

### Congruent Segments

Given:  $\overline{AB}$



Construct a segment congruent to  $\overline{AB}$ .

1. Use a straight edge to draw a working line,  $l$ .
2. Choose a point on  $l$  and label it  $A'$ .
3. Set your compass for radius  $\overline{AB}$  by placing one end at point  $A$  and another at point  $B$ . Draw an arc.
4. Using  $\overline{AB}$  as radius, place one end of compass on  $A'$  and draw an arc. Label the point of intersection  $B'$ .

$\overline{AB} \cong \overline{A'B'}$

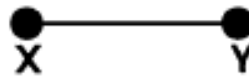
1. Construct a segment congruent to  $\overline{CD}$ .



2. Construct a segment congruent to  $\overline{EF}$ .



3. Construct a segment congruent to  $\overline{XY}$ .



4. Construct a segment whose length is  $\overline{CD} + \overline{EF}$ .

5. Construct a segment whose length is  $\overline{EF} + \overline{XY}$ .

6. Construct a segment whose length is  $\overline{EF} - \overline{CD}$ .

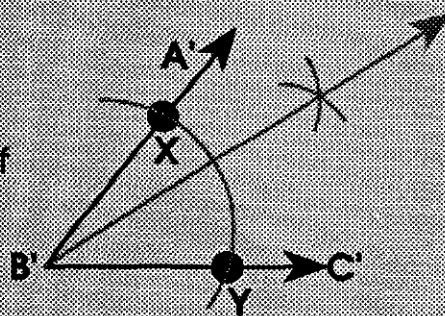
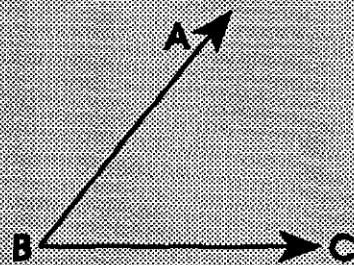
## Angle Bisectors

Given:  $\angle ABC$ .

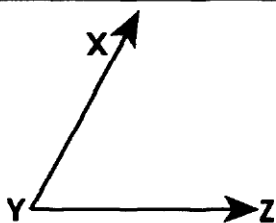
Construct an angle bisector.

1. Copy  $\angle ABC$ .
2. Using  $B'$  as center, choose any radius, and draw an arc intersecting  $\vec{B'A'}$  and  $\vec{B'C'}$ .
3. Using  $X$  as center, choose a radius greater than  $\frac{1}{2}XY$ , draw an arc in the interior of  $\angle A'B'C'$ . Repeat using  $Y$  as center and same radius. Label point of intersection  $Z$ .
4. Draw  $\vec{B'Z}$ .

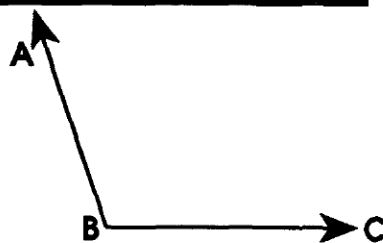
$\vec{B'Z}$  bisects  $\angle A'B'C'$ .



1. Bisect  $\angle XYZ$ .



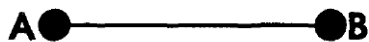
2. Bisect  $\angle ABC$ .



3. Construct a  $45^\circ$  angle.

(Hint: construct perpendicular lines first.)

4. Construct an equilateral  $\Delta$ . Use  $AB$  as the length of each side.



5. What is the measurement of each angle in #4? \_\_\_\_\_

6. Construct a  $30^\circ$  angle.

(Hint: use your equilateral  $\Delta$ .)

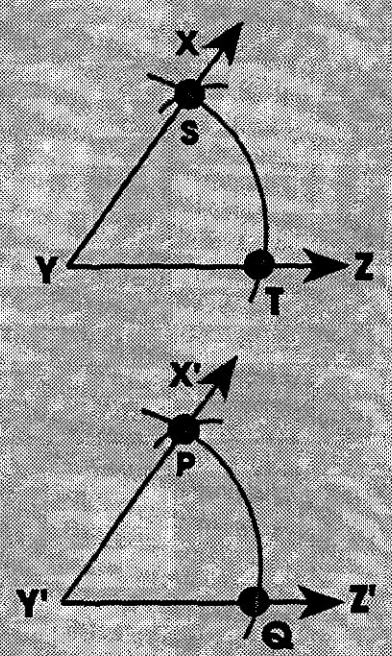
### Congruent Angles

Given:  $\angle XYZ$ .

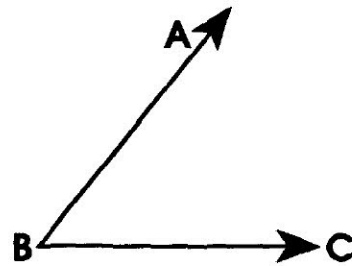
Construct an angle congruent to  $\angle XYZ$ .

1. Draw a ray, label it  $Y'Z'$ .
2. Using  $Y$  as center, choose any radius and draw an arc that intersects  $\vec{YX}$  and  $\vec{YZ}$ . Label points  $S$  and  $T$ .
3. Using  $Y'$  as center and the same radius, draw an arc intersecting  $\vec{Y'Z'}$ . Label the point of intersection  $Q$ .
4. Using  $T$  as center, find radius equal to  $TS$ . Draw arc through point  $S$ .
5. Using  $Q$  as center, draw arc using radius equal to  $TS$ . Label point of intersection  $P$ .
6. Draw  $\vec{Y'P}$ .

