

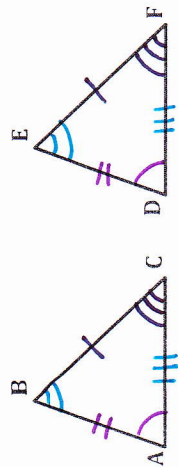
NOTES 5.2 & 5.4 - CONGRUENT TRIANGLES

Objective: I can use \cong , equilateral, & isosceles Δ s to find \angle measures.

CONGRUENT TRIANGLES:

Triangles in which corresponding angles & sides are \cong .

EXAMPLE 1: If $\triangle ABC \cong \triangle DEF$, then...

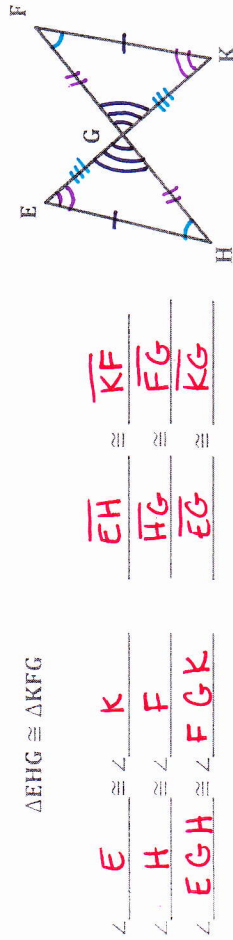


$\angle A \cong \angle$ <u>D</u>	$\overline{AB} \cong$ <u>DE</u>
$\angle B \cong \angle$ <u>E</u>	$\overline{BC} \cong$ <u>EF</u>
$\angle C \cong \angle$ <u>F</u>	$\overline{AC} \cong$ <u>DF</u>

EXAMPLE 2: If $\triangle XYZ \cong \triangle MNW$, determine whether the following statements are TRUE or FALSE.

STATEMENT	TRUE	FALSE
$\triangle YZX \cong \triangle WMN$		X
$\triangle ZXY \cong \triangle NWM$	X	
$\triangle YZX \cong \triangle NMW$	X	
$\triangle ZYX \cong \triangle NMW$		X

EXAMPLE 3: Use the given figure and information to name three pairs of congruent angles and three pairs of congruent sides.



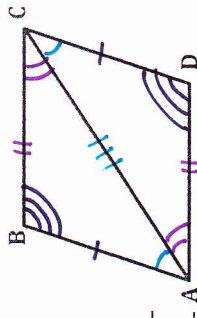
$\triangle EHG \cong \triangle KFG$

- \angle E $\cong \angle$ K
- \angle H $\cong \angle$ F
- \angle EGH $\cong \angle$ FGK
- $\overline{EH} \cong$ KF
- $\overline{HG} \cong$ FG
- $\overline{EG} \cong$ KG

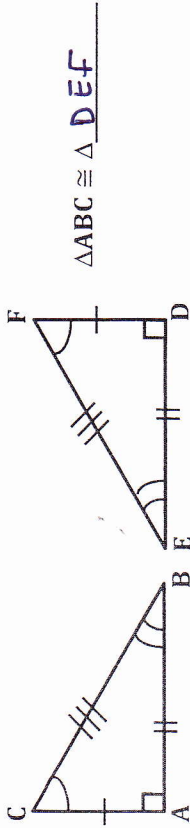
EXAMPLE 4: Use the given figure and information to name three pairs of congruent angles and three pairs of congruent sides.

$\triangle ABC \cong \triangle CDA$

- \angle BAC $\cong \angle$ ACD
- \angle BCA $\cong \angle$ DAC
- \angle B $\cong \angle$ D
- $\overline{AB} \cong$ CD
- $\overline{BC} \cong$ DA
- $\overline{AC} \cong$ CA

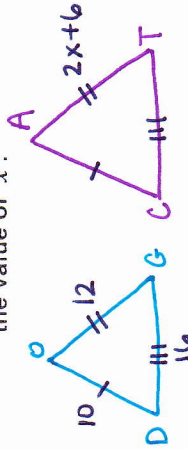


EXAMPLE 5: Using the diagram, complete the congruence statement.



$\triangle ABC \cong \triangle DEF$

EXAMPLE 6: If $\triangle DOG \cong \triangle CAT$, $DO = 10$, $OG = 12$, $DG = 16$, and $AT = 2x + 6$, find the value of 'x'.



