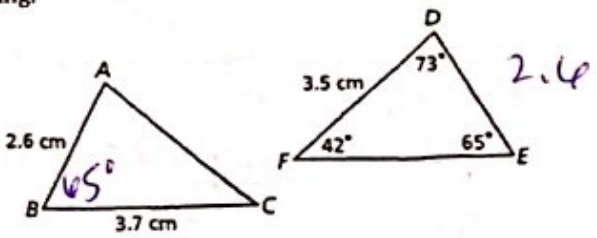
Key

Congruence & Triangles

Congruent figures – one shape can become the other through turns, flips, and/or slides

*same sides + angles

$\triangle ABC \cong \triangle DEF$. Find DE and $m\angle B$. Explain your reasoning.



A Complete the following to find DE.

Because $\triangle ABC \cong \triangle DEF$, there is a sequence of rigid motions that maps $\triangle ABC$ to $\triangle DEF$.

This same sequence of rigid motions maps $\overline{AB}$ to DE.

This means $\overline{AB} \cong$ $\overline{DE}$.

Congruent segments have the same length, so $AB =$ DE.

$AB =$ 2.6 cm, so $DE =$ 2.6 cm.

B To find $m\angle B$, use similar reasoning to show that $\angle B \cong$ $\angle E$.

So, $m\angle B =$ 65°.

C. If you know $\triangle ABC \cong \triangle DEF$, what six congruence statements about segments and angles ca you write? Why?

$\angle A \cong \angle D$	$\overline{AB} \cong \overline{DE}$
$\angle B \cong \angle E$	$\overline{AC} \cong \overline{DF}$
$\angle C \cong \angle F$	$\overline{BC} \cong \overline{EF}$

When two triangles are congruent, the **corresponding parts** are the sides and angles that are images of each other. The congruence statements are made by matching corresponding parts.

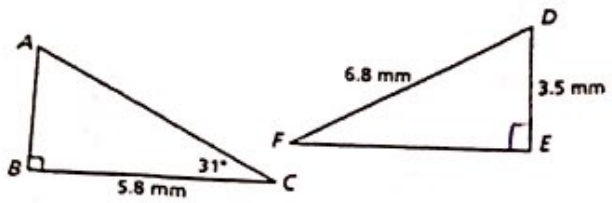
Corresponding Parts of Congruent Triangles are Congruent Theorem (CPCTC)

If two triangles are congruent, then corresponding sides are congruent and corresponding angles are congruent.

* This is super important! Make sure to memorize this thm*

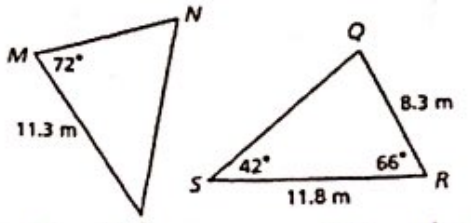
Practice with CPCTC:

1. $\triangle ABC \cong \triangle DEF$. Find AB and $m\angle E$.



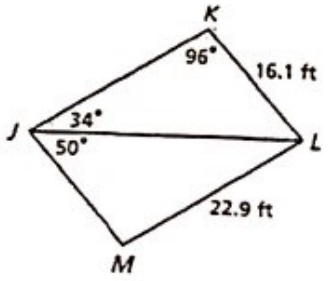
$AB = 3.5mm$ $\angle E = 90°$

2. $\triangle MNP \cong \triangle QRS$. Find NP and $m\angle P$.



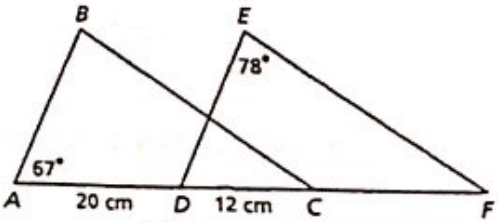
$NP = 11.3m$ $\angle P = 42°$

3. $\triangle JKL \cong \triangle LMJ$. Find JK and $m\angle JLM$.



Practice ↑

4. $\triangle ABC \cong \triangle DEF$. Find DF and $m\angle EDC$.

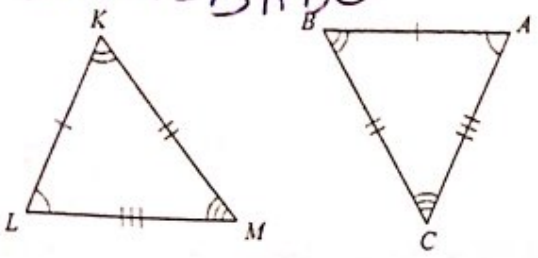


Practice ↑

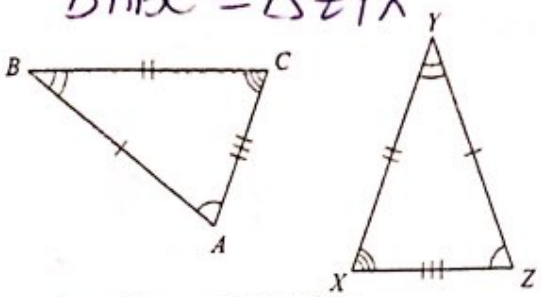
Congruences & Triangles

Write a statement that indicates that the triangles in each pair are congruent.

