CHAPTER 4:
CONGRUENT TRIANGLES

SECTION 4.1:
CONGRUENT FIGURES

Standards:

5.0 - Students prove that triangles are congruent or similar and they are able to use the concept of congruent parts of congruent triangles are congruent.

WARMUP

Factor the following completely.

1) $2x^2 - 7x - 4$

2) $5x^2 + x - 18$

3) $3x^2 - x - 4$

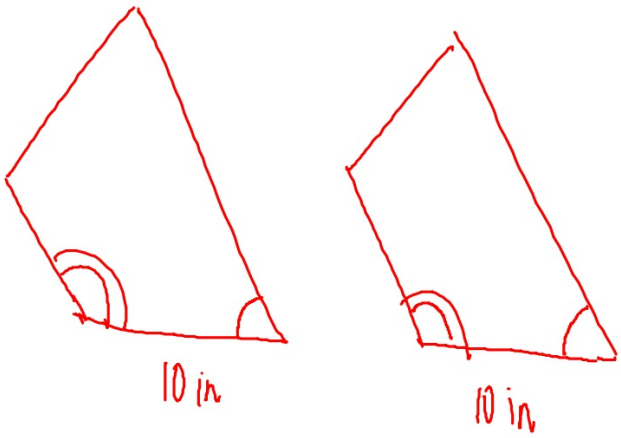
4) $6x^2 + 13x + 6$

CONGRUENT FIGURES

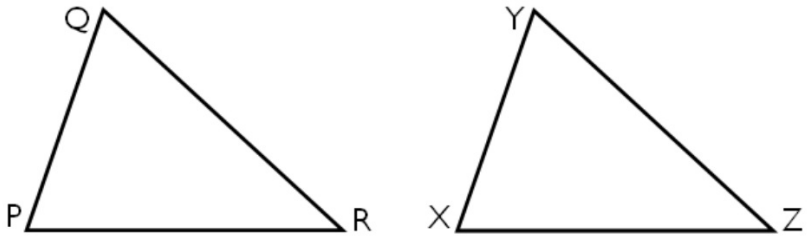
≅ ∠s

≅ sides

Figures with the same shape and the same size are called ≅ figures.



EXAMPLE 1



$\Delta QPR \cong \Delta YXZ$

ΔPQR and ΔXYZ are $\cong$

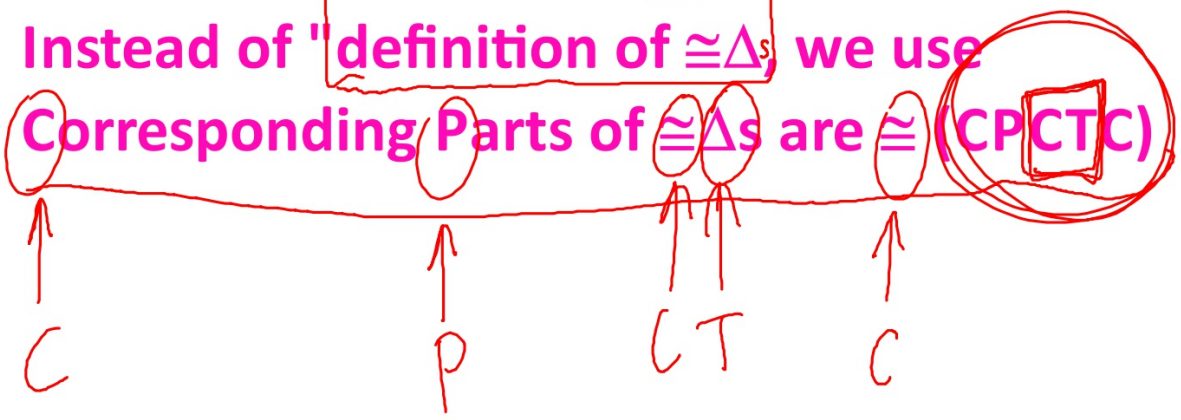
CORRESPONDING VERTICES	CORRESPONDING ANGLES	CORRESPONDING SIDES
P ⟷ X	$\angle P \longleftrightarrow \angle X$	$\overline{PQ} \longleftrightarrow \overline{XY}$
Q ⟷ Y	$\angle Q \longleftrightarrow \angle Y$	$\overline{QR} \longleftrightarrow \overline{YZ}$
R ⟷ Z	$\angle R \longleftrightarrow \angle Z$	$\overline{RP} \longleftrightarrow \overline{ZX}$

