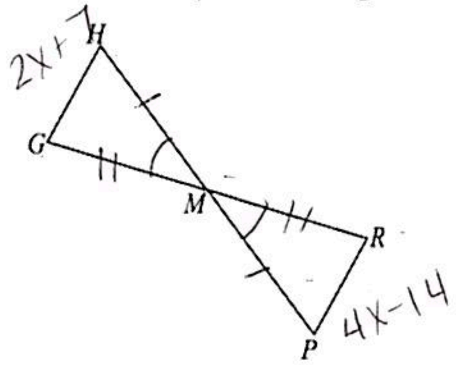
Name: Key Date: ____________

UNIT 3 **LESSON 8**

AIM: WHAT DOES CPCTC MEAN? HOW CAN WE USE THIS IN PROOFS? (DAY 1)

Do Now:

a) If $\overline{GR}$ and $\overline{HP}$ bisect each other at M, is $\Delta GHM \cong \Delta RPM$? Explain what shortcut you would use to support your answer. *(Mark the diagram and write the plan but you do not have to write the full proof!)*



S $\overline{HM} \cong \overline{MP}$

A $\angle HMG \cong \angle PMR$

S $\overline{GM} \cong \overline{MR}$

$\Delta HMG \cong \Delta PMR$

b) Identify all corresponding sides and angles.

CORRESPONDING SIDES	CORRESPONDING ANGLES
$\overline{GM} \cong \overline{MR}$	$\angle H \cong \angle P$
$HM \cong MP$	$\angle M \cong \angle M$
$HG \cong RP$	$\angle G \cong \angle R$

c) If $\overline{GH} = 2x + 7$ and $\overline{RP} = 4x - 14$, what is the value of x? Explain your answer.

$4x - \cancel{14} = \cancel{2x} + 7$

$-2x + \cancel{14} - \cancel{2x} + 14$

$2x = 21$

$\boxed{x = 10.5}$

corresponding sides are $\cong$

<u>C</u>ORRESPONDING <u>P</u>ARTS OF <u>C</u>ONGRUENT <u>T</u>RIANGLES ARE <u>C</u>ONGRUENT!

- **"PARTS"** refer to ___sides___ or ___angles___.
- In other words, if we know ___3___ pieces of information to prove two triangles are congruent, we can prove that ___all___ corresponding sides and angles are congruent.
- CPCTC is used when our prove statement is asking us to find corresponding ___sides___ or ___angles___ congruent within two triangles.
- Before we can use CPCTC, we must first prove the triangles are ___congruent___!

EXAMPLE #1:

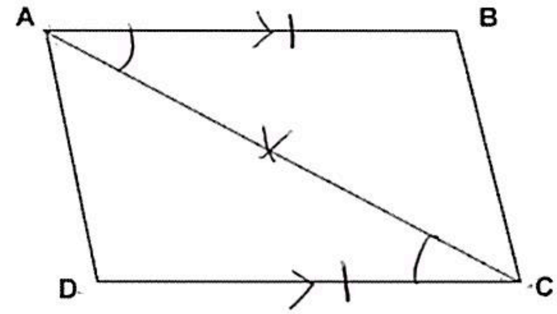
Given: $\overline{AB} \parallel \overline{CD}$ and $\overline{AB} \cong \overline{CD}$

Prove: $\overline{AD} \cong \overline{CB}$

SAS

✓✓✓

↳ First Prove: $\Delta ACD \cong \Delta CAB$



	STATEMENT	REASON
S	(1) $\overline{AB} \parallel \overline{CD}$ and $\overline{AB} \cong \overline{CD}$	(1) Given
A	(2) $\angle BAC \cong \angle DCA$	(2) Alt. int. $\angle$'s are $\cong$
S	(3) $\overline{AC} \cong \overline{AC}$	(3) Reflexive Property
	(4) $\Delta ACD \cong \Delta CAB$	(4) SAS $\cong$ SAS
	(5) $\overline{AD} \cong \overline{CB}$	(5) CPCTC

