Unit 4

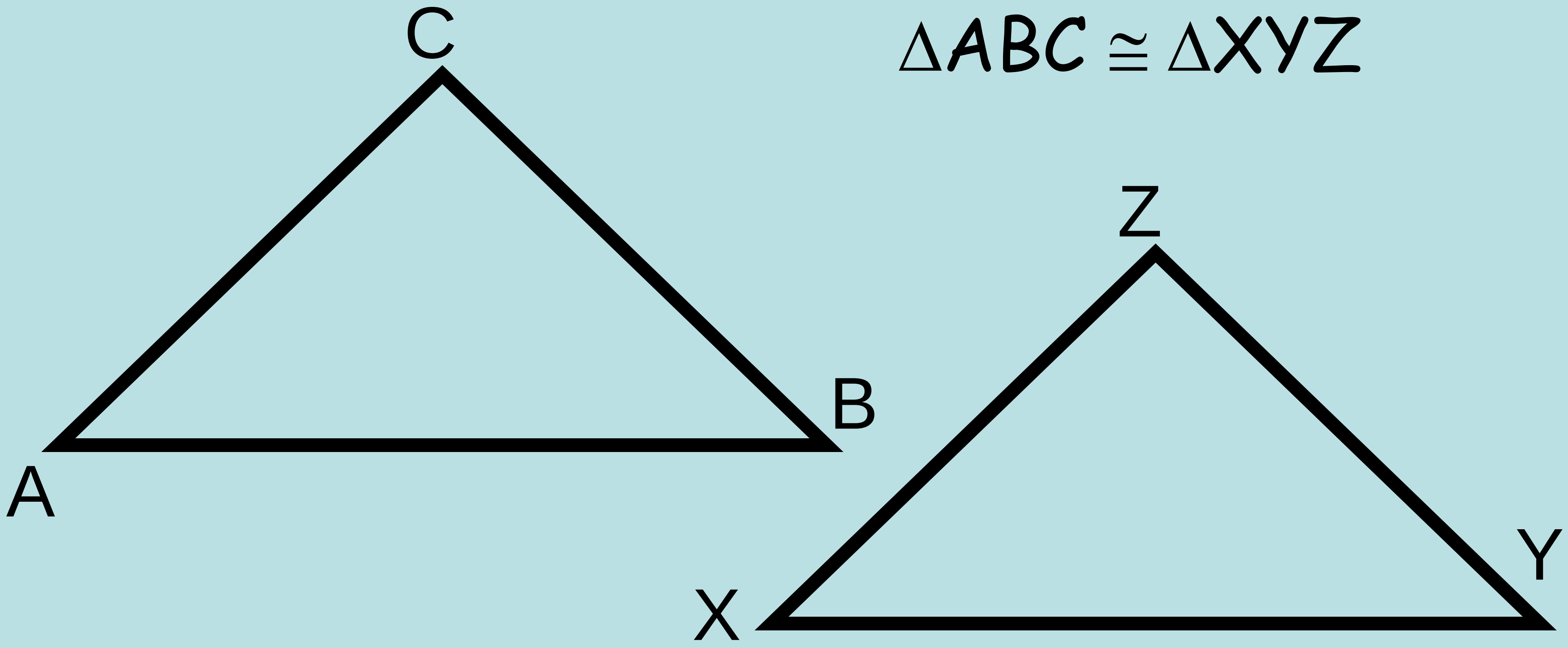
Congruent Triangles

Congruent Figures -

<u>Figures that have the same size and shape.</u>

What do you think is true, specifically, about these two congruent triangles.

