

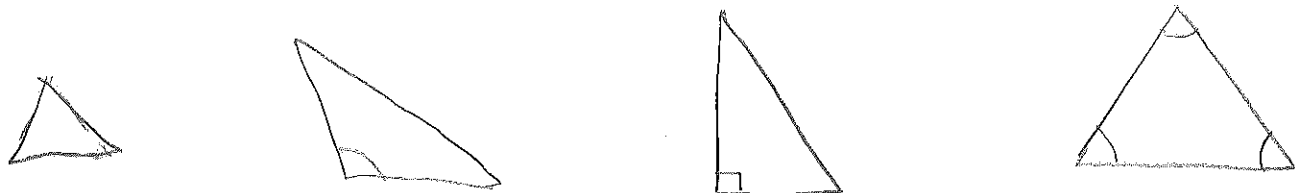
Notes 4-9: Isosceles and Equilateral Triangles

**Objectives:** Classify triangles by their angle measures and side lengths. Use classifications to find measures of sides and angles. Apply properties of isosceles and equilateral triangle.

**Triangle:** a 3-sided polygon which can be classified by its **angles** or **sides**. Draw and label the triangles.

• By Angles

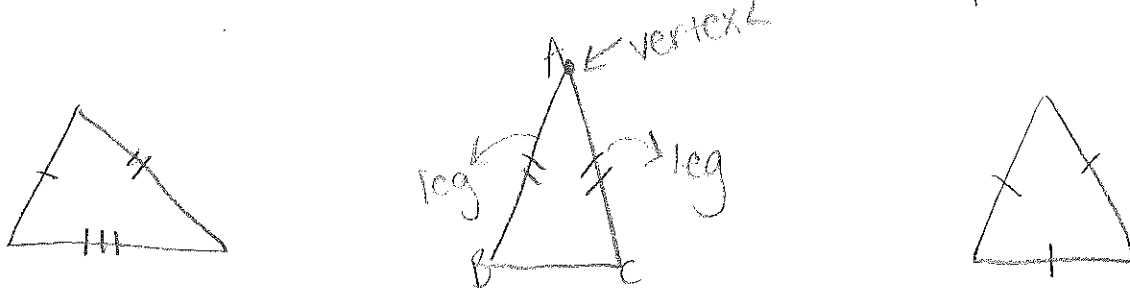
acute                      obtuse                      right                      equiangular



∠'s less than 90°                      1 ∠ greater than 90°                      1 ∠ = 90°                      = ∠'s

• By Sides

scalene                      isosceles                      equilateral




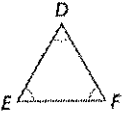
no sides equal or ≅                      2 ≅ sides                      all sides equal

- On the isosceles triangle above, label the congruent sides AB and AC. These are called legs.
- The point where the legs on an isosceles triangle meet is called the vertex angle.
- The base is opposite the vertex angle.
- The sides opposite the legs are the base angles. We name the triangle Δ ABC  
Δ BCA    Δ CAB

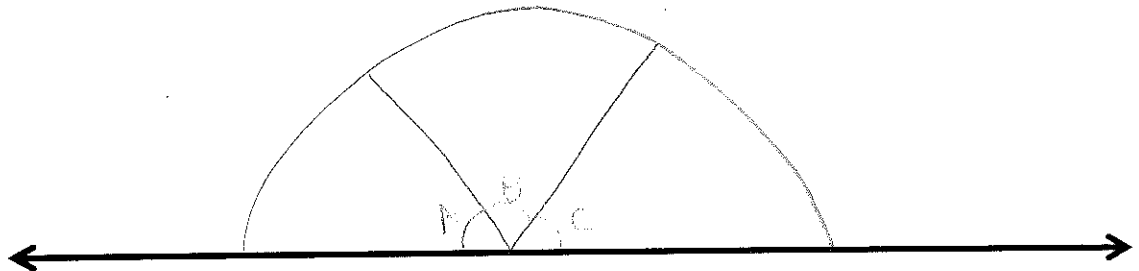
**Isosceles Triangle Theorem & Converse:**

Theorem	Hypothesis	Conclusion
<p><b>Isosceles Triangle Theorem</b></p> <p>If two sides of a triangle are <u>≅</u> ...</p>		<p>... then the angles <u>opposite</u> those sides are <u>≅</u>.</p> <p><u>∠ B = ∠ C</u></p>
<p><b>Convers of Isosceles Triangle Theorem</b></p> <p>If two angles of a triangle are <u>≅</u> ...</p>		<p>... then the sides <u>opposite</u> those angles are <u>≅</u>.</p> <p><u>DE = DF</u></p>

**Equilateral/Equiangular Triangle Theorems:**

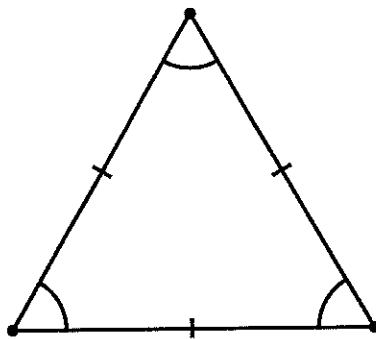
Theorem	Hypothesis		Conclusion	
<b>Equilateral Triangle Theorem</b>	If a triangle is <i>equilateral, ...</i>		... then it is <i>equiangular.</i>	$\angle A \cong \angle B \cong \angle C$
<b>Equiangular or Triangle Theorem</b>	If a triangle is <i>equiangular, ...</i>		... then it is <i>equilateral.</i>	$\overline{DE} \cong \overline{EF} \cong \overline{DF}$

**Explore:** Follow instructions to prove the *Triangle Sum Theorem*.



**Triangle Sum Theorem:** the sum of the angles of any triangle equals  $180^\circ$ .

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



**Angles of an Equilateral Triangle:** each angle of an equilateral/equiangular triangle measures  $60^\circ$ .