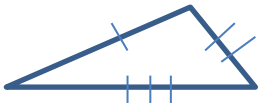
Relationships in Geometry

<u>The 3 types of triangles</u>

1. **Equilateral**
- all 3 sides are the same lengths
- all 3 interior angles are the same

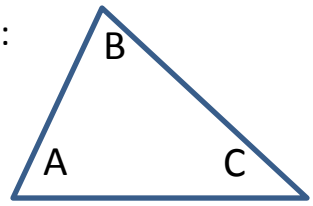
2. **Isosceles**
- 2 sides have the same length

3. **Scalene**
- no sides have the same length



* Measure the <u>interior</u> angles of any triangle. When you add the interior angles together for any triangle, the angles will always add up to 180^{o}.

Example:



therefore… angle A + angle B + angle C = 180^{o}
or… >A + >B + >C = 180^{o}

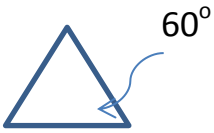
If you know only know 2 out of the 3 angles, start with the total (180^{o}) and subtract the other angles

Example: if A = 65^{o}, and B = 75^{o}, and C = *?*

C = 180-A-B
C = 180 – 65 – 75
C = 40^{o}

The 3 types of Angles within Triangles

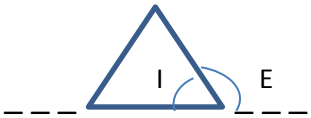
1. **Acute Angles**
- each interior angle is less than 90^o



2. **Right Angles**
- one angle is exactly 90^0

3. **Obtuse Angles**
- one angle is greater than 90^o

Relationship between Interior and Exterior Angles

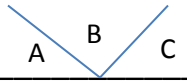


- start with a straight line: _____

- then add a line off of it: _____

- measure both angles: _____ 140^o 40^o _____

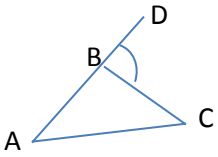
Key idea: All angles on a straight line add to 180^o.

Example: 

$\angle A + \angle B + \angle C = 180^o$

* Exterior angles of triangles:

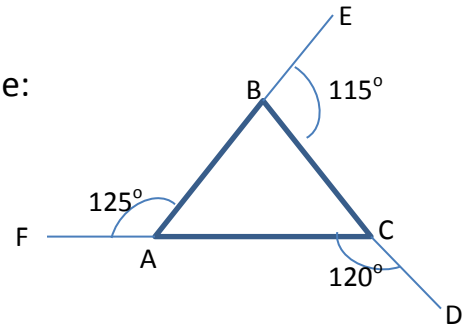
An exterior angle is formed outside a triangle when one side is extended. Angle DBC is an exterior angle of triangle ABC. ($\angle DBC$ is exterior of $\triangle ABC$)



The Relationship between Exterior Angles of a Triangle

First take a triangle and extend each of the sides and measure each exterior angle.

Example:



∠EBC + ∠ACD + ∠FAB = ?

$115^{o} + 120^{o} + 125^{o} = 360^{o}$

Key idea: The three exterior angles of a triangle will always add up to 360^{o}