$$\Delta ABC \cong \Delta XYZ$$



$\Delta ABC \cong \Delta XYZ$

Observations -

$\angle A \cong \angle X$

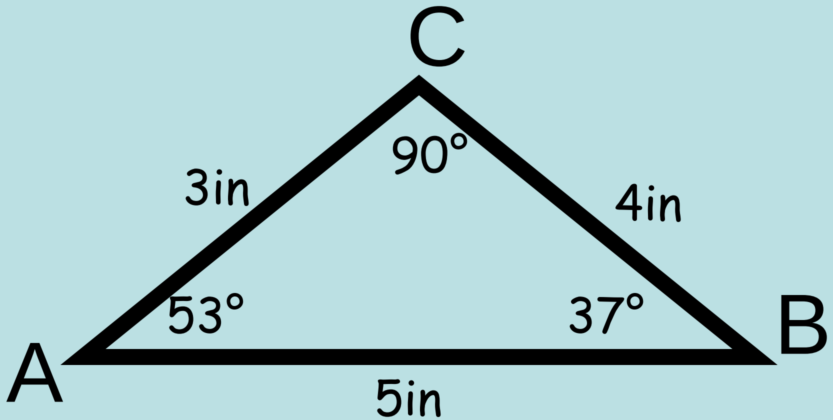
$\angle B \cong \angle Y$

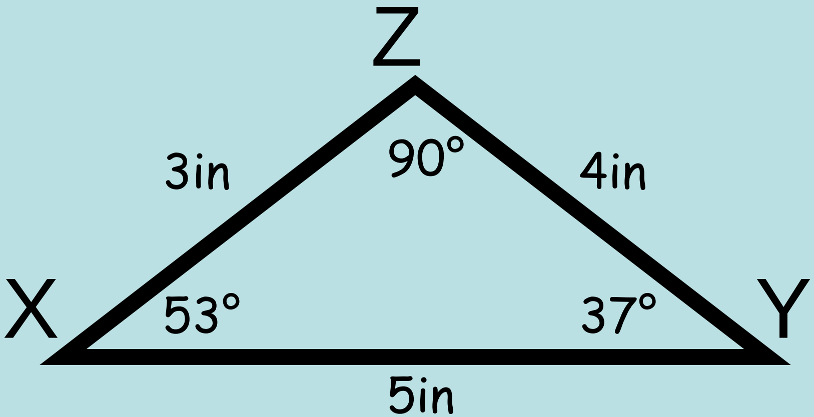
$\angle C \cong \angle Z$

$\overline{AB} \cong \overline{XY}$

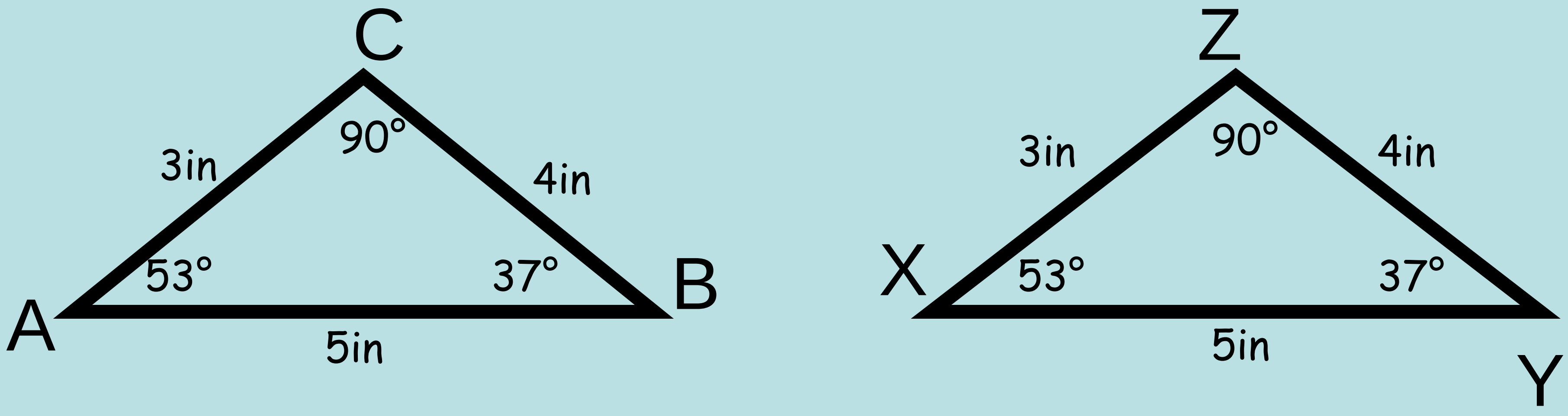
$\overline{BC} \cong \overline{YZ}$

$\overline{AC} \cong \overline{XZ}$





Two polygons are **congruent** if and only if their vertices can be matched up so that the **corresponding parts** (angles and sides) of the triangles are congruent.

