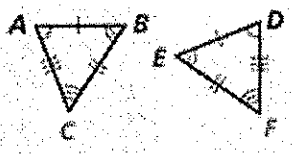
11-19-14

Notes 4-4: Congruent Triangles **Geometry - Ch. 4: *Triangle Congruence***

Objectives: *Use properties of congruent triangles. Prove triangles congruent by using the definition of congruence.*

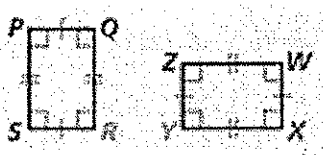
Congruent Polygons/Triangles: polygons having the same Size and shape.

- *Congruent polygons* have **corresponding** sides and **corresponding** angles which are ≅.
- Properties of ≅ Polygons: discuss the corresponding angles and corresponding sides in the congruent figures.



$\triangle ABC \cong \triangle DEF$

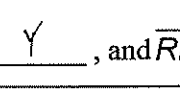
$PQRS \cong WXYZ$



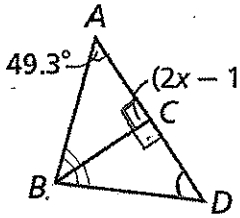
Naming Polygons: to name polygons, choose a vertex and list them alphabetically (if possible)

- The vertices can be named *clockwise* or *counter-clockwise*.
- The order MATTERS!

EX 1: If $\triangle PQR \cong \triangle XYZ$, then $\angle Q \cong \angle$ Y, and $\overline{RP} \cong \overline{ZX}$.



EX 2: $\triangle ABC \cong \triangle DBC$. Find the value of x.



$2x - 16 = 90$

$+16 \quad +16$

$\frac{2x}{2} = \frac{106}{2}$ $x = 53$

$x =$ 53

EX 3: $\triangle ABC \cong \triangle DEF$. Find the value of x.

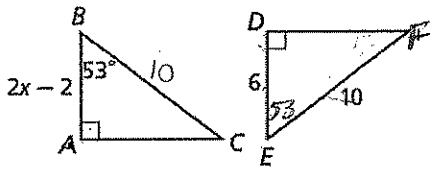
$\overline{AB} \cong \overline{DE}$

$2x - 2 = 6$

$+2 \quad +2$

$\frac{2x}{2} = \frac{8}{2}$

$x = 4$

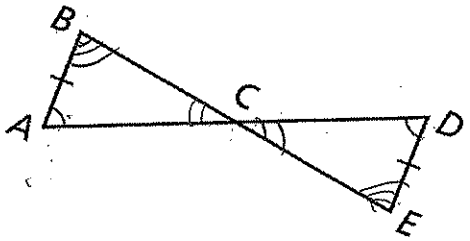


$x =$ 4

Proving Triangles Congruent: you must show that all 3 corresponding angles and all 3 corr. sides are ≅.

EX 4: *Given*: $\overline{AD}$ bisects $\overline{BE}$, $\overline{BE}$ bisects $\overline{AD}$.
$\overline{AB} \cong \overline{DE}$, $\angle A \cong \angle D$

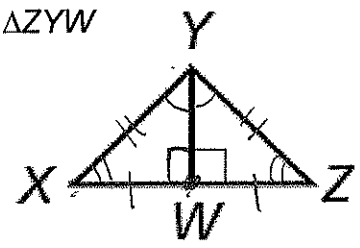
Prove: $\triangle ABC \cong \triangle DEC$



Statements	Reasons
1. $\angle A \cong \angle D$	1. Given
2. $\angle BCA \cong \angle DCE$	2. Vertical ∠ Th.
3. $\angle B \cong \angle E$	3. 3rd ∠ Th.
4. $\overline{AB} \cong \overline{DE}$	4. Given
5. $\overline{AD}$ bisects $\overline{BE}$, $\overline{BE}$ bisects $\overline{AD}$	5. Given
6. $\overline{BC} \cong \overline{EC}$, $\overline{AC} \cong \overline{DC}$	6. Def. of bisector
7. $\triangle ABC \cong \triangle DEC$	7. Def. of congruent △'s

EX 5: *Given*: $\angle YWX$ and $\angle YWZ$ are right angles.
$\overline{YW}$ bisects $\angle XYZ$.
W is the midpoint of $\overline{XZ}$.
$\overline{XY} \cong \overline{ZY}$

Prove: $\triangle XYW \cong \triangle ZYW$



Statements	Reasons
1. $\angle YWX$ and $\angle YWZ$ are rt. $\angle$s.	1. Given
2. $\angle YWX \cong \angle YWZ$	2. right ∠ ≅ Th.
3. $\overline{YW}$ bisects $\angle XYZ$	3. Given
4. $\angle XYW \cong \angle ZYW$	4. Defn. of bisector
5. W is midpt. of $\overline{XZ}$	5. Given
6. $\overline{XW} \cong \overline{ZW}$	6. Defn. of midpoint
7. $\overline{YW} \cong \overline{YW}$	7. reflexive
8. $\angle X \cong \angle Z$	8. 3rd ∠ Th.
9. $\overline{XY} \cong \overline{YZ}$	9. Given
10. $\triangle XYW \cong \triangle ZYW$	10. Def. of congruent △'s