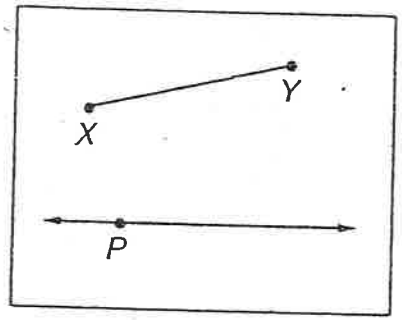
Name_____

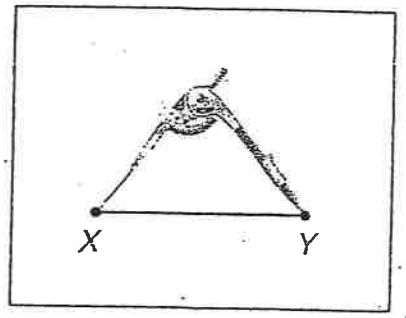
Constructions

Construction 1: Copy a Segment

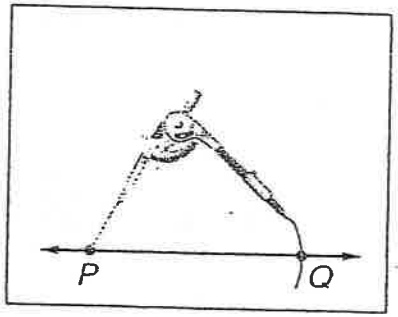
1. Draw a segment $\overline{XY}$. Elsewhere on your paper, draw a line and a point on the line. Label the point P.



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



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



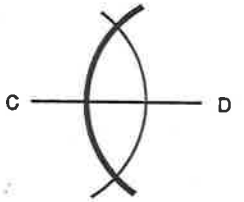
CONSTRUCTION 2: CONSTRUCT THE PERPENDICULAR BISECTOR OF A LINE SEGMENT.

Given $\overline{CD}$. Required to construct a line that is the perpendicular bisector of $\overline{CD}$.

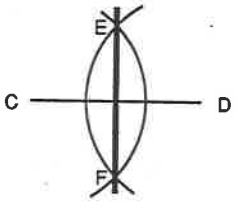
Procedure:

Step 1: Place the metal tip of the compass on point C. With a distance between the compass tips less than $\overline{CD}$, but greater than one-half the measure of $\overline{CD}$, make an arc intersecting $\overline{CD}$.

Step 2: Retaining the distance between compass points used to draw the arc, position the metal tip on point D and make a second arc that intersects the first arc both above and below $\overline{CD}$.



Step 3: Use a straightedge to draw a line segment that connects the two points (E and F) of intersection of the arcs. The resulting line divides $\overline{CD}$ into two congruent segments. The resulting segment is also perpendicular (forms a 90° angle) to $\overline{CD}$. $\overline{EF} \perp \overline{CD}$.



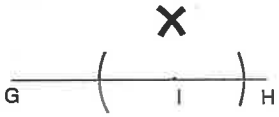
CONSTRUCTION 3: CONSTRUCT A PERPENDICULAR TO A LINE THROUGH A GIVEN POINT ON THE LINE.

Given $\overline{GH}$ with point I on $\overline{GH}$. Required to construct a perpendicular to $\overline{GH}$ through point I.

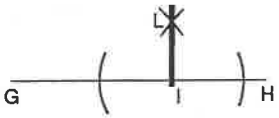
Procedure:

Step 1: Place the metal tip of the compass on point I. Using any convenient distance between the compass tips, draw arcs with equal radii intersecting the line on both sides of point I.

Step 2: Using the two points of intersection of the arcs and the line (J and K) as centers, draw arcs with equal radii that intersect above the line.



Step 3: Use a straightedge to connect the point where the arcs intersect (L) to point I. $\overline{LI}$ is perpendicular to $\overline{GH}$ at I. $\overline{LI} \perp \overline{GH}$.

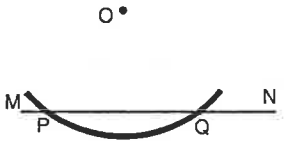


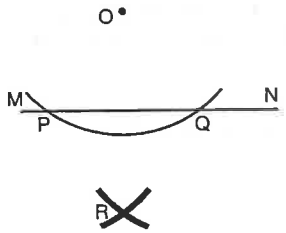
CONSTRUCTION 4: CONSTRUCT A PERPENDICULAR TO A LINE FROM A POINT NOT ON THE LINE.

Given $\overline{MN}$ and point O. Required to construct a perpendicular to $\overline{MN}$ passing through point O.

Procedure:

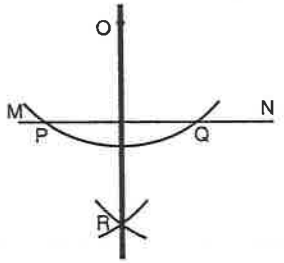
Step 1: Place the metal compass tip on point O and stretch the marking tip out a distance greater than the distance from O to $\overline{MN}$. Make an arc that cuts $\overline{MN}$ in two places (P and Q).





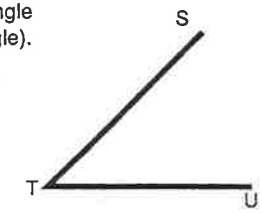
Step 2: With points P and Q as centers, make arcs with equal radii that intersect each other below $\overline{MN}$ (R).

