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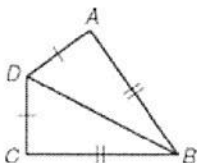
Geometry - 4.6-4.7 Review

4.6: Triangle Congruence: CPCTC

Corresponding Parts of Congruent Triangles are Congruent (CPCTC) is useful in proofs. If you prove that two triangles are congruent, then you can use CPCTC as a justification for proving corresponding parts congruent.

Given: $\overline{BD} \cong \overline{CD}$, $\overline{AB} \cong \overline{CB}$

Prove: $\angle A \cong \angle C$

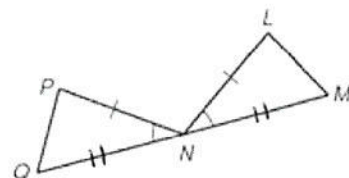


Statements	Reasons
1. $\overline{BD} \cong \overline{CD}$, $\overline{AB} \cong \overline{CB}$	1. Given
2. $\overline{DB} \cong \overline{DB}$	2. Reflexive Property of Congruence
3. $\triangle CDB \cong \triangle ADB$	3. SSS
4. $\angle A \cong \angle C$	4. CPCTC

Complete each proof.

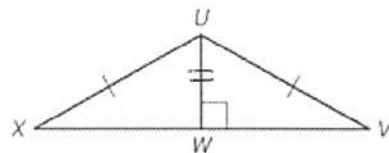
1) **Given:** $\angle PNQ \cong \angle LNM$, $\overline{PN} \cong \overline{LN}$, N is the midpoint of \overline{QM}

Prove: $\overline{PQ} \cong \overline{LM}$



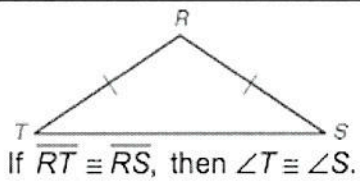
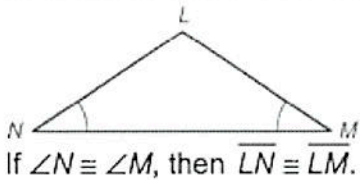
Statements	Reasons
1. $\angle PNQ \cong \angle LNM$, $\overline{PN} \cong \overline{LN}$, N is the midpoint of \overline{QM}	1. Given
2. $\overline{QN} \cong \overline{MN}$	2. Definition of Midpoint
3. $\triangle PNQ \cong \triangle LNM$	3. SAS
4. $\overline{PQ} \cong \overline{LM}$	4. CPCTC

- 2) **Given:** $\triangle UXW$ and $\triangle UVW$ are right \triangle s. $\overline{UX} \cong \overline{UV}$
Prove: $\angle X \cong \angle V$



Statements	Reasons
1. $\triangle UXW$ and $\triangle UVW$ are right \triangle s. $\overline{UX} \cong \overline{UV}$	1. Given
2. $\overline{UW} \cong \overline{UW}$	2. reflexive prop of \cong
3. $\triangle UXW \cong \triangle UVW$	3. HL
4. $\angle X \cong \angle V$	4. CPCTC

4.7: Isosceles and Equilateral Triangles

Theorem	Examples
Isosceles Triangle Theorem If two sides of a triangle are congruent, then the angles opposite the sides are congruent.	
Converse of Isosceles Triangle Theorem If two angles of a triangle are congruent, then the sides opposite those angles are congruent.	

You can use these theorems to find angle measures in isosceles triangles.

Find $m\angle E$ in $\triangle DEF$.

$$m\angle D = m\angle E$$

$$5x^\circ = (3x + 14)^\circ$$

$$2x = 14$$

$$x = 7$$

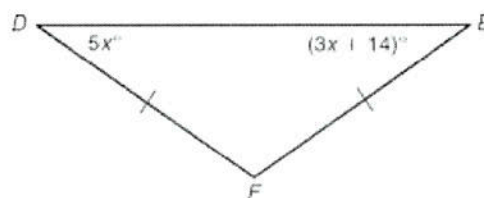
$$\text{Thus } m\angle E = 3(7) + 14 = 35^\circ.$$

Isosc. \triangle Thm.

Substitute the given values.

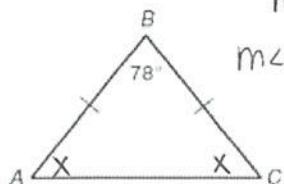
Subtract $3x$ from both sides.

Divide both sides by 2.



Find each angle measure.

