GEOMETRY UNIT 5

Using Congruent Triangles

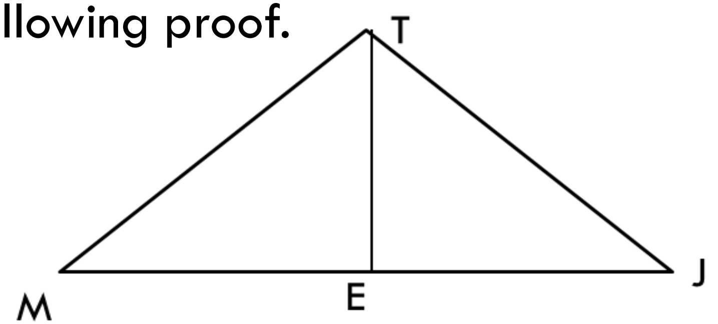
Using the Postulates

Supply the missing statements and reasons in the following proof.

Given: E is the midpoint of $\overline{MJ}$

$\overline{TE} \perp \overline{MJ}$

Prove: $\Delta MET \cong \Delta JET$



Statements	**Reasons**
1. E is the midpoint of $\overline{MJ}$	1. Given
2. $\overline{ME} \cong \overline{EJ}$	2. Def. of Midpoint
3. $\overline{TE} \perp \overline{MJ}$	3. Given
4. $< MET \cong < JET$	4. Def. of Perp. Lines
5. $\overline{TE} \cong \overline{TE}$	5. Reflexive
6. $\Delta MET \cong \Delta JET$	6. SAS Postulate

Using Congruent Triangles

- **Content Objective**: Students will be able to use congruent triangles to prove that their corresponding parts are congruent.

- **Language Objective**: Students will be able to write up a plan for proving that corresponding parts of congruent triangles are congruent.

Using Congruent Triangles

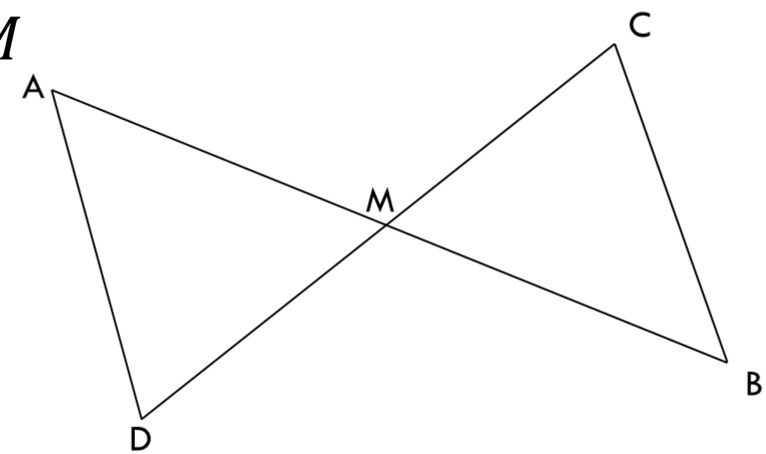
- Our goal from the last section was to prove that two triangles are congruent.

- Our goal in this section is to deduce information about segments or angles once we have shown that they are corresponding parts of congruent triangles.

Example : Complete this Proof

Given: $\overline{AB}$ and $\overline{CD}$ bisect each other at M

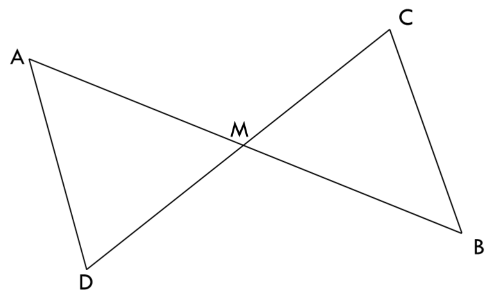
Prove: $\overline{AD} \parallel \overline{BC}$



Plan for Proof:

- You can plan $\overline{AD} \parallel \overline{BC}$ if you can show that __Alt.__ __Int.__ angles $< A$ and $< B$ are __$\cong$__.
- You will know that $< A$ and $< B$ are __$\cong$__ if they are __Corresponding Parts__ of congruent triangles.
- Thus, the Diagram suggests that you first prove __ΔADM__ $\cong$ __ΔBCM__.