Step 3: Use a straightedge to connect the intersection of the arcs (R) with O. $\overline{OR}$ is perpendicular to $\overline{MN}$. $\overline{OR} \perp \overline{MN}$.



CONSTRUCTION 5: BISECT AN ANGLE.

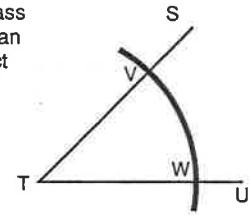
Given ∠STU. Required to divide the angle into two congruent parts (bisect the angle).



Procedure:

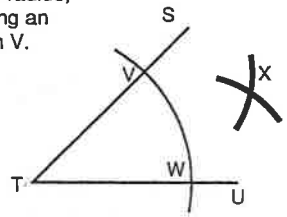
Step 1: Place the metal tip of the compass on the vertex of the angle (T) and make an arc of convenient length that will intersect both sides of the angle.

Points V and W are the same distance from T.

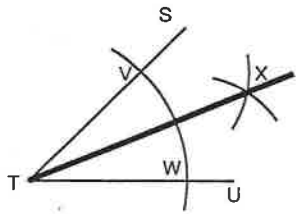


Step 2: Place the metal tip on point V and make an arc of convenient radius in the interior of the angle. Using the same radius, place the metal tip on point W, making an arc that intersects the arc drawn from V.

$\overline{VX}$ and $\overline{WX}$ are congruent (≅).

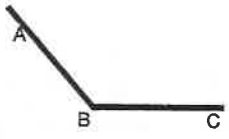


Step 3: Use a straightedge to connect points X and T. $\overrightarrow{TX}$ is the bisector of ∠STU. ∠STX ≅ ∠UTX.



CONSTRUCTION 6: COPY AN ANGLE.

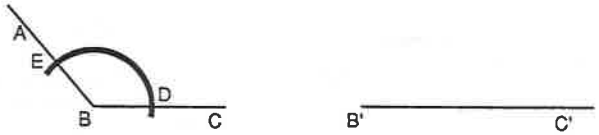
Given $\angle ABC$. Required to construct an angle congruent to $\angle ABC$.



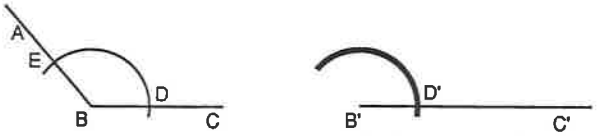
Procedure:

Step 1: Draw a helping line $\overrightarrow{B'C'}$ that will correspond to $\overline{BC}$.

Step 2: Place the metal tip of the compass on point B and make an arc of convenient length that intersects the sides of $\angle ABC$.

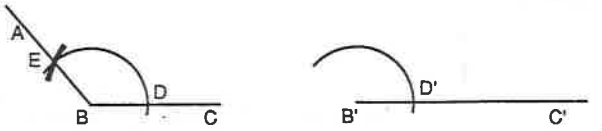


Step 3: Using the same radius with B' as a center, make an arc that cuts $\overrightarrow{B'C'}$.

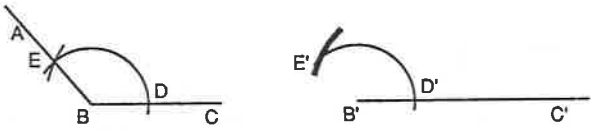


CONSTRUCTION 6 *(Continued)*

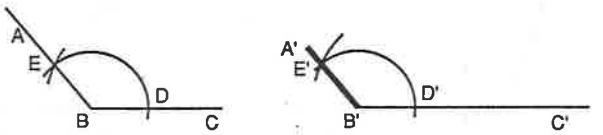
Step 4: Place the metal tip of the compass on point D and stretch the marking tip to E.



Step 5: Using the distance $\overline{DE}$ as a radius, place the metal tip on D' and draw an arc intersecting the previously constructed arc.



Step 6: Use a straightedge to connect B' and E'. $\angle A'B'C'$ has been constructed congruent to $\angle ABC$. $\angle ABC \cong \angle A'B'C'$.



Constructions Name _____

Copy a Segment

1. 

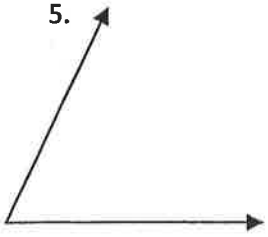
2. 

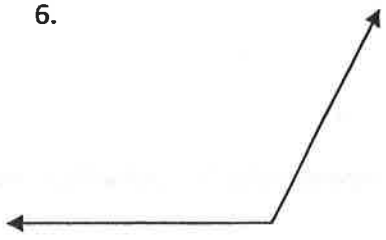
Bisect a Segment

3. 

4. 

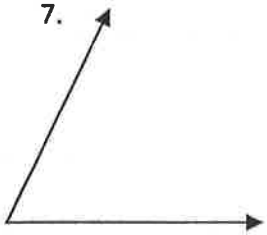
Copy an Angle

5. 

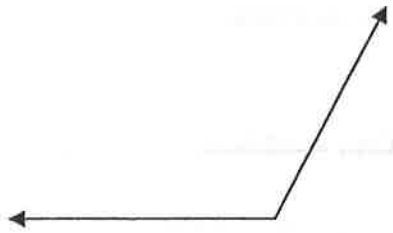
6. 

Bisect an Angle

7.



8.



Perpendicular Line Through a Point on the Line

9.

10.

Perpendicular Through a Point not on the Line

11.

12.