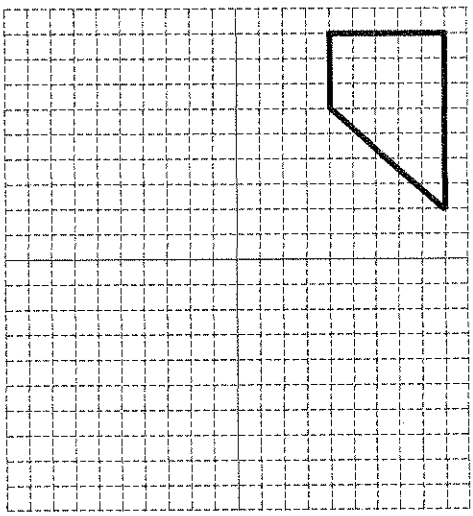
Day 8: Triangle Congruence

Warm-Up:

Create two figures congruent to the one given using two different transformations.



Describe the transformations you used and justify why you are sure that both of your figures are congruent to the original one.

answers vary

Triangle Congruence notes...

Congruent Figures

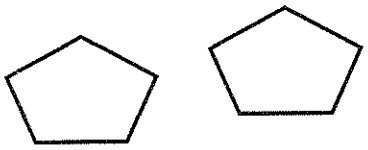
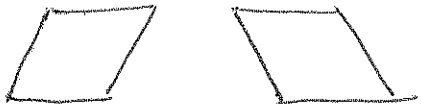
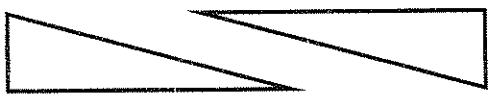
Definition

Figures with the same shape and the same size.

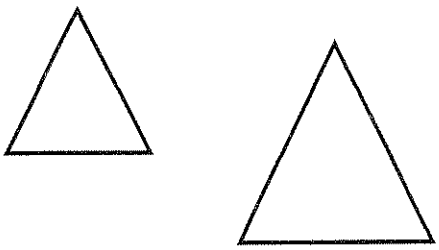
Characteristics

All angle pairs are $\cong$ (congruent)
All side pairs are $\cong$

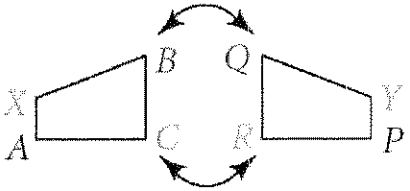
Examples

1. 
2. 
3. 

Non-Examples

1.  different shapes
2.  not $\cong$ sides, may be $\sim$ $\triangle$s

Congruent polygons have congruent corresponding ("matching") parts – their matching sides and angles.



C corresponds to R.
$\angle B$ corresponds to $\angle Q$.
$\overline{AX}$ corresponds to $\overline{PY}$.
$ACBX \cong PRQY$

Naming Congruent Figures

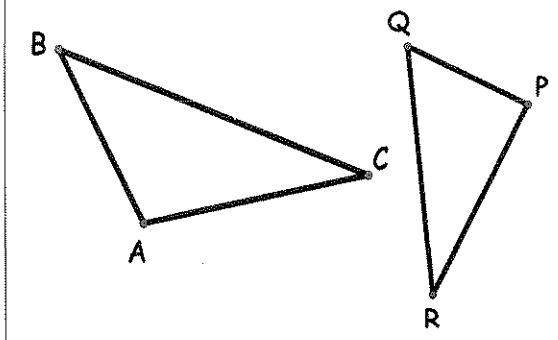
a) Points can be named in any consecutive order.

b) Each corresponding vertex must be in the same order for each figure.

Ex. Figure BCAX is congruent to QRPY.

Example: $\triangle ABC \cong \triangle PQR$. List the congruent corresponding parts.

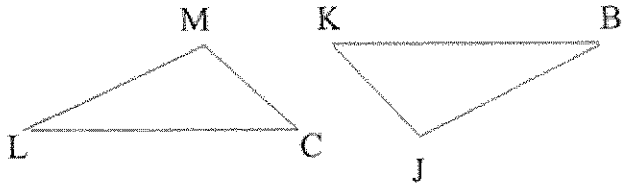
(List the corresponding vertices in the same order. List the corresponding sides in the same order.)