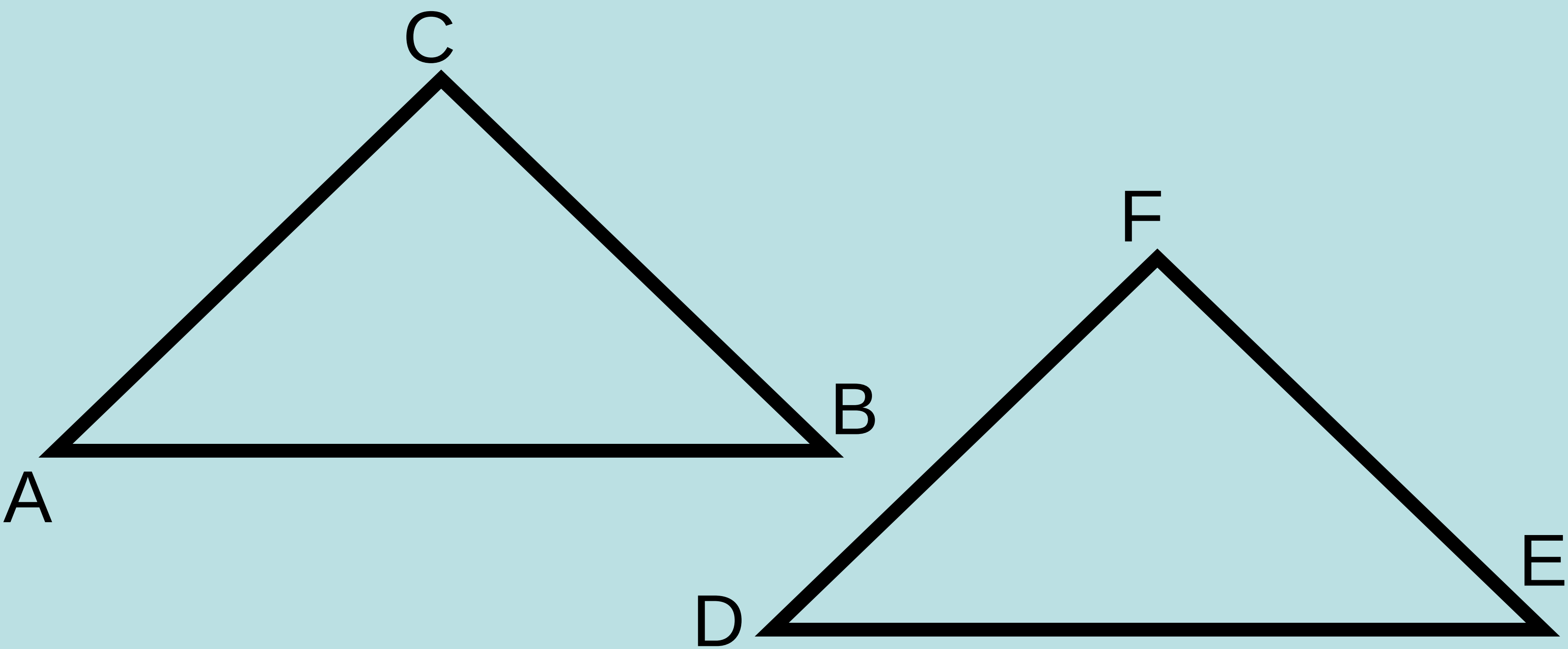


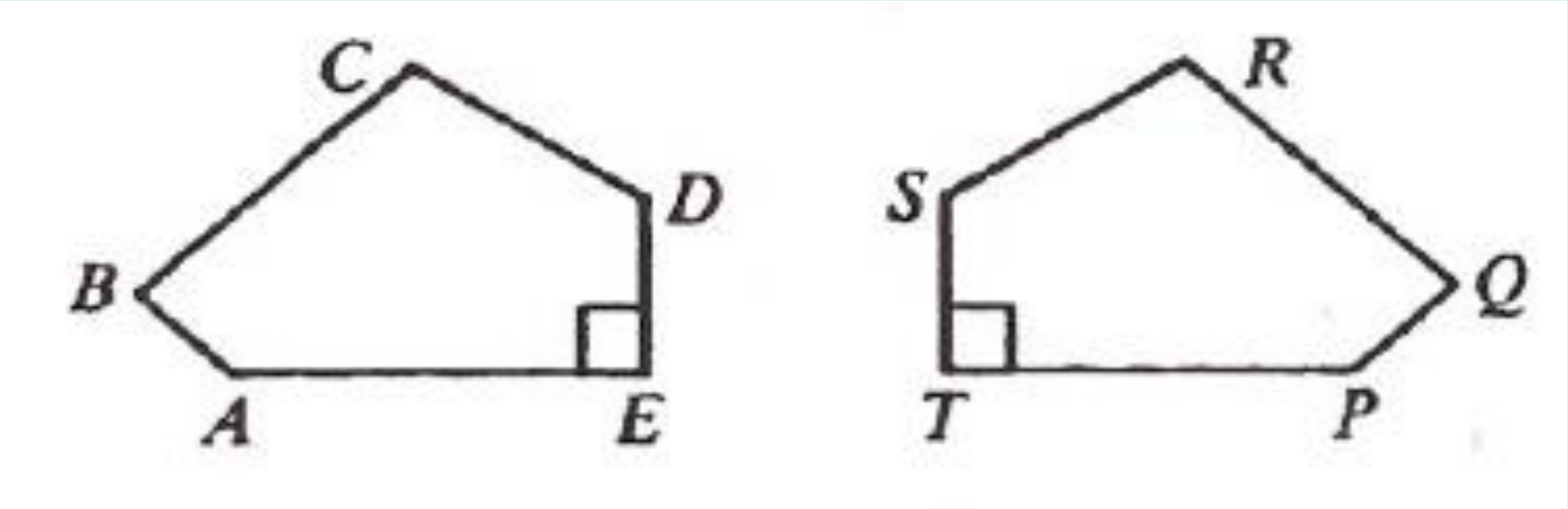
$\triangle ABC \cong \triangle DFE$

$\triangle BCA \cong \triangle$ FED

$\triangle CBA \cong \triangle$ EFD

$\triangle ACB \cong \triangle$ DEF





ABCDE ≅ PQRST

AEDCB ≅ PTSRQ

BCDEA ≅ QRSTP

CDEAB ≅ RSTPQ

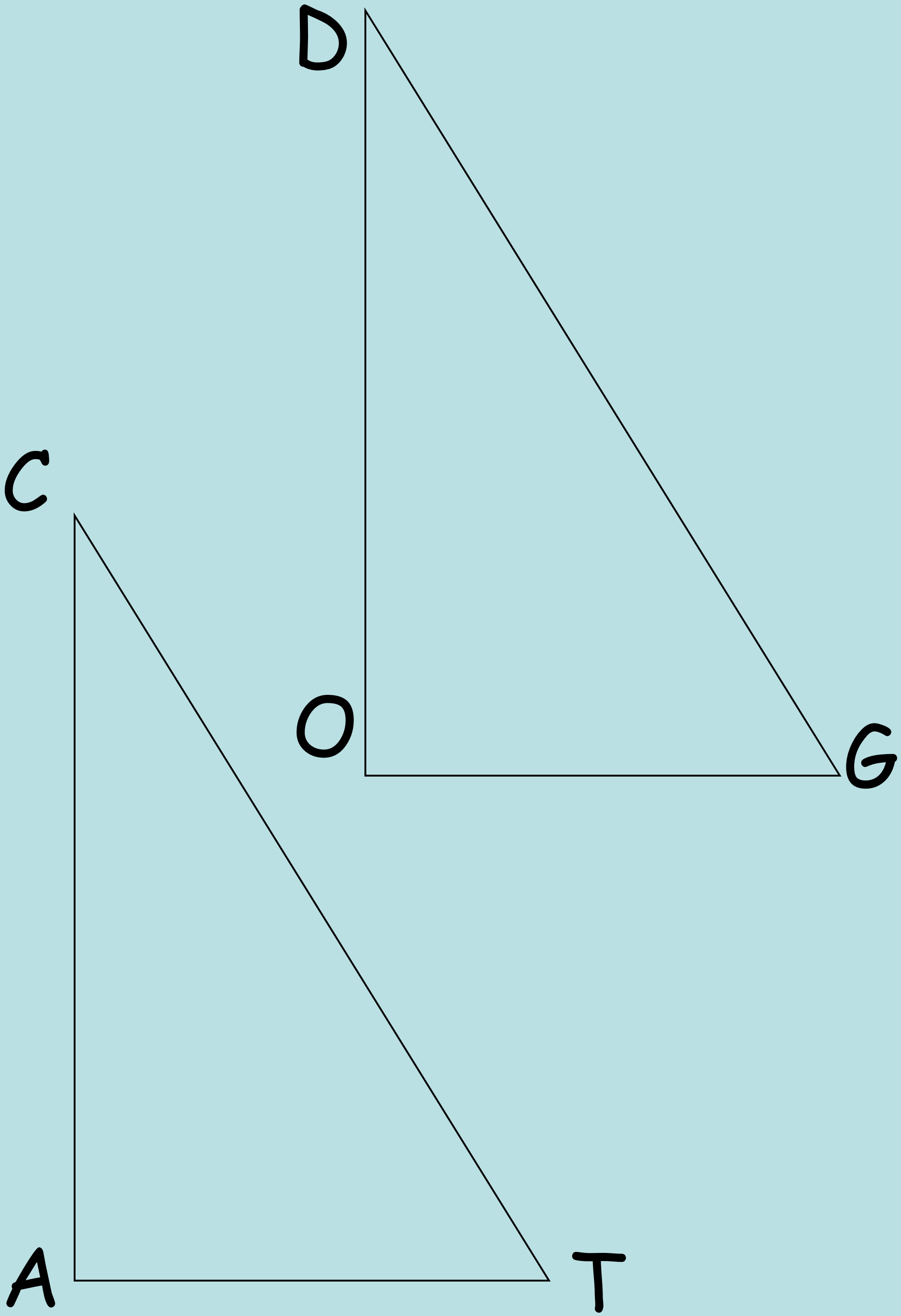
Definition of Congruent Triangles:

Two triangles are congruent if and only if their vertices can be matched up so the **corresponding parts** of the triangles are congruent.

★ When the definition of congruent triangles is used in a proof, the wording used is **corresponding parts of congruent triangles are congruent** abbreviated as **CPCTC**.

Corresponding Parts of Congruent Triangles are Congruent.

CPCTC



Given: $\Delta CAT \cong \Delta DOG$

$\overline{CA} \cong \overline{DO}$ $\quad \angle C \cong \angle D$

$\overline{CT} \cong \overline{DG}$ $\quad \angle A \cong \angle O$

$\overline{AT} \cong \overline{OG}$ $\quad \angle T \cong \angle G$

Practice - CPCTC

Given: $\Delta PIG \cong \Delta COW$

$\overline{PG} \cong \overline{CW}$ $\quad\quad \angle P \cong \angle C$

$\overline{PI} \cong \overline{CO}$ $\quad\quad \angle I \cong \angle O$

$\overline{IG} \cong \overline{OW}$ $\quad\quad \angle G \cong \angle W$

<u>Make sure the letters match up!!</u>

How else could you name the congruent triangles?