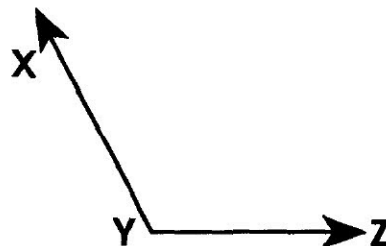
$\angle XYZ \cong \angle PYZ'$ .



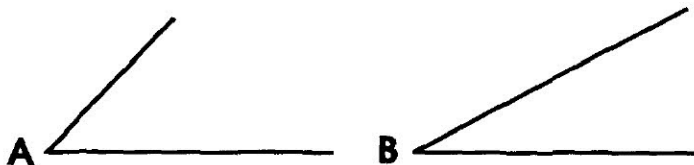
1. Construct a congruent angle to  $\angle ABC$ .



2. Construct a congruent angle to  $\angle XYZ$ .



3. Construct  $\triangle ABC$  using  $\angle A$  and  $\angle B$ .



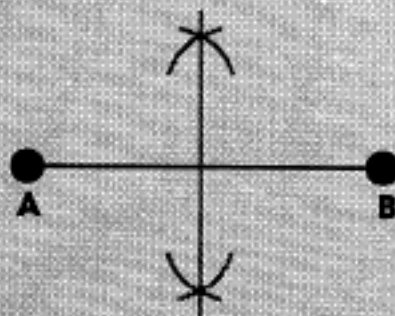
## Perpendicular Bisectors

Given:  $\overline{AB}$



Construct the perpendicular bisector of  $\overline{AB}$ .

1. Copy segment  $\overline{AB}$ .
2. Choose a radius greater than  $1/2 \overline{AB}$  and less than  $AB$ . Using A as center, draw 2 arcs, one above  $\overline{AB}$  and one below  $\overline{AB}$ . Repeat using B as center.
3. Draw  $\overleftrightarrow{CD}$ .



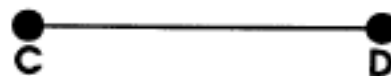
$\overleftrightarrow{CD}$  is the perpendicular bisector of  $\overline{AB}$ .

I. Construct the perpendicular bisector of the following.

1.



2.

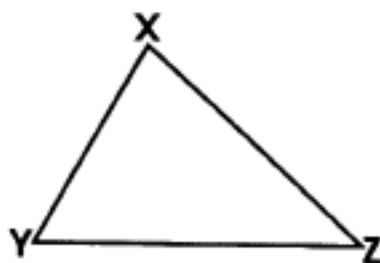


3.



II. Bisect side  $\overline{YZ}$  of  $\triangle XYZ$ .

4.



5. Construct a segment whose length equals  $\overline{XY} + \overline{YZ} + \overline{XZ}$ .

### Constructing Perpendiculars, Given a Point on the Line

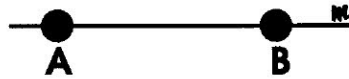
Given: Point A on line  $l$ .

Construct the perpendicular to point A.

1. Copy  $l$ .
2. Using A as center choose any radius, less than  $l$ . Draw arcs intersecting  $l$ . Label them C and D.
3. Using C as center, pick a radius greater than CA. Draw an arc above  $l$ . Repeat using D as center with same radius.
4. Draw  $\overleftrightarrow{XA}$ .

$\overleftrightarrow{XA}$  is perpendicular to  $l$  at point A.

I. Construct perpendicular lines to the given points.



1. point A

2. point B



3. point C

4. point D

## Constructing Perpendiculars, Given a Point Not on the Line

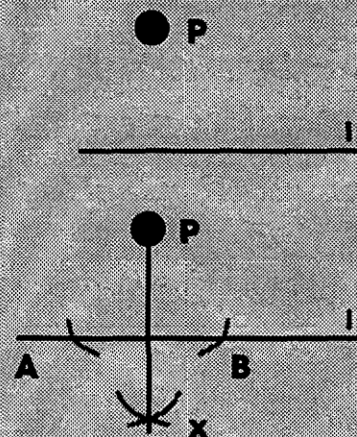
Given: Point P outside line  $l$ .

Construct a line perpendicular from P to  $l$ .

1. Copy  $l$ .
2. Using P as center, draw two arcs intersecting  $l$ . Label them A and B.
3. Choose a radius greater than  $1/2 AB$ . Using A as center, draw arc below  $l$ . Repeat using B as center with same radius. Label X.

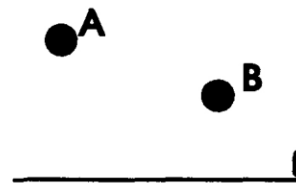
4. Draw  $\overleftrightarrow{PX}$ .

$\overleftrightarrow{PX}$  is perpendicular to  $l$ .



I. Construct perpendicular lines to  $l$  from:

1. point A



2. point B

II. Construct the perpendicular lines from each vertex to the opposite side in  $\triangle ABC$ .