EXAMPLE #2:

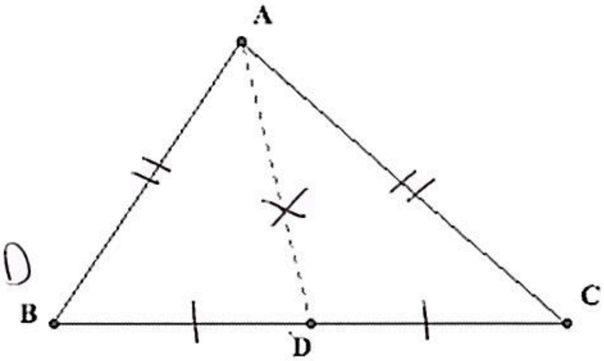
Given: $\overline{AD}$ is the median of ΔABC

$\overline{AB} \cong \overline{AC}$

Prove: $\measuredangle B \cong \measuredangle C$

✓✓ SSS

↳ FIRST Prove: $\Delta ABD \cong \Delta ACD$



	STATEMENT	REASON
S	① $\overline{AD}$ is the median of ΔABC, $\overline{AB} \cong \overline{AC}$	① Given
S	② $\overline{BD} \cong \overline{DC}$	② A median creates 2 ≅ segments
S	③ $\overline{AD} \cong \overline{AD}$	③ Reflexive
	④ $\Delta ABD \cong \Delta ACD$	④ SSS ≅ SSS
	⑤ $\measuredangle B \cong \measuredangle C$	⑤ CPCTC

EXAMPLE #3:

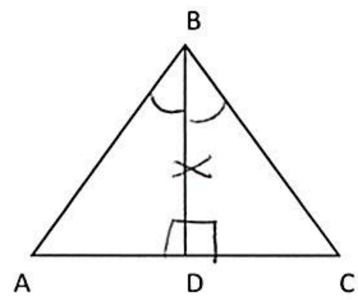
Given: $\overline{BD}$ bisects $\angle ABC$

$\overline{BD}$ is the altitude of ΔABC

Prove: $\measuredangle A \cong \measuredangle C$

ASA

↳ FIRST PROVE: $\Delta ABD \cong \Delta CBD$



STATEMENT	REASON
① $\overline{BD}$ bisects $\measuredangle ABC$ $\overline{BD}$ altitude of ΔABC	① Given
A ② $\measuredangle ABD \cong \measuredangle CBD$	② A bisector creates $2 \cong \measuredangle$'s
S ③ $\overline{BD} \cong \overline{BD}$	③ Reflexive property
A ④ $\measuredangle ADB \cong \measuredangle CDB$	④ altitudes form $\cong$ right $\measuredangle$'s
⑤ $\Delta ABD \cong \Delta CBD$	⑤ $ASA \cong ASA$
⑥ $\measuredangle A \cong \measuredangle C$	⑥ CPCTC

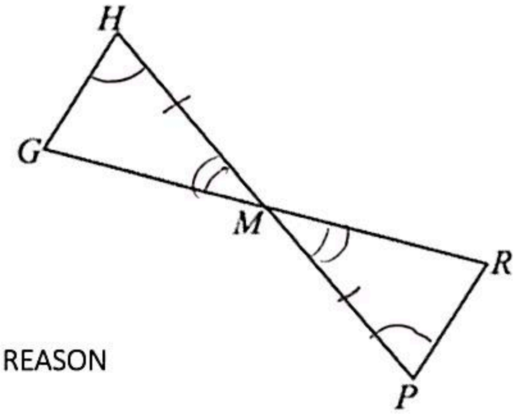
EXAMPLE #4:

Given: M is the midpoint of $\overline{HP}$, $\angle H \cong \angle P$

Prove: $\overline{GM} \cong \overline{MR}$

ASA

↳ FIRST PROVE: $\triangle HMG \cong \triangle PMR$



STATEMENT	REASON
① M is the midpoint of HP $\angle H \cong \angle P$ ✓	① Given
② $\overline{HM} \cong \overline{MP}$ ✓	② A midpoint creates 2 $\cong$ segments
③ $\angle HMG \cong \angle PMR$ ✓	③ vertical $\angle$'s are $\cong$
④ $\triangle HMG \cong \triangle PMR$	④ ASA $\cong$ ASA
⑤ $\overline{GM} \cong \overline{MR}$	⑤ CPCTC

Name: ______________________________ Date: ____________________

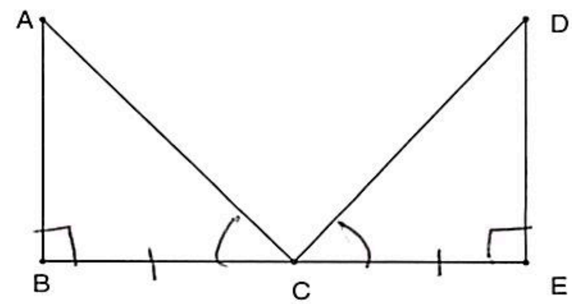
UNIT 3 **LESSON 8**

HOMEWORK

1. Given: $\angle ACB \cong \angle DCE$
   $\overline{AB} \perp \overline{BE}, \overline{DE} \perp \overline{BE}$
   C is the midpoint of $\overline{BE}$

   ASA

   Prove: $\overline{AB} \cong \overline{DE}$
   ↳ FIRST PROVE: $\Delta ABC \cong \Delta DEC$

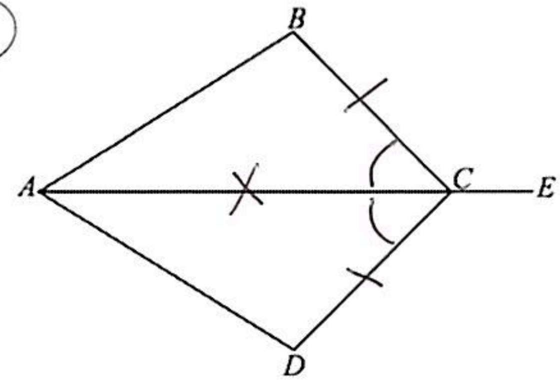


STATEMENT	REASON
① $\angle ACB \cong \angle DCE$ ✓ $\overline{AB} \perp \overline{BE}$, $\overline{DE} \perp \overline{BE}$ C midpoint of BE	① Given
② $\overline{BC} \cong \overline{CE}$ ✓	② A midpoint creates 2 ≅ segments
③ $\angle ABC \cong \angle DEC$ ✓	③ ⊥ lines form ≅ right ∠'s
④ $\Delta ABC \cong \Delta DEC$	④ ASA ≅ ASA
⑤ $\overline{AB} \cong \overline{DE}$	⑤ CPCTC

2. Given: $\overline{AE}$ bisects $\angle BCD$ and $\overline{BC} \cong \overline{DC}$
Prove: $\measuredangle B \cong \measuredangle D$

SAS ✓✓✓

↳ FIRST PROVE: $\Delta ABC \cong \Delta ADC$



STATEMENT	REASON
① $\overline{AE}$ bisects $\measuredangle BCD$ $\overline{BC} \cong \overline{DC}$ ✓	① Given
② $\measuredangle BCA \cong \measuredangle DCA$ ✓	② A bisector creates 2 $\cong$ $\measuredangle$'s
③ $\overline{AC} \cong \overline{AC}$ ✓	③ Reflexive Property
④ $\Delta ABC \cong \Delta ADC$	④ SAS $\cong$ SAS
⑤ $\measuredangle B \cong \measuredangle D$	⑤ CPCTC