Name:_____

Date:_____Per.:_____

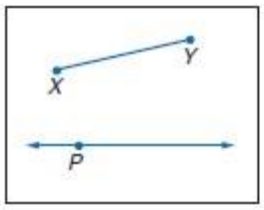
Geometry Constructions Reference Book

Geometry Segment Constructions #1

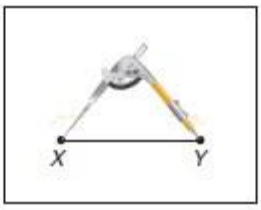
CONSTRUCTION

Copy a Segment

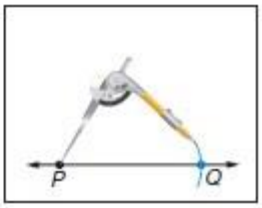
Step 1 Draw a segment $\overline{XY}$. Elsewhere on your paper, draw a line and a point on the line. Label the point P.



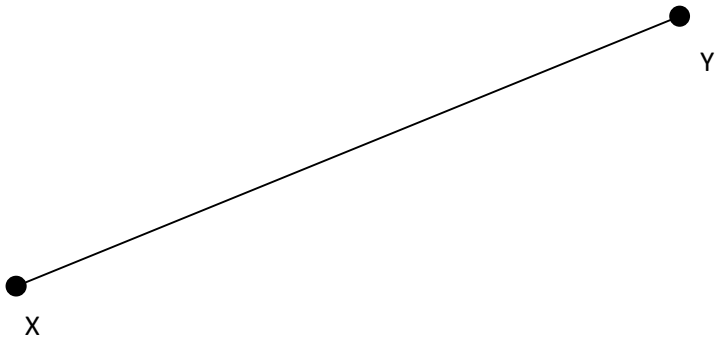
Step 2 Place the compass at point X and adjust the compass setting so that the pencil is at point Y.



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, $\overline{PQ} \cong \overline{XY}$.



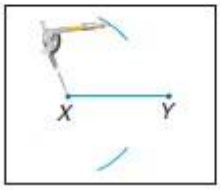
Now do the construction yourself here. Be sure to leave your marks to show that you actually did the construction.



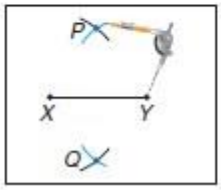
CONSTRUCTION

Bisect a Segment

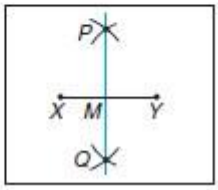
Step 1 Draw a segment and name it $\overline{XY}$. Place the compass at point X. Adjust the compass so that its width is greater than $\frac{1}{2}XY$. Draw arcs above and below $\overline{XY}$.



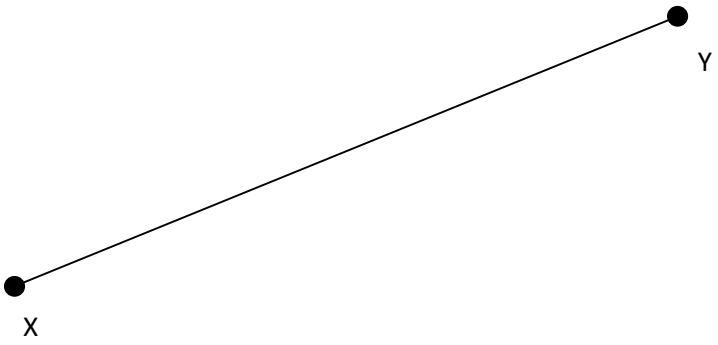
Step 2 Using the same compass setting, place the compass at point Y and draw arcs above and below $\overline{XY}$ that intersect the two arcs previously drawn. Label the points of intersection as P and Q.



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 $XM = MY = \frac{1}{2}XY$.



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



Geometry Constructions #2

CONSTRUCTION

Copy an Angle

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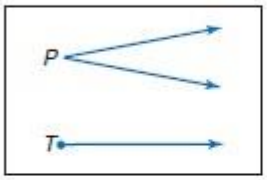
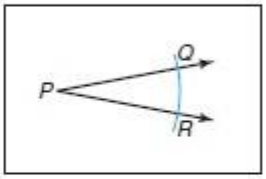
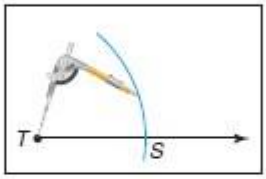
Step 1
Draw an angle like $\angle P$ on your paper. Use a straightedge to draw a ray on your paper. Label its endpoint T.



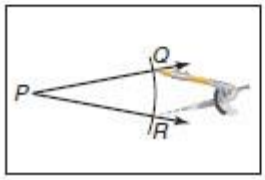
Step 2
Place the tip of the compass at point P and draw a large arc that intersects both sides of $\angle P$. Label the points of intersection Q and R.