CONGRUENT TRIANGLES

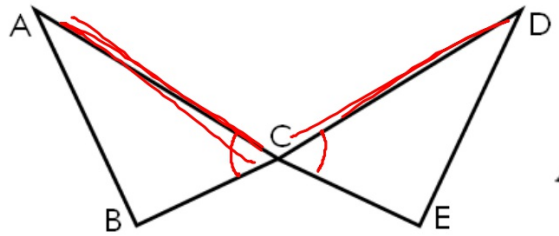
if and only if

2Δ s are ≅ iff their vertices can be matched up so that the corresponding parts (angles and sides) of the Δs are ≅

Instead of "definition of ≅Δs, we use Corresponding Parts of ≅Δs are ≅ (CPCTC)



EXAMPLE 2



$\Delta ABC \cong \Delta DEC$

$\angle A \cong \angle D$

$\angle B \cong \angle E$

$\angle C \cong \angle C$

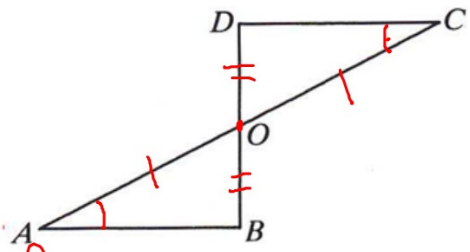
$\overline{AC} \cong \overline{DC}$

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

$\Delta BCA \cong \Delta ECD$

The two triangles shown are congruent. Complete.

- $\triangle ABO \cong$ ΔCDO
- $\angle A \cong \angle C$
- $\overline{AO} \cong \overline{CO}$
- $BO = DO$



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

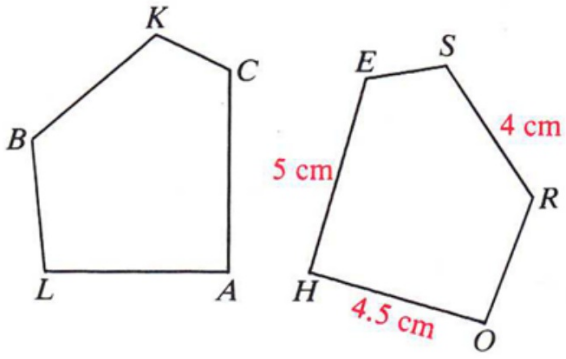
O is the midpoint of $\overline{DB}$ and $\overline{AC}$ Def. of midpt.

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

4. $\angle A \cong \angle C$ 4. CPCTC

5. $\overline{DC} \parallel \overline{AB}$ 5 if alt. int. $\angle$s $\cong$ then lines $\parallel$

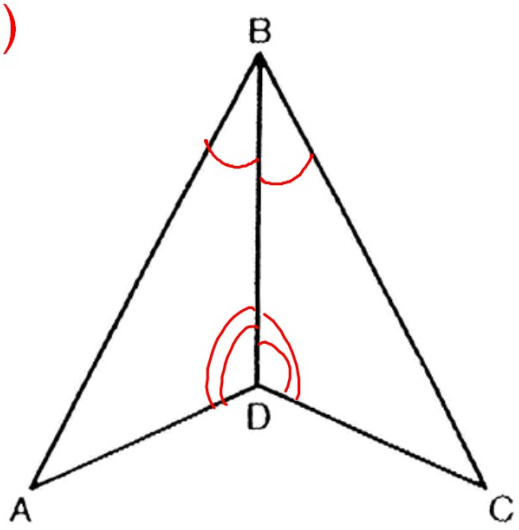
The **pentagons shown are congruent. Complete.**



1. B corresponds to R.
2. $BLACK \cong$ ROHES
3. $m\angle C = m\angle E$
4. $KB =$ 4 cm
5. If $\overline{CA} \perp \overline{LA}$, name two right angles in the figures.

∠A
∠H

I)

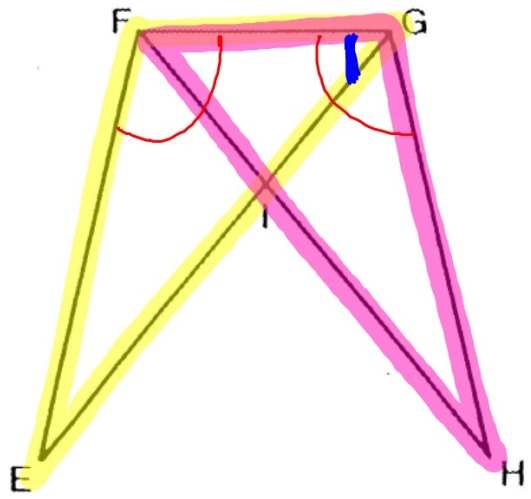


$\triangle ABD \cong \triangle CBD$

E

1)	$\angle A$	S	$\overline{BD}$
2)	$\angle ABD$	I	$\angle CDB$
3)	$\angle BDA$	E	$\angle C$
4)	$\overline{AB}$	A	$\overline{CD}$
5)	$\overline{BD}$	B	$\overline{BC}$
6)	$\overline{AD}$	O	$\angle DBC$

