

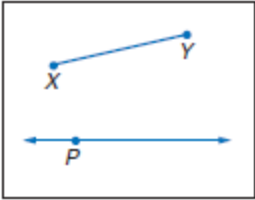
## Geometry Constructions #1

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**CONSTRUCTION**

**Copy a Segment**

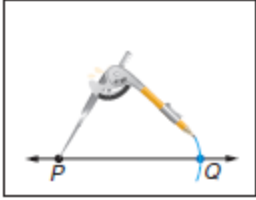
**Step 1** Draw a segment  $\overline{XY}$ . Elsewhere on your paper, draw a line and a point on the line. Label the point  $P$ .



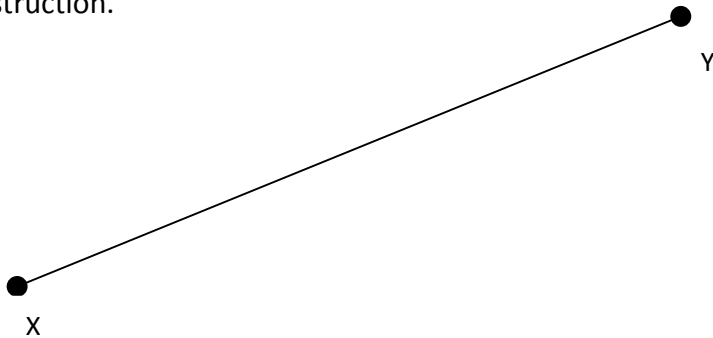
**Step 2** Place the compass at point  $X$  and adjust the compass setting so that the pencil is at point  $Y$ .



**Step 3** Using that setting, place the compass point at  $P$  and draw an arc that intersects the line. Label the point of intersection  $Q$ . Because of identical compass settings,  $\overline{PQ} \cong \overline{XY}$ .



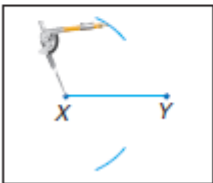
Now do the construction yourself, here. Be sure to leave your marks to show that you actually did the construction.



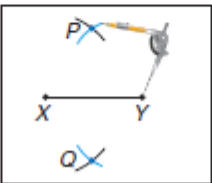
**CONSTRUCTION**

### Bisect a Segment

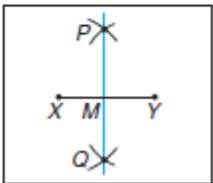
**Step 1** Draw a segment and name it  $\overline{XY}$ . Place the compass at point  $X$ . Adjust the compass so that its width is greater than  $\frac{1}{2}\overline{XY}$ . Draw arcs above and below  $\overline{XY}$ .



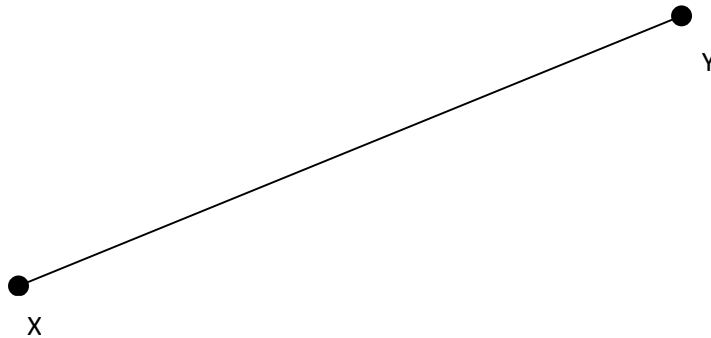
**Step 2** Using the same compass setting, place the compass at point  $Y$  and draw arcs above and below  $\overline{XY}$  that intersect the two arcs previously drawn. Label the points of intersection as  $P$  and  $Q$ .



**Step 3** Use a straightedge to draw  $\overleftrightarrow{PQ}$ . Label the point where it intersects  $\overline{XY}$  as  $M$ . Point  $M$  is the midpoint of  $\overline{XY}$ , and  $\overleftrightarrow{PQ}$  is a bisector of  $\overline{XY}$ . Also  $XM = MY = \frac{1}{2}\overline{XY}$ .




Now do the construction yourself, here. Be sure to leave your marks to show that you actually did the construction.



## Geometry Constructions #2

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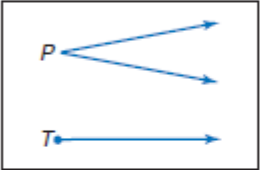
### CONSTRUCTION

### Copy an Angle

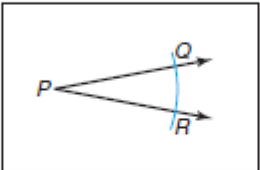
Concepts in Motion

Animation [ca.geometryonline.com](http://ca.geometryonline.com)

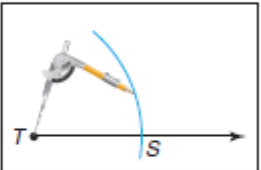
**Step 1**  
Draw an angle like  $\angle P$  on your paper. Use a straightedge to draw a ray on your paper. Label its endpoint  $T$ .



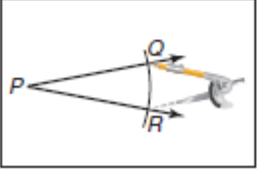
**Step 2**  
Place the tip of the compass at point  $P$  and draw a large arc that intersects both sides of  $\angle P$ . Label the points of intersection  $Q$  and  $R$ .



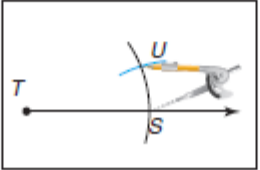
**Step 3**  
Using the same compass setting, put the compass at  $T$  and draw a large arc that intersects the ray. Label the point of intersection  $S$ .