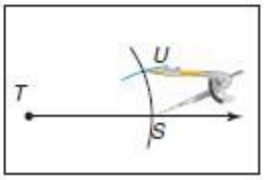
Step 3
Using the same compass setting, put the compass at T and draw a large arc that intersects the ray. Label the point of intersection S.



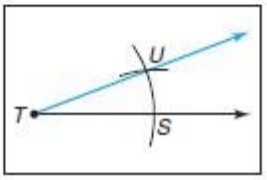
Step 4
Place the point of your compass on R and adjust so that the pencil tip is on Q.



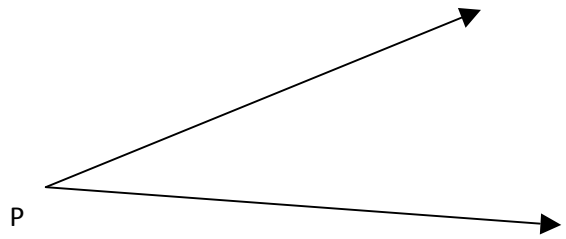
Step 5
Without changing the setting, place the compass at S and draw an arc to intersect the larger arc you drew in Step 3. Label the point of intersection U.



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



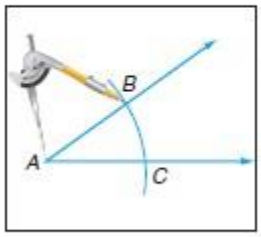
Now do the construction yourself here. Be sure to leave your marks to show that you actually did the construction.



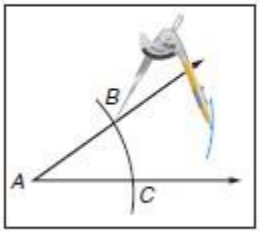
CONSTRUCTION

Bisect an Angle

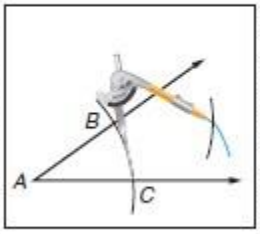
Step 1
Draw an angle and label the vertex as A. Put your compass at point A and draw a large arc that intersects both sides of $\angle A$. Label the points of intersection B and C.



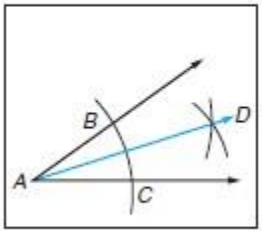
Step 2
With the compass at point B, draw an arc in the interior of the angle.



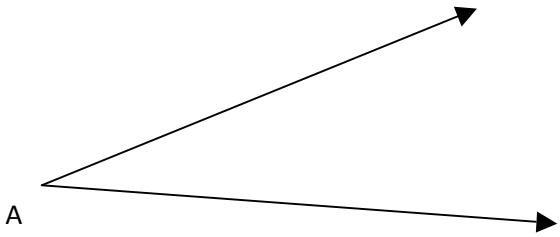
Step 3
Keeping the same compass setting, place the compass at point C and draw an arc that intersects the arc drawn in Step 2.



Step 4
Label the point of intersection D. Draw $\overrightarrow{AD}$. $\overrightarrow{AD}$ 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.



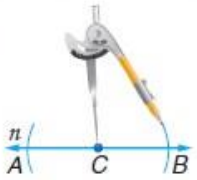
Geometry Constructions #3

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.

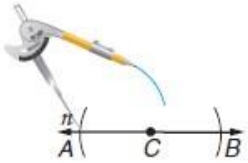
ACTIVITY 1 Perpendicular Through a Point on the Line

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

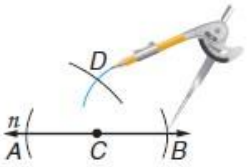
1. Place the compass at point C. Using the same compass setting, draw arcs to the right and left of C, intersecting line n. Label the points of intersection A and B.



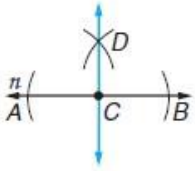
2. Open the compass to a setting greater than AC. Put the compass at point A and draw an arc above line n.



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.



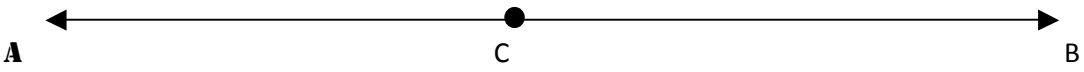
4. Use a straightedge to draw $\overleftrightarrow{CD}$.



In Motion

Concepts in Motion

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



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

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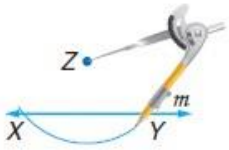
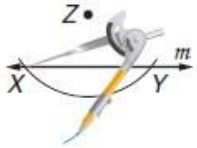
Construct a line perpendicular to line m and passing through point Z *not* on m.