2)



$\triangle EFG \cong \triangle HGF$

7) $\angle E$ — (R) $\overline{FH}$

8) $\angle EFG$ — (O) $\angle H$

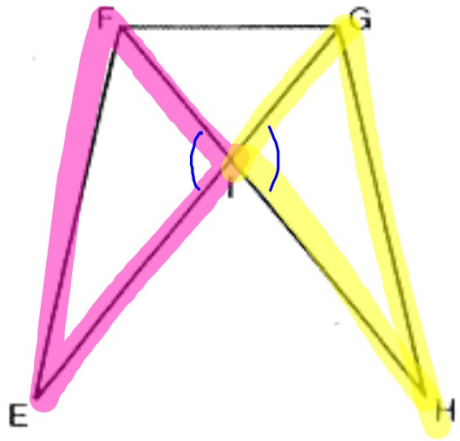
9) $\angle FGE$ — (E) $\angle FGH$

10) $\overline{EF}$ — (E) $\overline{FG}$

11) $\overline{FG}$ — (I) $\angle GFH$

12) $\overline{GE}$ — (S) $\overline{GH}$

3)



$\triangle EFI \cong \triangle HGI$

13) $\angle E$ — (S) $\angle HGI$

14) $\angle EFI$ — (C) $\overline{IH}$

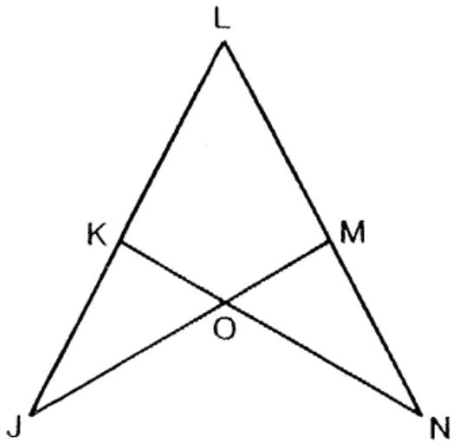
15) $\angle FIE$ — (U) $\angle GIH$

16) $\overline{FE}$ — (E) $\overline{GH}$

17) $\overline{FI}$ — (E) $\angle H$

18) $\overline{IE}$ — (R) $\overline{GI}$

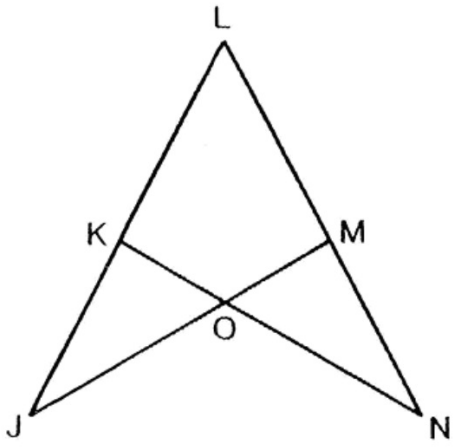
4)



$\triangle JLM \cong \triangle NLK$

19) $\angle J$	Ⓣ $\angle LKN$
20) $\angle L$	Ⓡ $\angle L$
21) $\angle LMJ$	Ⓣ $\overline{KN}$
22) $\overline{LJ}$	Ⓥ $\overline{LN}$
23) $\overline{LM}$	Ⓓ $\overline{LK}$
24) $\overline{MJ}$	Ⓔ $\angle N$

5)



$\triangle JKO \cong \triangle NMO$

25) $\angle J$

26) $\angle JKO$

27) $\angle KOJ$

28) $\overline{KJ}$

29) $\overline{KO}$

30) $\overline{OJ}$

Ⓒ $\overline{ON}$

Ⓟ $\overline{MO}$

Ⓢ $\angle NMO$

Ⓝ $\angle MON$

Ⓣ $\angle N$

Ⓣ $\overline{MN}$

HOMEWORK

Assignment #4.1

- Pages 120-121 #1-11, 14-17, 20, 21
  14-17: MUST USE GRAPH PAPER