Corresponding Angles	Corresponding Sides
$\angle A \cong \angle P$	$\overline{AB} \cong \overline{PQ}$
$\angle B \cong \angle Q$	$\overline{BC} \cong \overline{QR}$
$\angle C \cong \angle R$	$\overline{AC} \cong \overline{PR}$

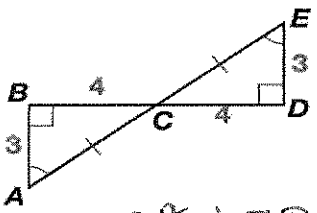
Be careful! The pictures don't always line up corresponding parts! The congruence statement MUST have them in order! ☺

You Try
$\Delta LMC \cong \Delta BJK$
Complete the congruence statements. (Name all congruent angles. Name all congruent sides.)



3. $\overline{LC} \cong$ $\overline{BK}$
4. $\overline{KJ} \cong$ $\overline{CM}$
5. $\overline{JB} \cong$ $\overline{ML}$
6. $\angle L \cong$ $\angle B$
7. $\angle K \cong$ $\angle C$
8. $\angle M \cong$ $\angle J$
9. $\Delta CML \cong$ ΔKJB
10. $\Delta KBJ \cong$ ΔCLM

Can you conclude that $\Delta ABC \cong \Delta CDE$ in the figure below?

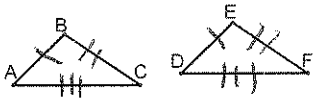


this statement shows $\angle BAC \cong \angle DCE$
but in figure $\angle BAC \cong \angle DEC$
so $\Delta ABC \cong \Delta CDE \Rightarrow$ Instead, $\Delta ABC \cong \Delta EDC$

* discovery activity here before notes

Postulate 4-1: Side – Side – Side Postulate (or SSS Postulate)

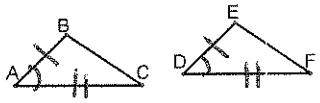
If 3 sides of one triangle are congruent to 3 sides of another triangle, then the 2 triangles are congruent.



If $\overline{AB} \cong \overline{DE}, \overline{BC} \cong \overline{EF}, \overline{AC} \cong \overline{DF}$ *Then* $\Delta ABC \cong \Delta$ DEF

Postulate 4-2: Side – Angle – Side Postulate(or SAS Postulate)

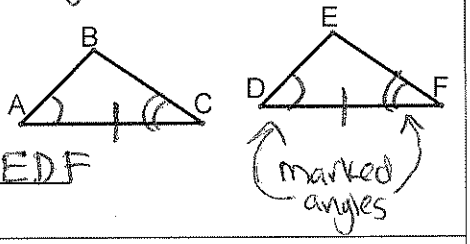
If 2 sides and the included angle of one triangle are congruent to 2 sides and the included angle of another triangle, then the 2 triangles are congruent.



If $\overline{AB} \cong \overline{DE}, \angle A \cong \angle D, \overline{AC} \cong \overline{DF}$ *Then* $\Delta BAC \cong \Delta EDF$

Postulate 4-3 Angle – Side - Angle Postulate (or ASA Postulate):

If 2 angles and the included side of one triangle are congruent to 2 angles and the included side of another triangle, then the 2 triangles are congruent

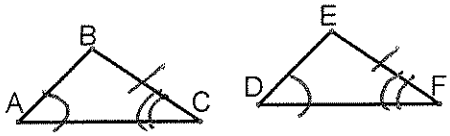


If $\overline{AC} \cong \overline{DF}, \angle A \cong \angle D, \angle C \cong \angle F$, then $\Delta BAC \cong \Delta$ EDF

* NOTE: Side here is between 2 marked angles (called an included side)

Postulate 4-4 Angle – Angle - Side ~~Postulate~~ (or AAS ~~Postulate~~): Theorem Theorem

If 2 angles and a non included side of one triangle are congruent to 2 angles and a corresponding non included side of another triangle, then the 2 triangles are congruent



If $\overline{BC} \cong \overline{EF}, \angle A \cong \angle D, \angle C \cong \angle F$, then $\Delta BAC \cong \Delta$ EDF

* NOTE: marked side here is between a blank angle and a marked angle (this side is called a non-included side)