Example : Complete this Proof



Now, on to the proof:

Statements	**Reasons**
1. $\overline{AB}$ and $\overline{CD}$ bisect each other at M	1. Given
2. M is the midpoint of $\overline{AB}$ and $\overline{CD}$	2. Def. of a Segment Bisector
3. $\overline{AM} \cong \overline{MB}$; $\overline{DM} \cong \overline{MC}$	3. Def. of Midpoint
4. $< AMD \cong < BMC$	4. Vertical <'s are ≅
5. $\Delta AMD \cong \Delta BMC$	5. SAS Postulate
6. $< A \cong < B$	6. CPCTC
7. $\overline{AD}$ ll $\overline{BC}$	7. If 2 lines ACBAT and Alt. Int. <'s are ≅, then the lines are ll.

Coming Up with a Plan

- When trying to prove if two segments or two angles are congruent, follow this strategy.

1.) Identify two triangles in which the two segments or angles are corresponding parts.

2.) Prove that those triangles are congruent.

3.) State the two congruent parts, using the reason

CPCTC

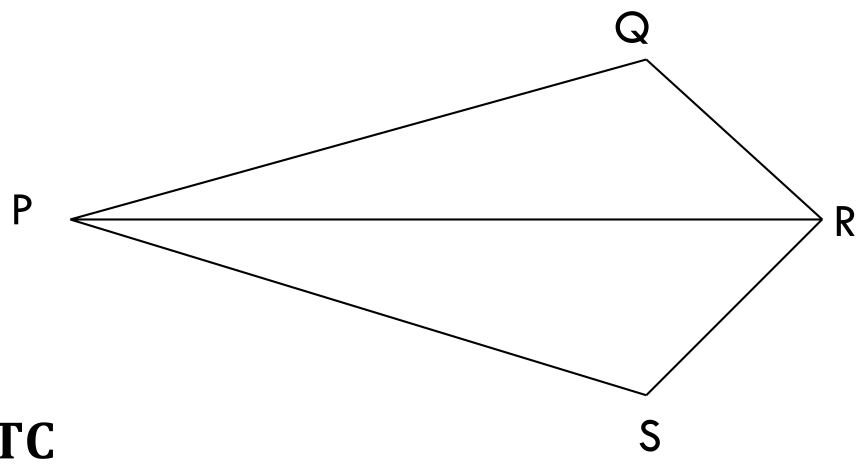
*Extra planning may be needed if you need to prove more things (i.e. lines are parallel, lines are perp., etc.)

Coming up with a Plan: Example A

- Describe the plan for proving the following

Given: $\overleftrightarrow{PR}$ bisects $< QPS$; $\overline{PQ} \cong \overline{PS}$

Prove: $< Q \cong < S$



1.) $< Q$ is in ΔPQR ; $< S$ is in ΔPSR

2.) Prove that $\Delta PQR \cong \Delta PSR$

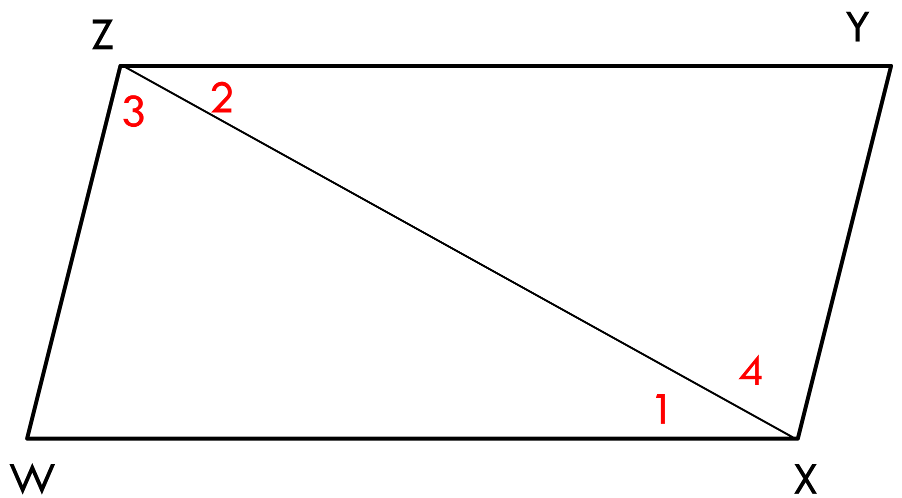
3.) State that $< Q \cong < S$ by **CPCTC**