$\Delta PIG \cong \Delta COW$

$\Delta GIP \cong \Delta WOC$

$\Delta IPG \cong \Delta OCW$

$\Delta GPI \cong \Delta WCO$

$\Delta PGI \cong \Delta CWO$

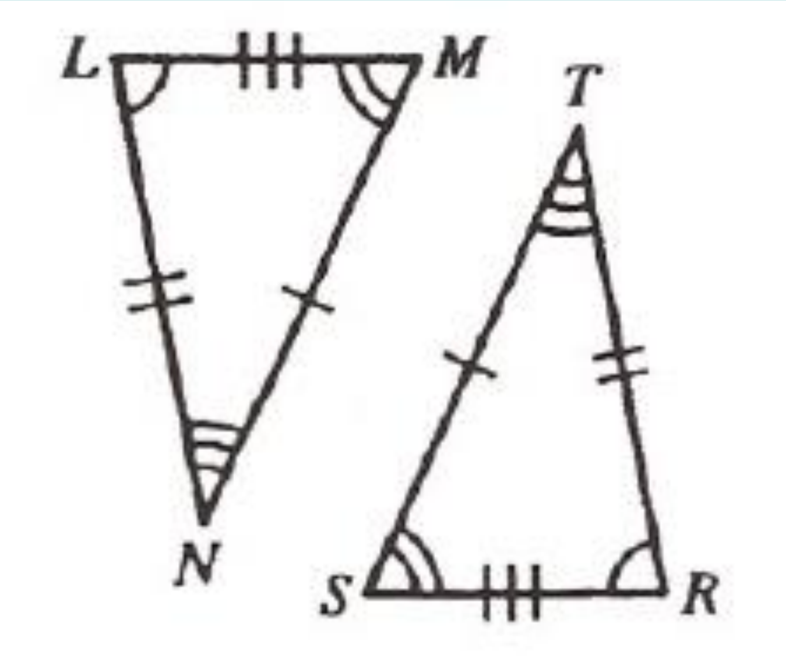
$\Delta IGP \cong \Delta OWC$

$\Delta PIG \cong \Delta WOC$

$\Delta GIP \cong \Delta COW$

$\Delta IPG \cong \Delta WCO$

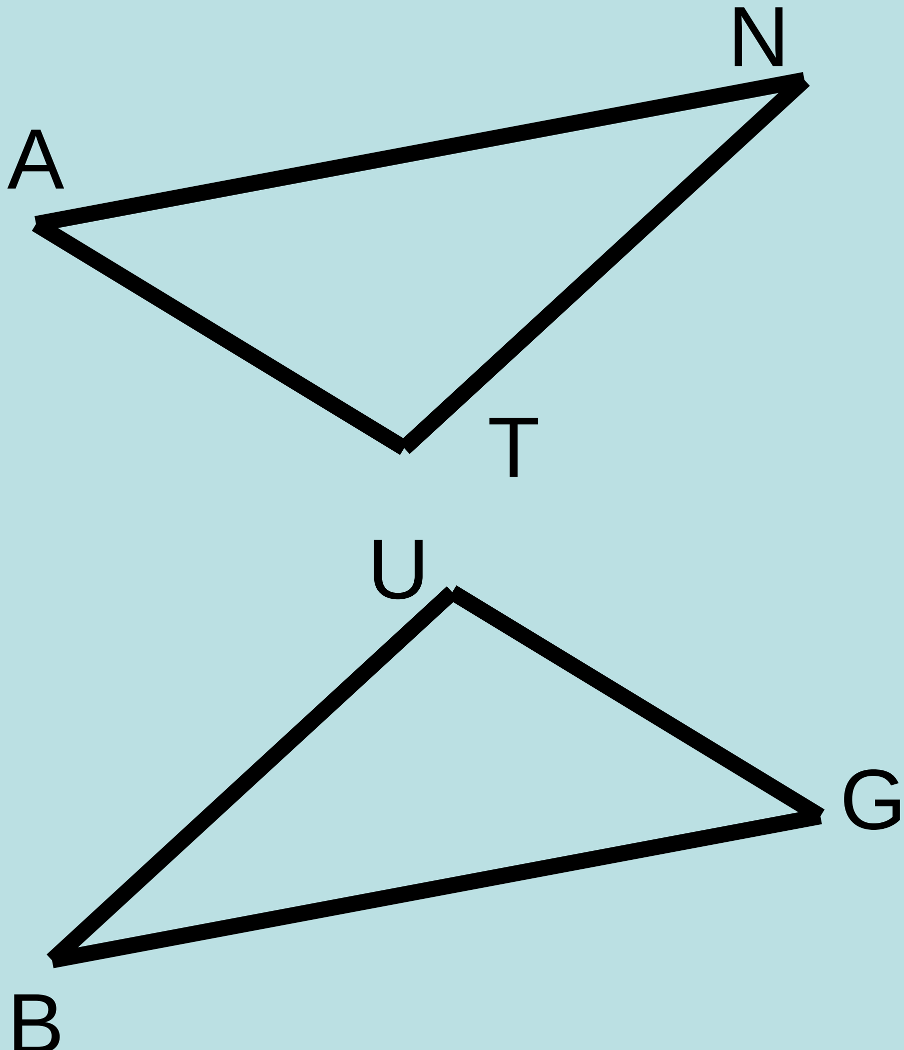
If $\triangle$**LMN** $\cong$ $\triangle$**RST**, then the following corresponding parts are congruent.