1) $\triangle LKM \cong \triangle ABC$

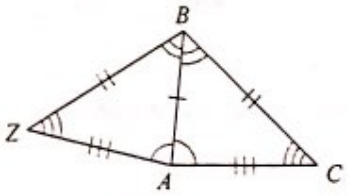


2) $\triangle ABC \cong \triangle ZYX$



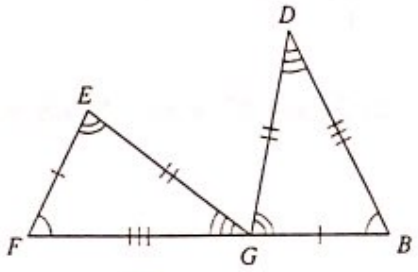
Complete each congruence statement by naming the corresponding angle or side.

3) $\triangle ABC \cong \triangle ABZ$



$\overline{AB} \cong ?$ $\overline{AB}$

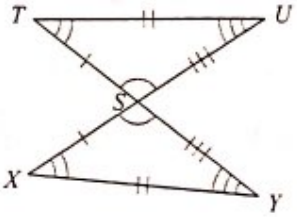
4) $\triangle FEG \cong \triangle BGD$



$\overline{FE} \cong ?$ $\overline{BG}$

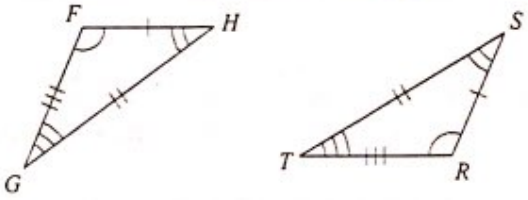
Practice

5) $\triangle STU \cong \triangle SXY$



$\overline{ST} \cong ?$

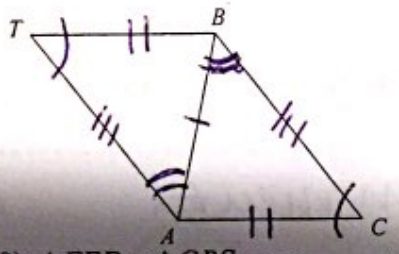
6) $\triangle FHG \cong \triangle RST$ Practice



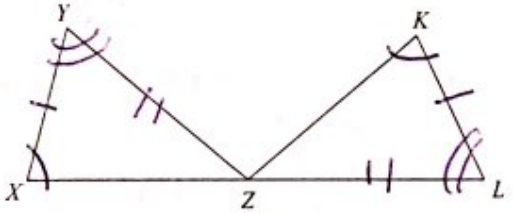
$\angle G \cong ?$

Mark the angles and sides of each pair of triangles to indicate that they are congruent.

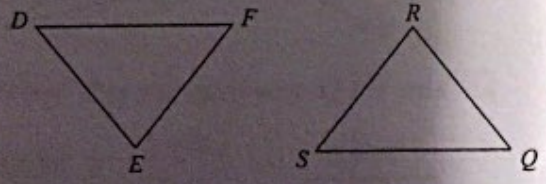
7) $\triangle ABC \cong \triangle BAT$



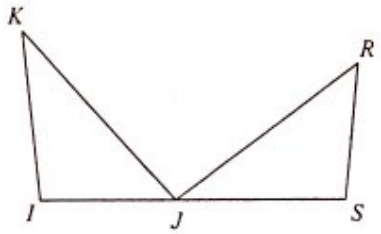
8) $\triangle XYZ \cong \triangle KLZ$



9) $\triangle FED \cong \triangle QRS$ Practice



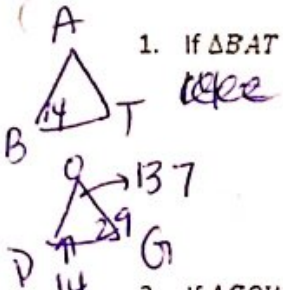
10) $\triangle IKJ \cong \triangle SJR$ Practice



CPCTC and Naming Congruent Triangles

I. Draw and label a diagram. Then solve for the variable and the missing measure or length.

1. If $\Delta BAT \cong \Delta DOG$, and $m\angle B = 14$, $m\angle G = 29$, and $m\angle O = 10x + 7$. Find the value of x $m\angle O$.



Wrong

$137 = 10x + 7$

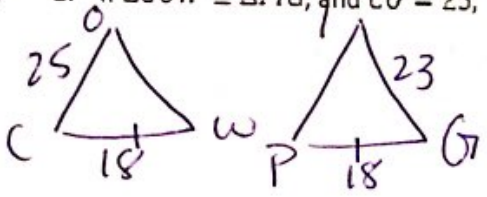
$130 = 10x$

$13 = x$

x = 13

$m\angle O$ = 137°

2. If $\Delta COW \cong \Delta PIG$, and $CO = 25$, $CW = 18$, $IG = 23$, and $PG = 7x - 17$. Find the value of x and PG.



