<name>
Class: Honors Geometry
Date: 9/14/06
Topic: Lesson 4-5 (Isosceles & Equilateral Triangles)

Theorem 4-3

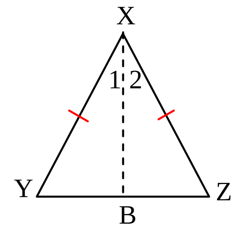
Isosceles Triangle Theorem

If 2 sides of a Δ are $\cong$, the $\angle's$ opposite those sides are $\cong$.

Proof:

Given: $\overline{XY} \cong \overline{XZ}$, $\overline{XB}$ bisects $\angle YXZ$

Prove: $\angle Y \cong \angle Z$



Proof: $\overline{XY} \cong \overline{XZ}$	Given
$\angle 1 \cong \angle 2$	Defn. angle bisector
$\overline{XB} \cong \overline{XB}$	Reflexive POC
$\Delta XYB \cong \Delta XZB$	SAS
$\angle Y \cong \angle Z$	CPCTC

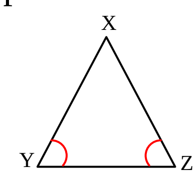
Q.E.D.

Theorem 4-4

Converse of Isosceles Triangle Theorem

If 2 $\angle's$ of a Δ are $\cong$, the sides opposite the $\angle's$ are $\cong$.

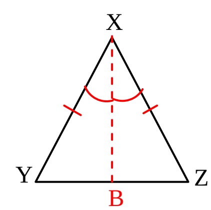
$\overline{XY} \cong \overline{XZ}$



Theorem 4-5

The bisector of the vertex $\angle$ of an isosceles Δ is the $\perp$ bisector of the base.

$\overline{XB} \perp \overline{YZ}$ and $\overline{XB}$ bisects $\overline{YZ}$



Definition

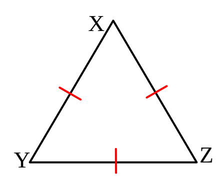
Corollary

A statement that follows immed fm a thm

Corollary to Theorem 4-3

If a Δ is equilateral, the Δ is equiangular

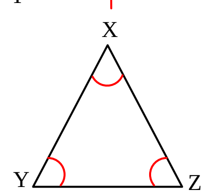
$\overline{XY} \cong \overline{YZ} \cong \overline{XZ}$



Corollary to Theorem 4-4

If a Δ is equiangular, the Δ is equilateral

$\angle X \cong \angle Y \cong \angle Z$



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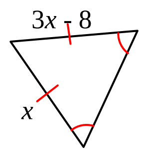
Examples

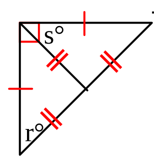
Not in the book

1)



$x = 3x - 8$ (Isosceles triangle)
$x = 4$

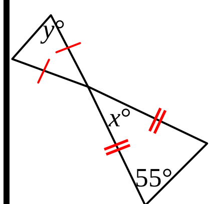
2)



Using big Δ:
$90 + r + r = 180$ ($\Delta\angle$ sum thm & isos Δ base $\angle$'s $\cong$)
$r = 45$

Using small Δ:
$s = r$ (both s and r are base $\angle$'s)
$s = 45$

3)



$x + 2 \bullet 55 = 180$ (Isosceles Δ)
$x = 70$

$2 \bullet y + x = 180$ (vert $\angle$'s & isosceles Δ)
$y = 55$