Angles: $\angle L \cong \angle$______
$\angle M \cong \angle$______
$\angle N \cong \angle$______

Sides: LM $\cong$ ______
MN $\cong$ ______
LN $\cong$ ______

CPCTC: Since, the definition is an **"if and only if"** statement, it also means that if you know the corresponding parts are congruent, then you can say the triangles are congruent.



$\overline{AN} \cong \overline{GB}$ $\angle A \cong \angle G$

$\overline{AT} \cong \overline{GU}$ $\angle N \cong \angle B$

$\overline{NT} \cong \overline{BU}$ $\angle T \cong \angle U$

$$\Delta BUG \cong \Delta NTA$$

Partner Practice

page 119 # 1-10

p. 119 # 1-4

$\Delta FIN \cong \Delta WEB$

1. Name the three pairs of corresponding sides.

$\overline{FI} \cong \overline{WE}$ $\overline{IN} \cong \overline{EB}$ $\overline{FN} \cong \overline{WB}$

2. Name the three pairs of corresponding angles.

$\angle F \cong \angle W$ $\angle I \cong \angle E$ $\angle N \cong \angle B$

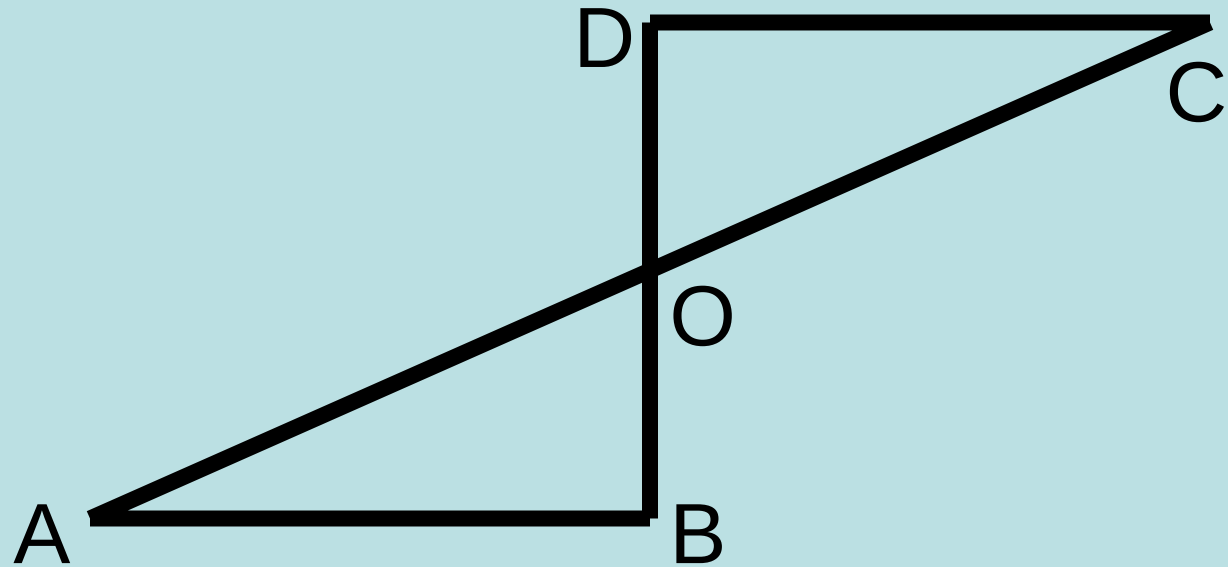
3. Is it correct to say $\Delta NIF \cong \Delta BEW$?