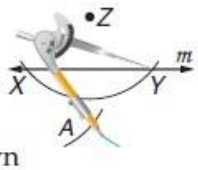
1. Place the compass at point Z. Draw an arc that intersects line m in two different places. Label the points of intersection X and Y.



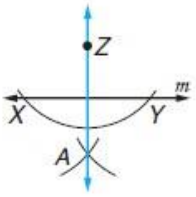
2. Open the compass to a setting greater than $\frac{1}{2}XY$. Put the compass at point X and draw an arc below line m.



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 $\overleftrightarrow{ZA}$.



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

Z

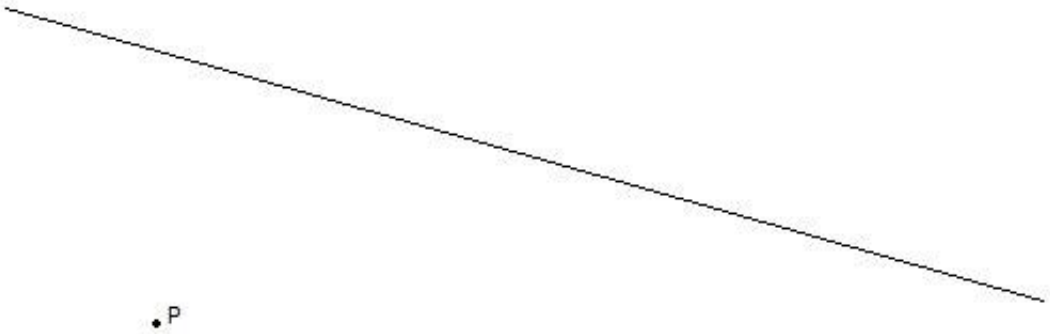
•

M

Geometry Constructions #4 CONSTRUCT A PARALLEL LINE

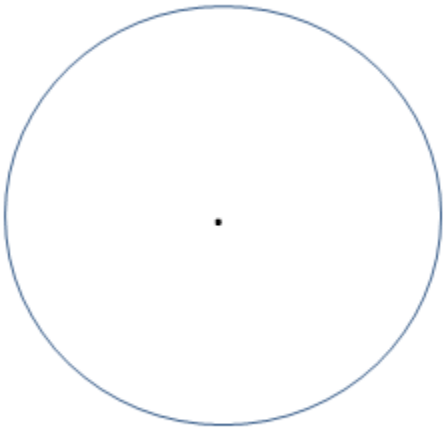
Construct a line parallel to a given line through a given point with compass and straightedge

1. Construct a line parallel to the one below that passes through the point P

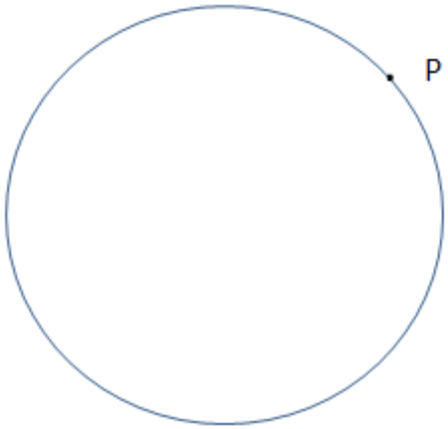


Geometry Constructions #5 Construct a square inscribed in a given circle

1. Construct a square inscribed in the circle below

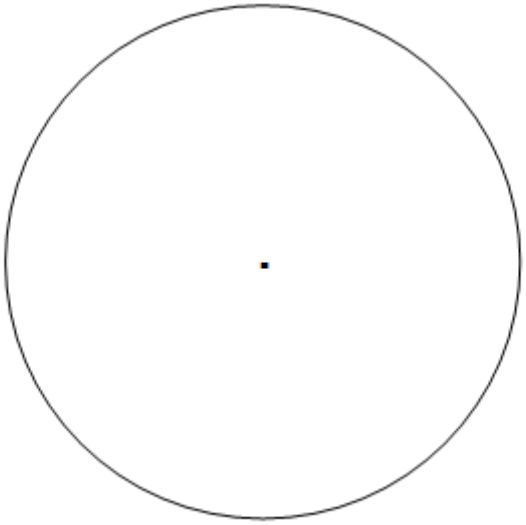


2. Construct a square inscribed in the circle below, with one vertex of the square on the point P. You will need to construct the center point first. (Create 2 chords and bisect both of these. Where they meet is the center of the circle).



Geometry Constructions #6 - Construct a hexagon inscribed in a given circle

1. Construct the largest regular hexagon that will fit in the circle below.



2. (a) Find the center of the circle below. (Create 2 chords and bisect both of these. Where they meet is the center of the circle).

   (b) Construct a hexagon inscribed in the circle.