$7x - 17 = 18$

$7x = 35$

$x = 5$

x = 5

PG = 18

3. If $\Delta DEF \cong \Delta PQR$ and $DE = 3x - 10$, $QR = 4x - 23$, and $PQ = 2x + 7$. Find the value of x and EF.

Practice

x = _____

EF = _____

II. Use the given information and triangle congruence statement to complete the following.

1. $\Delta ABC \cong \Delta GEO$, AB = 4, BC = 6, and AC = 8. What is the length of $\overline{GO}$? How do you know?

8, its ≅ to $\overline{AC}$

2. $\Delta BAD \cong \Delta LUK$, $m\angle D = 52°$, $m\angle B = 48°$, and $m\angle A = 80°$.

   a. What is the largest angle of ΔLUK? ∠U

   b. What is the smallest angle of ΔLUK?

∠L

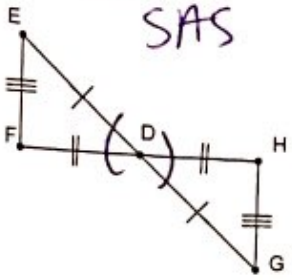
3. $\Delta SUN \cong \Delta HOT$. ΔSUN is isosceles. Is there enough information to determine if ΔHOT is isosceles? Explain why or why not.

yes, because they are congruent!

III. Complete the congruence statement for each pair of congruent triangles. Then state the reason you are able to determine the triangles are congruent. If you cannot conclude that triangles are congruent, write "none" in the blanks.

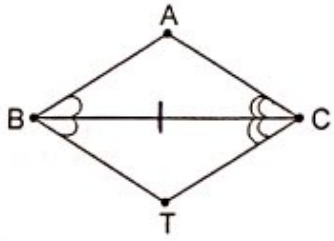
1. $\Delta EFD \cong \Delta$ GHD

by SSS or SAS



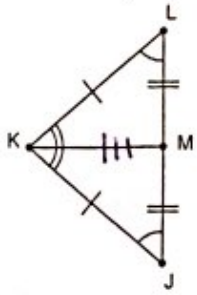
2. $\Delta ABC \cong \Delta$ TBC

by ASA



3. $\Delta LKM \cong \Delta$ JKM

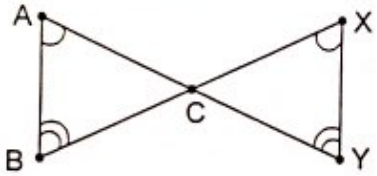
by SSS, or SAS, or ASA



Practice

4. $\Delta ABC \cong \Delta$_____

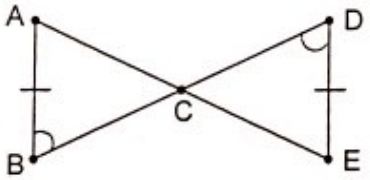
by _____



Practice

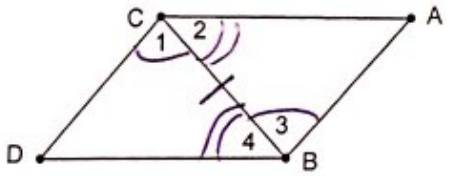
5. $\Delta ABC \cong \Delta$_____

by _____



IV. Use the given information to mark the diagram and any additional congruence you can determine from the diagram. Then complete the triangle congruence statement and give the reason for triangle congruence .

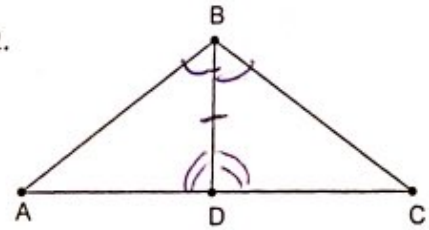
1.



Given: $\angle 1 \cong \angle 3$, $\angle 2 \cong \angle 4$

$\Delta ABC \cong \Delta$ DCB by ASA

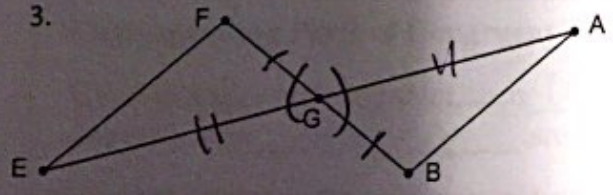
2.



Given: $\angle ABD \cong \angle CBD$, $\angle ADB \cong \angle CDB$

$\Delta ABD \cong \Delta$ CBD by ASA

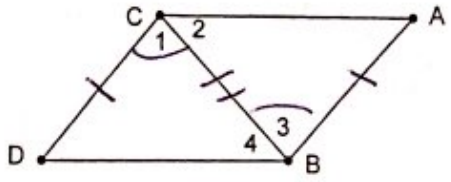
3.



Given: *G is the midpoint of* $\overline{FB}$ *and* $\overline{EA}$

$\Delta ABG \cong \Delta$ EFG by SAS

4.



Given: $\angle 1 \cong \angle 3$, $\overline{CD} \cong \overline{AB}$

$\Delta ABC \cong \Delta$ DCB by SAS

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