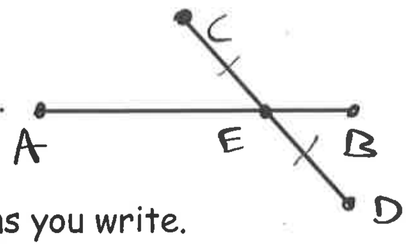
Review of Segments

Draw a diagram to represent the following.
$\overline{AB}$ intersects $\overline{CD}$ at its midpoint E.



Question 1: You must justify any equations you write.
If CE = 3x+1 and DE = 5x-7, find the value of x and CD.

$\boxed{1}$ $\overline{CE} \cong \overline{DE}$ [Def. of Midpt]

$CE = DE$ [Def. of $\cong$ seg.]

$3x+1 = 5x-7$

$2x = 8$

$\boxed{x=4}$

$\boxed{2}$ $CE + DE = CD$ [Seg. Add. Post.]

$3x+1+5x-7 = CD$

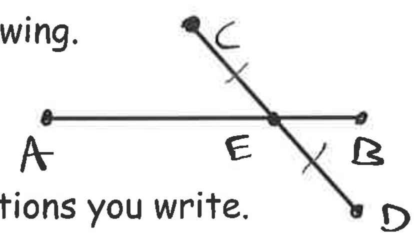
$CD = 8x-6$

$CD = 32-6$

$\boxed{CD = 26 \text{ units}}$

Draw a diagram to represent the following.

$\overline{AB}$ intersects $\overline{CD}$ at its midpoint E.



Question 2: You must justify any equations you write.
If AE = 2y +8, AB = 6y +16, and EB = y^2 4 ,
find the value of y and determine if E is the midpoint of $\overline{AB}$.

$\boxed{1}$ $AE + EB = AB$ [Seg. Add. Post.]

$2y+8+y^2-4 = 6y+16$

$y^2-4y-12 = 0$

$(y-6)(y+2) = 0$

$y = \cancel{-2}, 6$

No zero lengths

$\boxed{y=6}$

$\boxed{2}$ $y=-2$ | $y=6$

$AE=4$ | $AE=20$

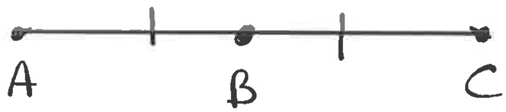
$EB=0$ | $EB=32$

Not Possible

E is not the midpoint of $\overline{AB}$.

If B is the midpoint of $\overline{AC}$,

what do you think is true?



☆ Things we already know:

$\overline{AB} \cong \overline{BC}$
[Def. of midpt.]

$AB + BC = AC$
[Seg. Add. Post.]

$AB = BC$, $AB = \frac{1}{2}AC$, $BC = \frac{1}{2}AC$

☆ These are statements we will have to prove.
It will be our first Theorem.

Building Blocks of Logical Reasoning (Proof)

Definitions: These are given. Don't make things up. Know the exact wording. (notecards)

Front → Word(s)/Phrase Back → Diagram
Equation
Statement(s)

Postulates (Axioms): These are statements we accept without proof. (no proof needed)

Properties: These are observable and are also accepted without proof. (no proof needed)

Theorems: These are statements that require proof. (A proof is a logical argument.)

The Midpoint Theorem If B is the midpoint of $\overline{AC}$ then

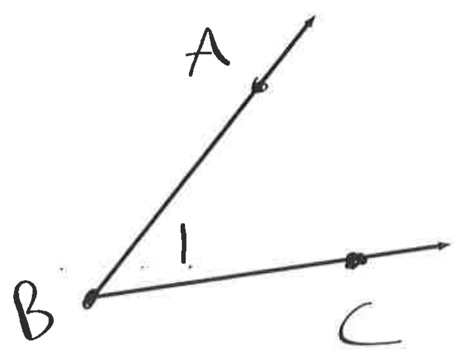
$AB = \frac{1}{2}AC$, $BC = \frac{1}{2}AC$, and $AB = BC$.

Given: B is the midpoint of $\overline{AC}$

Prove: $AB = \frac{1}{2}AC$, $BC = \frac{1}{2}AC$, $AB = BC$

Statements	Reasons
1. B is the midpt of $\overline{AC}$	Given
2. $\overline{AB} \cong \overline{BC}$	Def. of midpt.
3. $AB = BC$	Def. of $\cong$ seg.
4. $AB + BC = AC$	Seg. Add. Post.
5. $AB + AB = AC$	Substitution Prop. of $=$ $(3 \rightarrow 4)$
6. $2AB = AC$	Distributive Prop.
7. $AB = \frac{1}{2}AC$	Division Prop. of $=$
8. $BC = \frac{1}{2}AC$	Subst. of $=$ $(3 \rightarrow 7)$

Naming Angles:



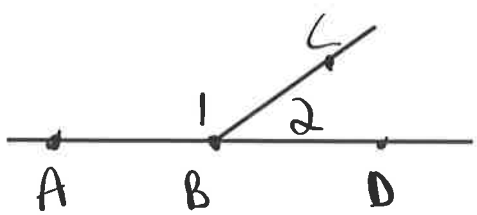
$\angle B$ 1 point [vertex]

$\angle ABC$ 3 points [middle is the vertex]

or

$\angle CBA$

$\angle 1$ #



$\angle B$ X Cannot use 1 point here!

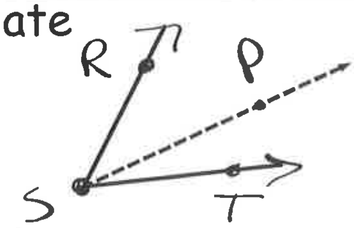
$\angle ABC$, $\angle 1$

$\angle CBD$, $\angle 2$

Angle Addition Postulate

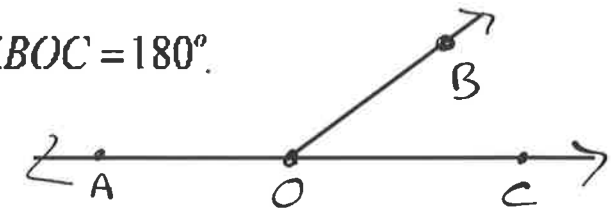
(1) If P is in the interior of $\angle RST$,

then $m\angle RSP + m\angle PST = m\angle RST$



(2) If $\angle AOC$ is a straight angle and B is any point not on $\overline{AC}$,

then $m\angle AOB + m\angle BOC = 180^\circ$.



This part of the Angle Addition Postulate is sometimes expressed as the Linear Pair Postulate.

If two angles form a linear pair, the angles are supplementary.

Assignment #9

Read and Take Notes on p. 17-19 and 23.

Complete p. 21-22 WE #1-18, 29-33 odd

Make the Chapter 1 Note cards (16)