Coming up with a Plan: Example B

- Describe the plan for proving the following

Given: $\overline{WX} \cong \overline{YZ}$; $\overline{ZW} \cong \overline{XY}$

Prove: $\overline{WX} \parallel \overline{ZY}$



1.) $\overline{WX}$ is in ΔXWZ; $\overline{YZ}$ is in ΔZYX

2.) Prove that $\Delta XWZ \cong \Delta ZYX$

3.) State that $< 1 \cong < 2$ or $< 3 \cong < 4$ by $\mathbf{CPCTC}$

4.) State that $\overline{WX} \parallel \overline{ZY}$ because we have $\mathbf{Alt.Int.} <' \mathbf{s} \cong$

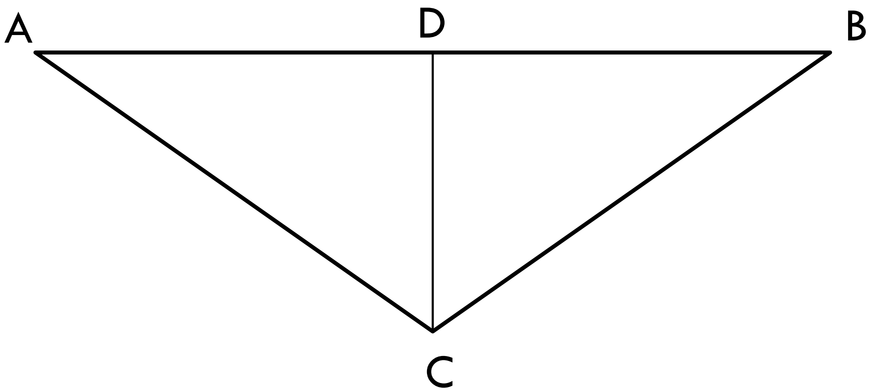
Coming up with a Plan: Example C

- Describe the plan for proving the following

Given: $\overline{CD} \perp \overline{AB}$;

D is the midpoint of $\overline{AB}$

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



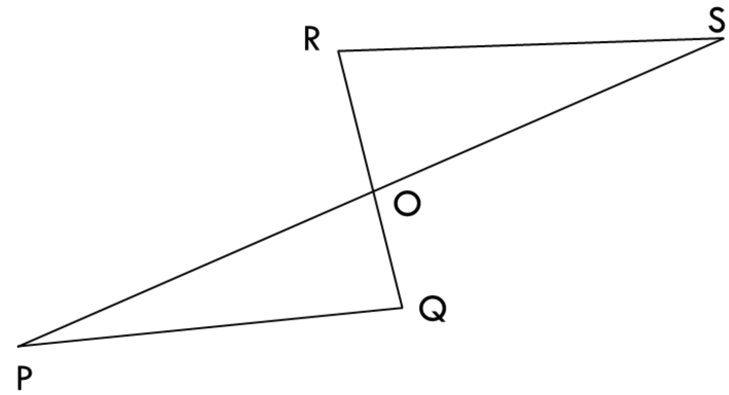
1.) $\overline{CA}$ is in ΔCAD ; $\overline{CB}$ is in ΔCBD

2.) Prove that $\Delta CAD \cong \Delta CBD$

3.) State that $\overline{CA} \cong \overline{CB}$ by **CPCTC**

<u>Exit Ticket</u>:

Complete the Proof



Given: $< P \cong < S$

O is the midpoint of $\overline{PS}$

Prove: O is the midpoint of $\overline{RQ}$

Statements	Reasons
1. $< P \cong < S$	1. Given
2. O is the midpoint of $\overline{PS}$	2. Given
3. $\overline{PO} \cong \overline{OS}$	3. Def. of Midpoint
4. $< POQ \cong < SQR$	4. Vertical <'s are ≅
5. $\Delta AMD \cong \Delta BMC$	5. ASA Postulate
6. $\overline{QO} \cong \overline{RO}$	6. CPCTC
7. O is the midpoint of $\overline{RQ}$	7. Def. of Midpoint