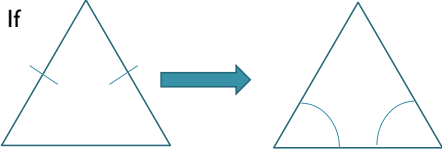**Friday, October 26, 2012**

No TISK problems or Mental Math Today
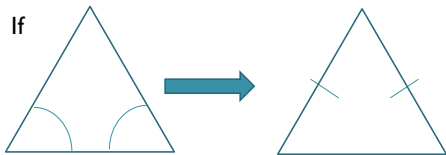
Homework: p. 226 #36-39 all

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**§4-6 Analyzing Isosceles Triangles**

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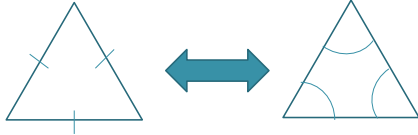
If



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**§4-6 Analyzing Isosceles Triangles**

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

If

## §4-6 Analyzing Isosceles Triangles

- Corollary
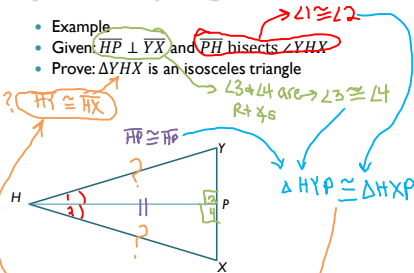  - A triangle is equilateral if and only if it is equiangular.



## §4-6 Analyzing Isosceles Triangles

- Corollary
  - Each angle of an equilateral triangle measures 60°.

## §4-6 Analyzing Isosceles Triangles

- Example
- Given: $\overline{HP} \perp \overline{YX}$ and $\overline{PH}$ bisects $\angle YHX$
- Prove: $\Delta YHX$ is an isosceles triangle

$\angle 1 \cong \angle 2$

$? \quad \overline{HY} \cong \overline{HX}$

$\angle 3 \& \angle 4 \text{ are} \rightarrow \angle 3 \cong \angle 4$
$Rt \angle s$

$\overline{HP} \cong \overline{HP}$

$\Delta HYP \cong \Delta HXP$

## Proof

| Statement | Reason |
|---|---|
| 1) $\overline{HP} \perp \overline{YX}$ and $\overline{PH}$ bisects $\angle YHX$ | 1) Given |
| 2) $\angle 3$ and $\angle 4$ are rt. $\angle$s | 2) If lines are $\perp \Rightarrow$ 4 rt. $\angle$s are formed |
| 3) $\angle 3 \cong \angle 4$ | 3) Rt. $\angle$ Th. |
| 4) $\angle 1 \cong \angle 2$ | 4) Def. $\angle$ Bisector |
| 5) $\overline{HP} \cong \overline{HP}$ | 5) Reflexive Prop. of $\cong$ Segments |
| 6) $\Delta HYP \cong \Delta HXP$ | 6) ASA Post. |
| 7) $\overline{HY} \cong \overline{HX}$ | 7) CPCTC |
| 8) $\Delta YHX$ is an isos. $\Delta$ | 8) Def. isos. $\Delta$ |

## §4-6 Analyzing Isosceles Triangles

- Given: $\Delta IOE$ is an isosceles triangle with base $\overline{OE}$, $\overline{AO}$ bisects $\angle IOE$, $\overline{AE}$ bisects $\angle IEO$
- Prove: $\Delta AOE$ is an isosceles triangle
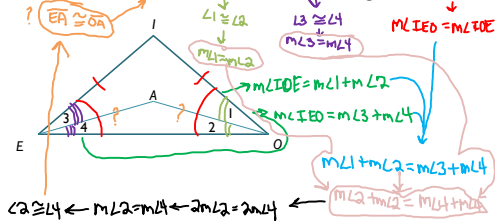


## Proof

| Statement | Reason |
|---|---|
| 1) $\Delta IOE$ is an isosceles triangle with base $\overline{OE}$, $\overline{AO}$ bisects $\angle IOE$, $\overline{AE}$ bisects $\angle IEO$ | 1) Given |
| 2) $\overline{IO} \cong \overline{IE}$ | 2) Def. isos. $\Delta$ |
| 3) $\angle IEO \cong \angle IOE$ | 3) Isos. $\Delta$ Th. |
| 4) $m\angle IEO = m\angle IOE$ | 4) def. $\cong \angle$s |
| 5) $\angle 1 \cong \angle 2, \angle 3 \cong \angle 4$ | 5) Def. $\angle$ bisector |
| 6) $m\angle 1 = m\angle 2, m\angle 3 = m\angle 4$ | 6) Def. $\cong \angle$s |
| 7) $m\angle IOE = m\angle 1 + m\angle 2, m\angle IEO = m\angle 3 + m\angle 4$ | 7) $\angle$ Addition Post. |
| 8) $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$, $m\angle 2 + m\angle 2 = m\angle 4 + m\angle 4$ | 8) Substitution Prop. of = |
| 9) $2m\angle 2 = 2m\angle 4$ | 9) Simplify |
| 10) $m\angle 2 = m\angle 4$ | 10) Division Prop of = |
| 11) $\angle 2 \cong \angle 4$ | 11) Def. $\cong \angle$s |
| 12) $\overline{AE} \cong \overline{AO}$ | 12) Converse of Isos. $\Delta$ Th. |
| 13) $\Delta AOE$ is an isos. $\Delta$ | 13) Def. isos. $\Delta$ |