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# Basic Constructions of Congruent Angles, Segments, and Perpendicular Bisectors

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# Unit 1

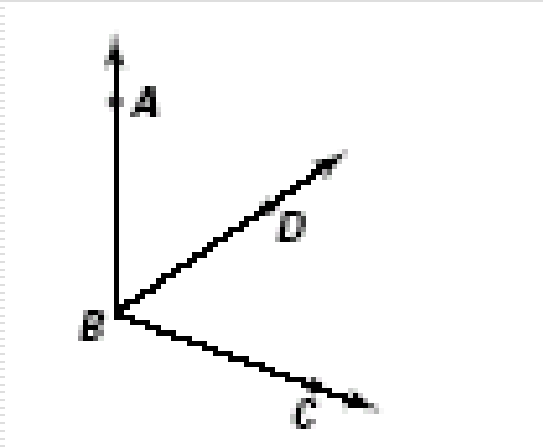
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## 1.6 Basic Constructions

# DO NOW

## I Complete

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BD is the bisector of  $\angle ABC$

$$m\angle ABD = 4x + 14$$

$$m\angle DBC = 6x - 34$$

Solve for  $x$  and find  $m\angle ABD$

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**$x = 24, 110$  degrees**

## Objective 1.6

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- Understanding congruent angles and the bisection of segments and angles.

## Essential Question

How can you construct congruent angles and congruent segments?

How can you bisect segments and angles?

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# Vocabulary

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- **Construction:** Point that divides a segment into two congruent segments.
  - **Straightedge:** Ruler with no marking on it.
  - **Compass:** Geometric tool used to draw circles and parts of circles called arcs.
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# Construction 1

## Congruent Segments

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Given  $\overline{AB}$  construct a congruent segment  $CD$

### steps

- Draw a ray with endpoint  $C$
  - Open the compass to the length of  $\overline{AB}$
  - With the same compass setting, put the compass point on  $C$ . Draw an arc that intersects the ray
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## Construction 2

# Construct an angle congruent to the given angle.

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Given  $\angle A$  construct a congruent  $\angle S$

### Steps

1. Draw a line with endpoint S
  2. With the compass point on point A draw an arc that intersects the sides of  $\angle A$ . Label the points of intersection B and C
  3. With the same compass setting, put the compass point on point S. Draw an arch that intersects the ray at point R
  4. Open the compass to the length of BC. Keeping the same compass setting, put the compass point on R. Draw an arc to determine point T.
  5. Draw ST
-

# Construction 3

## Perpendicular Bisector

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Construct the perpendicular bisector of a segment.  
Given AB

### Steps

1. Put the compass point on point A and draw an arc. Be sure the opening is greater than  $\frac{1}{2}$  AB. Keep the same compass setting for step 2
2. Put the compass point on point B and draw an arc. Label the points where the two arcs intersect as X and Y
3. Draw XY. Label the intersection of AB and XY as point M

Now XY is the perpendicular bisector of AB. Point M is the midpoint of AB

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# Construction 4

## Angle Bisector

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Construct the bisector of an angle. Given  $\angle A$

### Steps

1. Put the compass point on vertex A. Draw an arc that intersects the sides of  $\angle A$ . label the points of intersection B and C
2. Put the compass point on point C and draw an arc. Keep the same compass setting and repeat with point B. Be sure the arcs intersect. Label the point where the two arcs intersect as point X.
3. Draw AX

Now AX is the angle bisector of  $\angle CAB$

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# Problem

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- Draw a triangle with three given sides
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# TOD

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## TOD

Work book

Practice 1.6 Example Exercises (odds)

## Homework

Work book

Practice 1.6 Example Exercises (even)

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# Quiz

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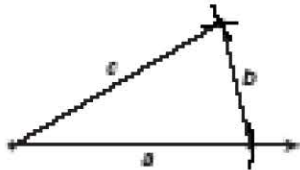
## Lesson Quiz

1-6

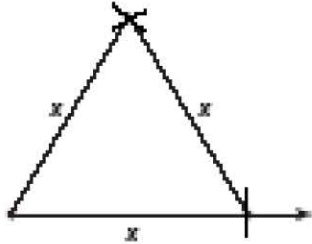
1. Draw a line segment. Call it  $\overline{AB}$ .
  - a. Construct a segment congruent to  $\overline{AB}$ . Call it  $\overline{XY}$ .
  - b. Construct the perpendicular bisector of  $\overline{AB}$ . Call it  $\overleftrightarrow{GH}$ .
2. Draw an angle with measure about  $60^\circ$ . Label it  $\angle C$ .
  - a. Then construct an angle congruent to  $\angle C$ . Label it  $\angle D$ .
  - b. Construct the angle bisector of  $\angle C$ . Label it  $\overleftrightarrow{CE}$ .

### Practice 1-6: Example Exercises

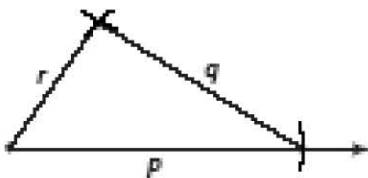
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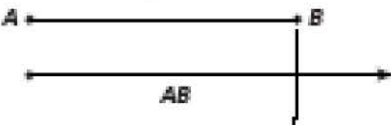
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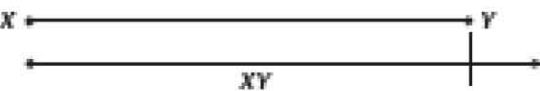
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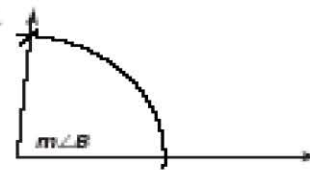
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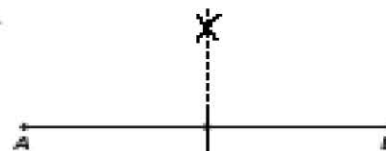
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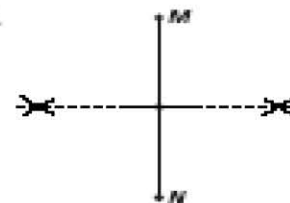
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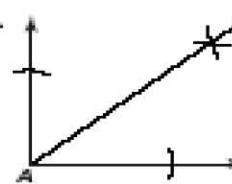
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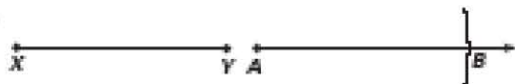


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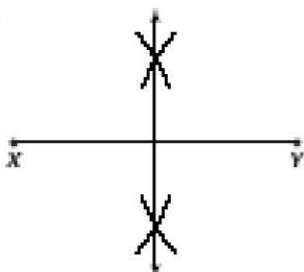


### Practice 1-6: Mixed Exercises

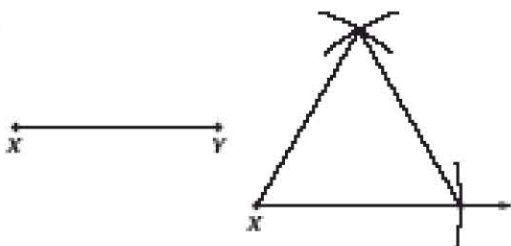
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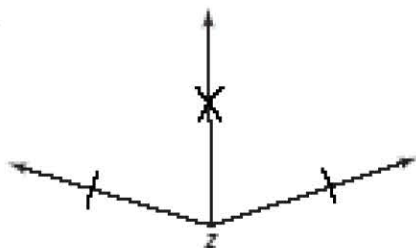
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