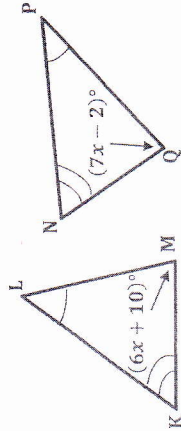
$$2x + 6 = 12$$

$$2x = 6$$

$$x = 3$$

If two angles of one triangle are congruent to two angles of another triangle, then the third pair of angles are congruent.

EXAMPLE 7: Find $m\angle M$ and $m\angle Q$.



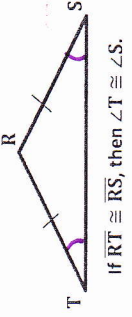
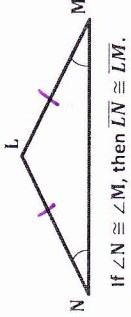
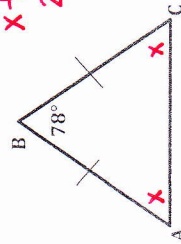
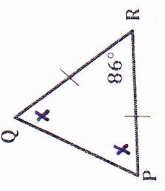
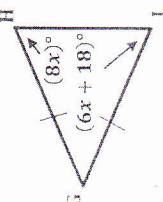
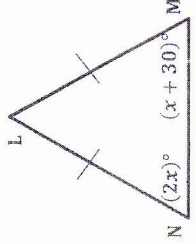
$$6x + 10 = 7x - 2$$

$$12 = x$$

$$m\angle M = 6(12) + 10 = 82^\circ$$

$$m\angle Q = 7(12) - 2 = 82^\circ$$

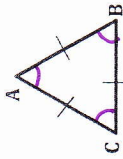
ISOSCELES & EQUILATERAL TRIANGLES

THEOREM	DIAGRAM
<p>ISOSCELES TRIANGLE THEOREM</p> <p>If two sides of a triangle are congruent, then the angles opposite the sides are congruent.</p>	 <p style="text-align: center;">If $\overline{RT} \cong \overline{RS}$, then $\angle T \cong \angle S$.</p>
<p>CONVERSE OF ISOSCELES TRIANGLE THEOREM</p> <p>If two angles of a triangle are congruent, then the sides opposite those angles are congruent.</p>	 <p style="text-align: center;">If $\angle N \cong \angle M$, then $\overline{LN} \cong \overline{LM}$.</p>
EXAMPLES:	
<p>1. $m\angle C = 51^\circ$</p>  <p style="text-align: center;"> $x + x + 78 = 180$ $2x + 78 = 180$ $2x = 102$ $x = 51$ </p>	<p>2. $m\angle Q = 47^\circ$</p>  <p style="text-align: center;"> $x + x + 86 = 180$ $2x + 86 = 180$ $2x = 94$ $x = 47$ </p>
<p>3. $m\angle H = 72^\circ$</p>  <p style="text-align: center;"> $8x = 6x + 18$ $2x = 18$ $x = 9$ </p>	<p>4. $m\angle M = 60^\circ$</p>  <p style="text-align: center;"> $2x = x + 30$ $x = 30$ </p>

COROLLARY

EQUILATERAL TRIANGLE COROLLARY

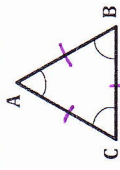
If a triangle is equilateral, then it is equiangular.



DIAGRAM

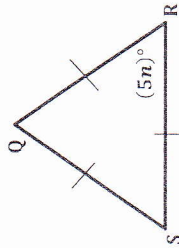
EQUIANGULAR TRIANGLE COROLLARY

If a triangle is equiangular, then it is equilateral.

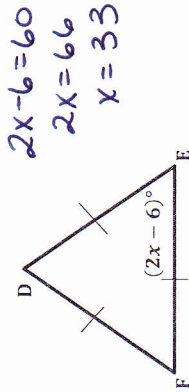


EXAMPLES:

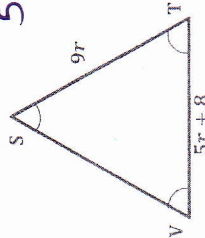
5. $n = 12$



6. $x = 33$



7. $VT = 18$



8. $MN = 13$

