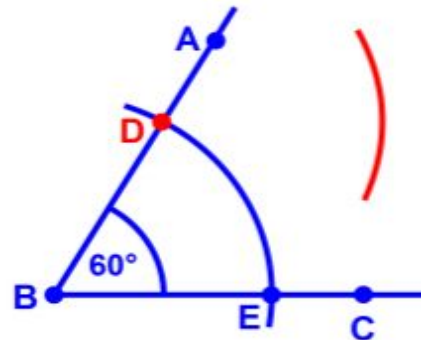


## Part 1: Continued

First, we make an arc with our compass from **point B** that passes through  $\overline{AB}$  and  $\overline{BC}$

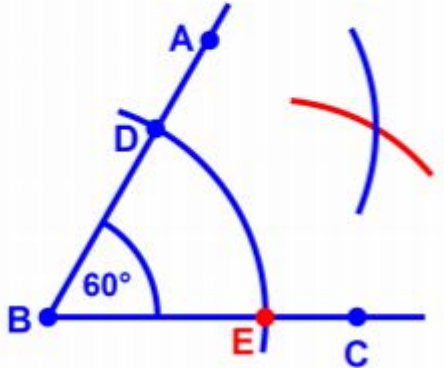


Next, we make an arc with our compass from **point D**.

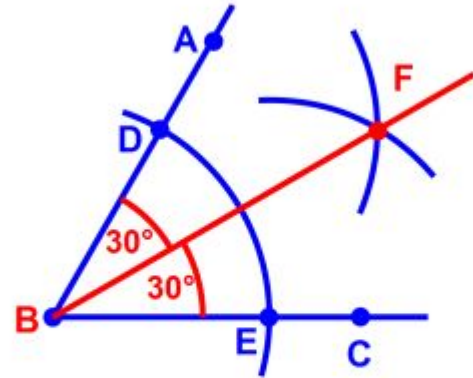


# Part 1: Continued

Now, we make the same arc with our compass from **point E**. Be sure to keep the same arc length.



Finally, draw a line that connects **point B** to the place that the two arcs meet (**point F**).

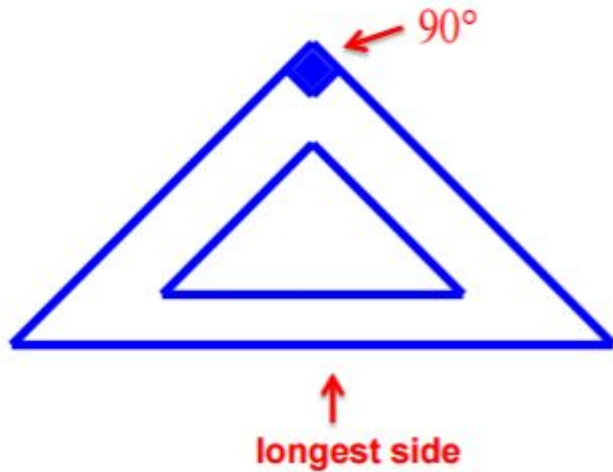


**Ray BF** is the angle bisector of  $\angle ABC$ .

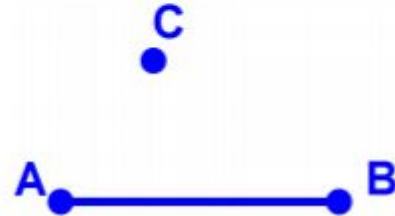
Since  $\angle ABC = 60^\circ$ ,  $\angle ABF = 30^\circ$  and  $\angle FBC = 30^\circ$

## Part 2: Constructing Parallel Lines

To construct parallel lines, we will need to use a **set square**. A set square looks like this:

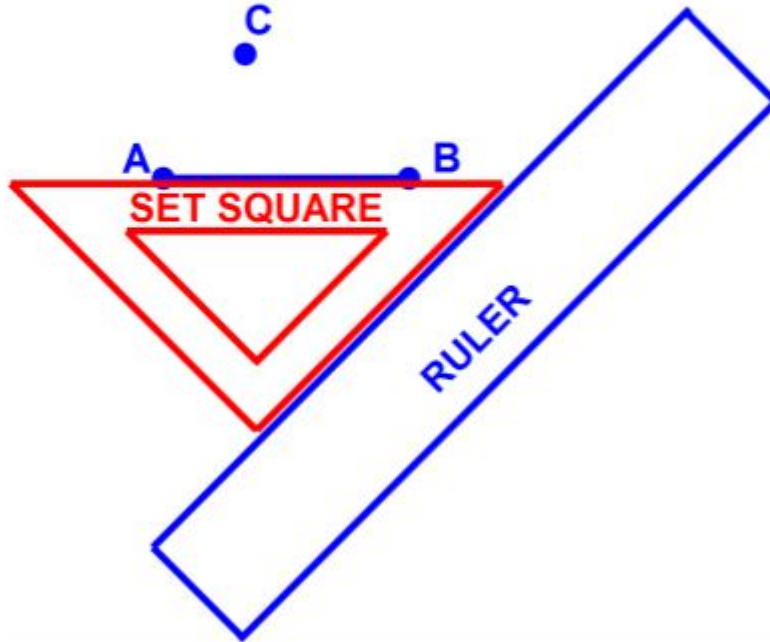


If we want to construct a line that is parallel to  $\overline{AB}$  that passes through point C in the diagram below, we will do the following steps.