3) $m\angle C = 51^\circ$



$$m\angle A = m\angle C \text{ ISOSC. } \triangle \text{ Thm}$$

$$m\angle A + m\angle B + m\angle C = 180$$

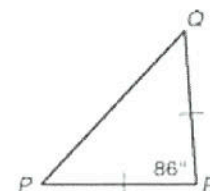
$$x + 78 + x = 180$$

$$2x + 78 = 180$$

$$2x = 102$$

$$x = 51$$

4) $m\angle Q = 47^\circ$



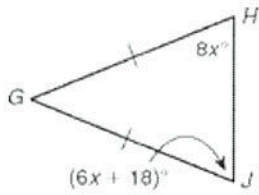
$$x + x + 86 = 180$$

$$2x + 86 = 180$$

$$2x = 94$$

$$x = 47$$

5) $m\angle H = 72^\circ$

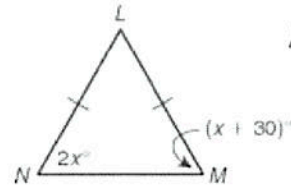


$8x = 6x + 18$
 $2x = 18$
 $x = 9$

$m\angle H = 8(9)$

$m\angle H = 72^\circ$

6) $m\angle M = 60^\circ$



$2x = x + 30$
 $x = 30$

$m\angle M = 30 + 30$

$m\angle M = 60^\circ$

Equilateral Triangle Corollary

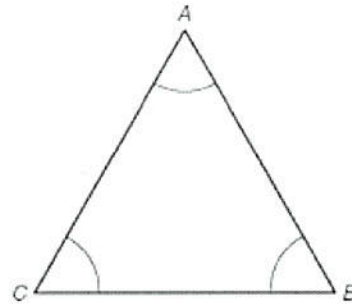
If a triangle is equilateral, then it is equiangular.

(equilateral $\triangle \rightarrow$ equiangular \triangle)

Equiangular Triangle Corollary

If a triangle is equiangular, then it is equilateral.

(equiangular $\triangle \rightarrow$ equilateral \triangle)



If $\angle A \cong \angle B \cong \angle C$, then $\overline{AB} \cong \overline{BC} \cong \overline{CA}$.

You can use these theorems to find values in equilateral triangles.

Find x in $\triangle STV$.

$\triangle STV$ is equiangular.

$(7x + 4)^\circ = 60^\circ$

$7x = 56$

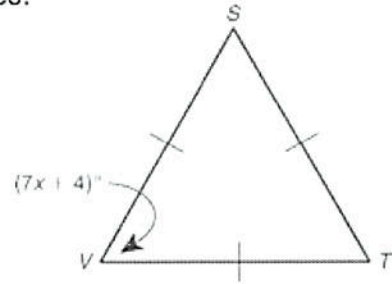
$x = 8$

Equilateral $\triangle \rightarrow$ equiangular \triangle

The measure of each \angle of an equiangular \triangle is 60° .

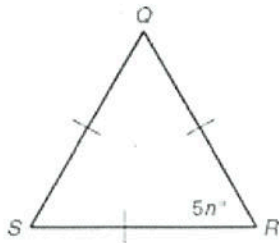
Subtract 4 from both sides.

Divide both sides by 7.



Find each value.

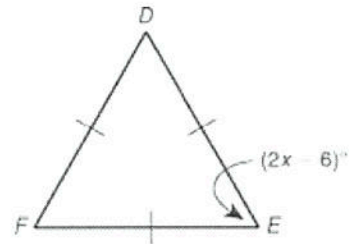
7) $n = 12$



$5n = 60$

$n = 12$

8) $x = 33$

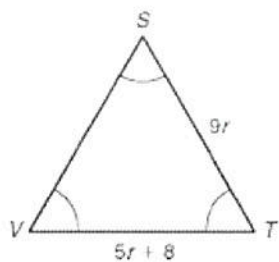


$2x - 6 = 60$

$2x = 66$

$x = 33$

9) $VT = \underline{18}$



$$5r + 8 = 9r$$

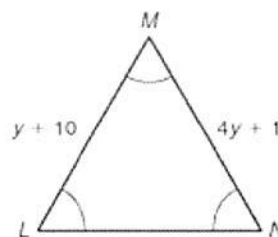
$$8 = 4r$$

$$2 = r$$

$$VT = 5(2) + 8$$

$$VT = 18$$

10) $MN = \underline{13}$



$$y + 10 = 4y + 1$$

$$9 = 3y$$

$$3 = y$$

$$MN = 4(3) + 1$$

$$MN = 12 + 1$$

$$MN = 13$$