Yes

4. Is it correct to say $\Delta INF \cong \Delta EWB$?

No

p. 119 # 5 - 9



5. $\Delta ABO \cong \Delta CDO$

6. $\angle A \cong \angle C$

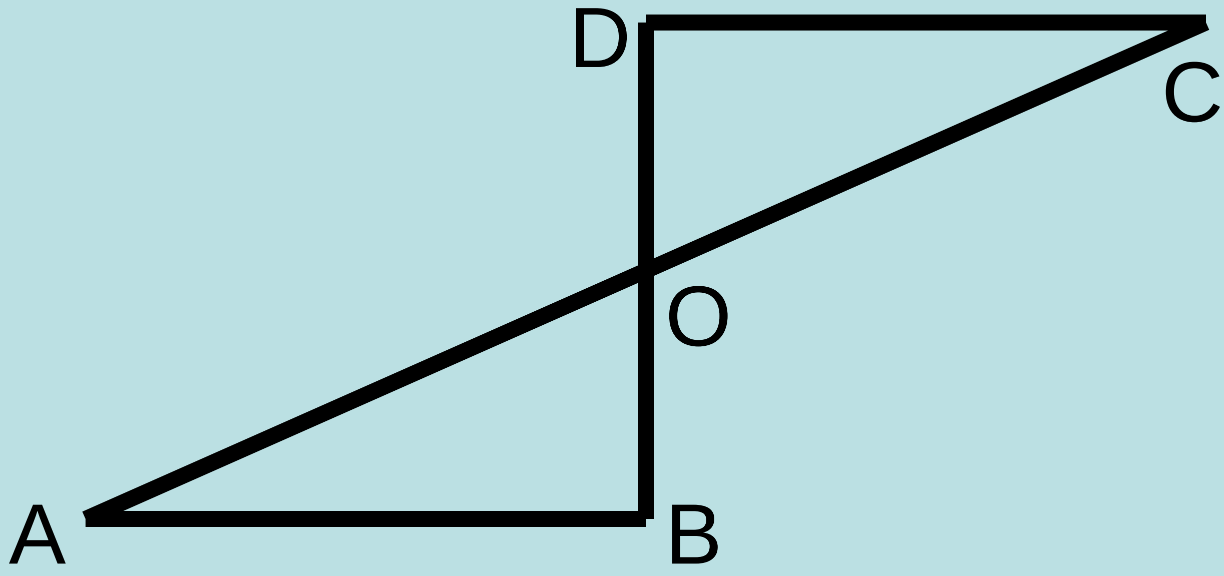
7. $\overline{AO} \cong \overline{CO}$

8. $\overline{BO} \cong \overline{DO}$

9. Can you deduce that O is the midpoint of any segment?

Yes. O is the midpoint of $\overline{AC}$ and $\overline{DB}$ because AO = OC and DO = OB.

p. 119 # 10



10. Explain how you can deduce that $\overline{DC} \parallel \overline{AB}$.

$\angle A \cong \angle C$

If two lines are cut by a transversal and alternate interior angles are congruent, then the lines are parallel.