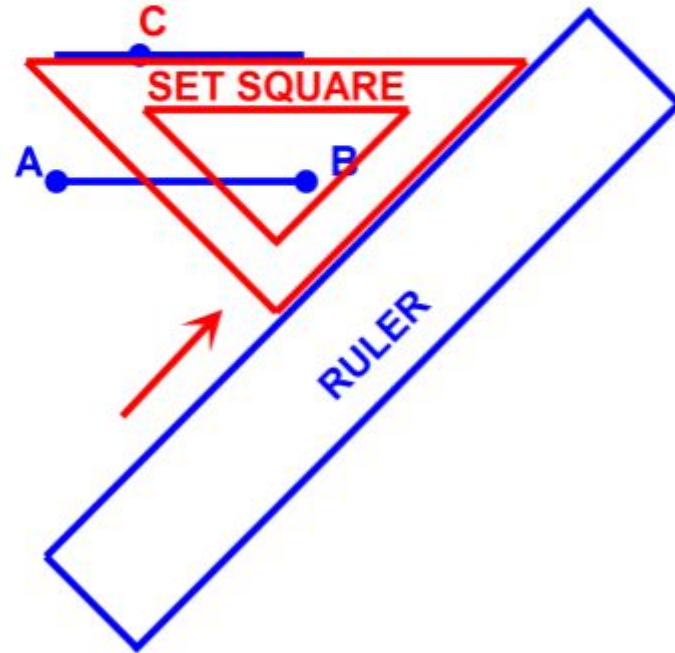
## Part 2: Continued

First, we will place the longest side of the **set square** along  $\overline{AB}$  and a **ruler** on one of the other sides of the set square as shown below.



## Part 2: Continued

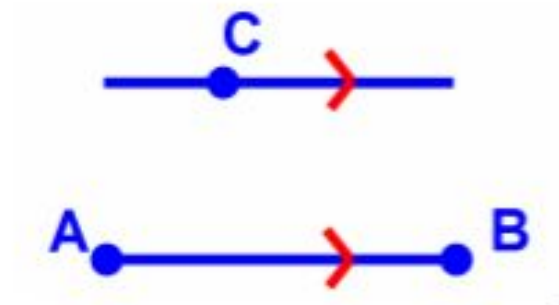
Next, we slide the **set square** along the edge of the **ruler** until the longest side of the **set square** is touching **point C**. Draw a line through **point C** along the longest side of the **set square**.





## Part 2: Continued

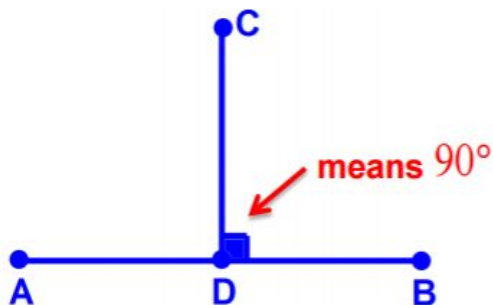
Finally, remove your geometry set tools and label the parallel lines.



## Part 3: Perpendicular Lines

Remember - 2 lines are perpendicular if they intersect at a 90 degree angle!

For example, in the diagram below,  $\overline{AB}$  is **perpendicular** to  $\overline{CD}$ . Using symbols, we can write  $\overline{AB} \perp \overline{CD}$ .



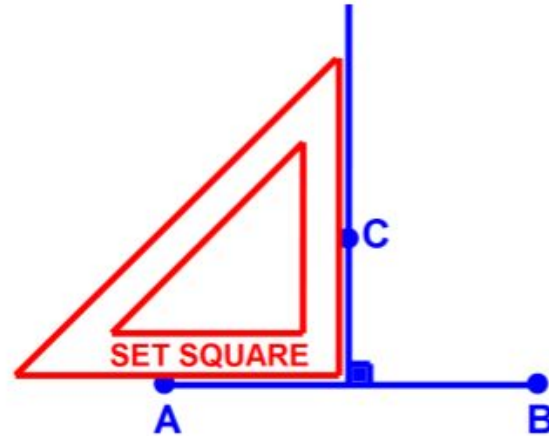
It is also worth noting that the shortest distance from the **point C** to  $\overline{AB}$  is along  $\overline{CD}$ .

## Part 3 - Continued

Homework:

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Place the **set square** on  $\overline{AB}$  as shown in the diagram below. Then, draw a line that passes through **point C** and  $\overline{AB}$  along the **set square**.



The new line that has been drawn through **point C** is perpendicular to  $\overline{AB}$ .