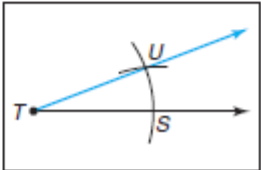
**Step 4**  
Place the point of your compass on  $R$  and adjust so that the pencil tip is on  $Q$ .



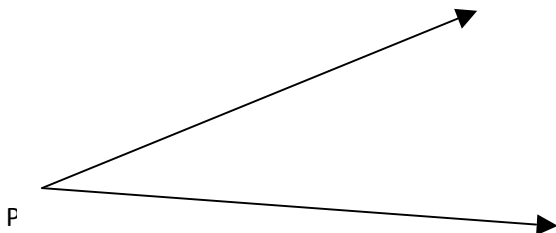
**Step 5**  
Without changing the setting, place the compass at  $S$  and draw an arc to intersect the larger arc you drew in Step 3. Label the point of intersection  $U$ .



**Step 6**  
Use a straightedge to draw  $\overline{TU}$ .



Now do the construction yourself, here. Be sure to leave your marks to show that you actually did the construction.



Page 35 (animation at ca.geometryonline.com)

**CONSTRUCTION**  
**Bisect an Angle**

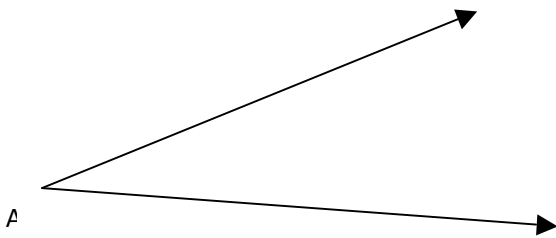
**Step 1**  
Draw an angle and label the vertex as  $A$ . Put your compass at point  $A$  and draw a large arc that intersects both sides of  $\angle A$ . Label the points of intersection  $B$  and  $C$ .

**Step 2**  
With the compass at point  $B$ , draw an arc in the interior of the angle.

**Step 3**  
Keeping the same compass setting, place the compass at point  $C$  and draw an arc that intersects the arc drawn in Step 2.

**Step 4**  
Label the point of intersection  $D$ . Draw  $\overline{AD}$ .  $\overline{AD}$  is the bisector of  $\angle A$ . Thus,  $m\angle BAD = m\angle DAC$  and  $\angle BAD \cong \angle DAC$ .

Now do the construction yourself, here. Be sure to leave your marks to show that you actually did the construction.



## Geometry Constructions #3

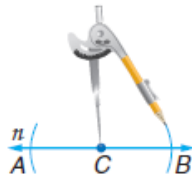
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You can use a compass and a straightedge to construct a line perpendicular to a given line through a point on the line, or through a point not on the line.

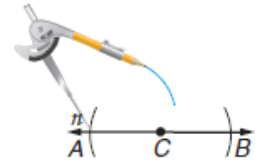
### ACTIVITY 1 Perpendicular Through a Point on the Line

Construct a line perpendicular to line  $n$  and passing through point  $C$  on  $n$ .

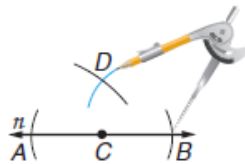
1. Place the compass at point  $C$ . Using the same compass setting, draw arcs to the right and left of  $C$ , intersecting line  $n$ . Label the points of intersection  $A$  and  $B$ .



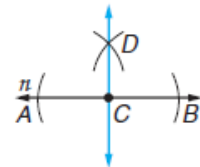
2. Open the compass to a setting greater than  $AC$ . Put the compass at point  $A$  and draw an arc above line  $n$ .



3. Using the same compass setting as in Step 2, place the compass at point  $B$  and draw an arc intersecting the arc drawn in Step 2. Label the point of intersection  $D$ .

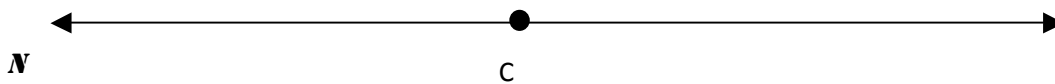


4. Use a straightedge to draw  $\overleftrightarrow{CD}$ .



Concepts in Motion

Show your construction below. Be sure to leave your marks to show that you actually did the construction.

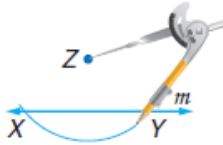


**ACTIVITY 2** Perpendicular Through a Point not on the Line

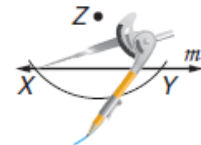
Concepts in Motion  
Animation [ca.geometryonline.com](http://ca.geometryonline.com)

Construct a line perpendicular to line  $m$  and passing through point  $Z$  not on  $m$ .

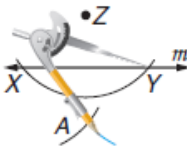
1. Place the compass at point  $Z$ . Draw an arc that intersects line  $m$  in two different places. Label the points of intersection  $X$  and  $Y$ .



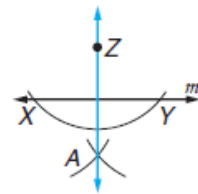
2. Open the compass to a setting greater than  $\frac{1}{2}XY$ . Put the compass at point  $X$  and draw an arc below line  $m$ .



3. Using the same compass setting, place the compass at point  $Y$  and draw an arc intersecting the arc drawn in Step 2. Label the point of intersection  $A$ .



4. Use a straightedge to draw  $\overleftrightarrow{ZA}$ .



Show your construction below. Be sure to leave your marks to show that you actually did the construction.

Z •

