SECTION 4.4: THE ISOSCELES TRIANGLE THEOREMS

Standards:

2.0 - Students write geometric proofs, including proofs by contradiction

4.0 - Students prove basic theorems involving congruence and similarity.

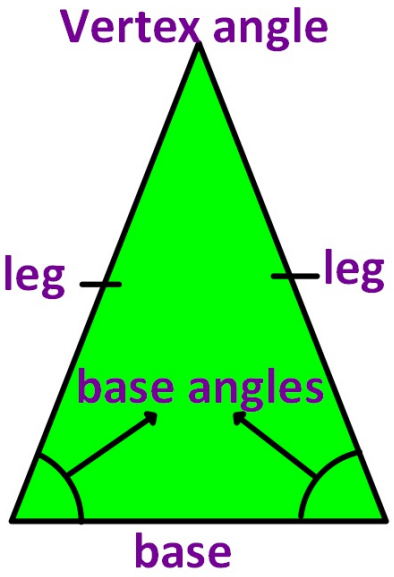
ISOSCELES TRIANGLE

Legs: ≅sides

Base: 3rd side

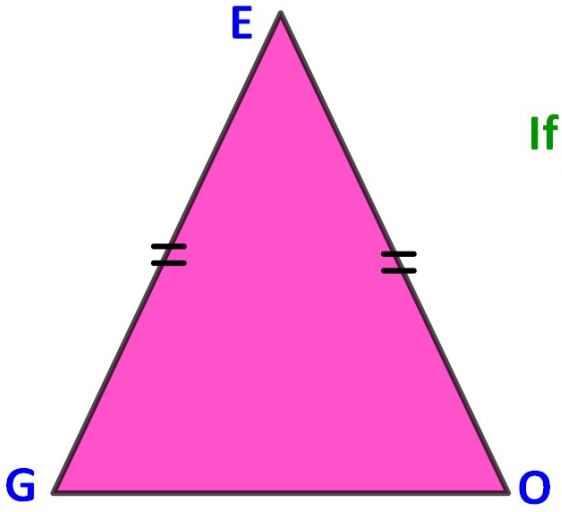
Base angles: angles at base

Vertex: Angle opposite of base angle



THEOREM

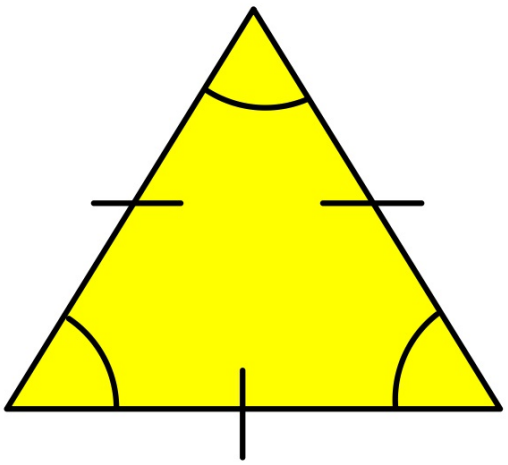
If 2 sides of a Δ are ≅, then the angles opposite those sides are≅



If $\overline{GE} \cong \overline{EO}$, then $\angle G \cong \angle O$

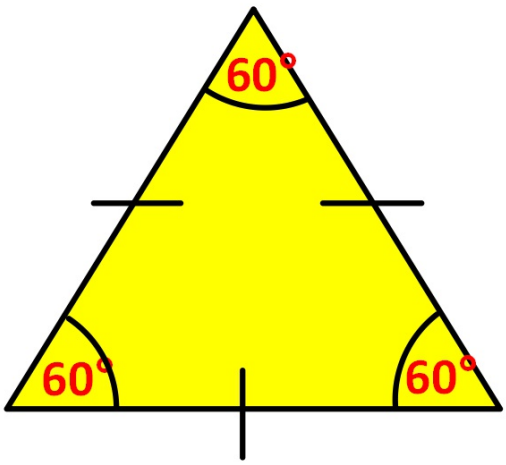
COROLLARY

An equilateral Δ is also equiangular.



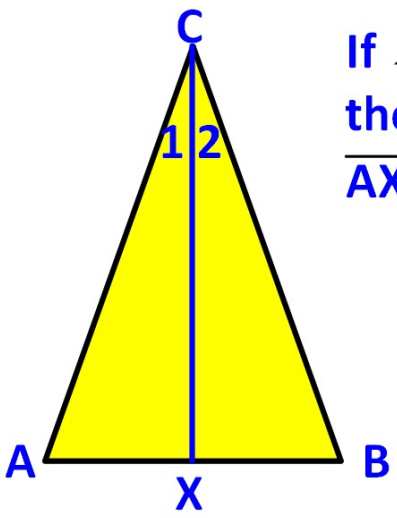
COROLLARY

An equilateral Δ has 3 60° angles.



COROLLARY

The bisector of the vertex of an isosceles Δ is $\perp$ to the base at its midpt

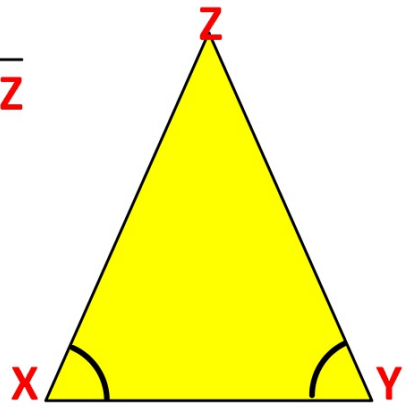


If $\angle 1 \cong \angle 2$ then $BX \perp AC$ and $\overline{AX} \cong \overline{XC}$

THEOREM

If 2 angles of aΔ are $\cong$, then the sides opposite those angles are $\cong$

If $\angle X \cong \angle Z$, then $\overline{XY} \cong \overline{YZ}$

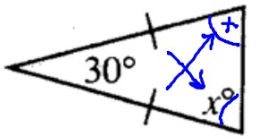


COROLLARY

An equiangular Δ is also equilateral.

1-3: Find the value of x.

1)



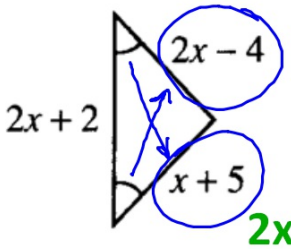
30+2x=180

2x=150

x=75

Answer

2)



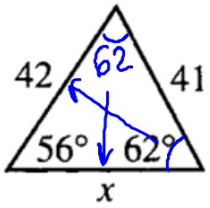
2x-4=x+5

2x=x+9

x=9

Answer

3)



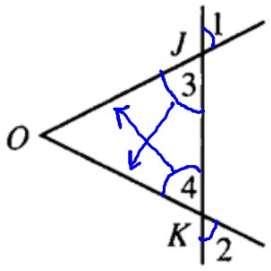
X = 42

Answer

4)
Given: $\angle 1 \cong \angle 2$

Prove: $\overline{OK} \cong \overline{OJ}$

Proof:



STATEMENTS	REASONS
1 $\angle 1 \cong \angle 2$	1 Given
2 $\angle 1 \cong \angle 3$; $\angle 2 \cong \angle 4$	2 Vert angles are $\cong$
3 $\angle 3 \cong \angle 4$	3 Substitution
4 $\overline{OK} \cong \overline{OJ}$	4 If 2 angles of a $\Delta \cong$, then opposite sides are $\cong$