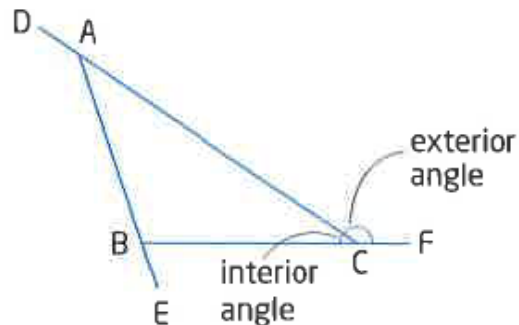


7.1 - Angle Relationships in Triangles

Interior and Exterior Angles

Interior Angle - angle formed on the inside of a polygon by two sides meeting at a vertex.

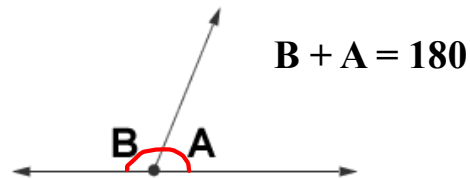
Exterior Angle - angle formed on the outside of a geometric shape by extending one of the sides past a vertex.



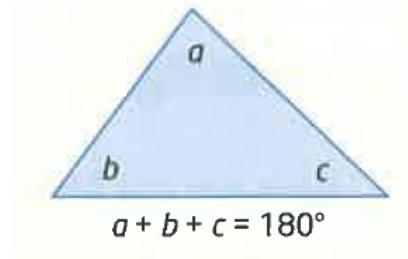
You must remember....

Supplementary Angles:

- angles that add to 180 degrees
- angles on a straight line are supplementary

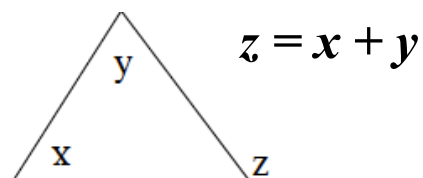


The sum of the **interior angles** of a triangle is **180** degrees.

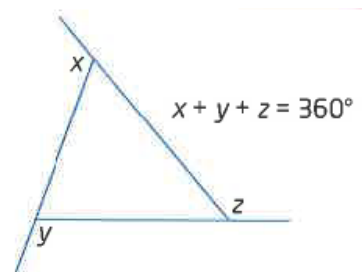


New Exterior Angle Rules...

The **exterior angle** is equal to the sum of the 2 opposite interior angles.

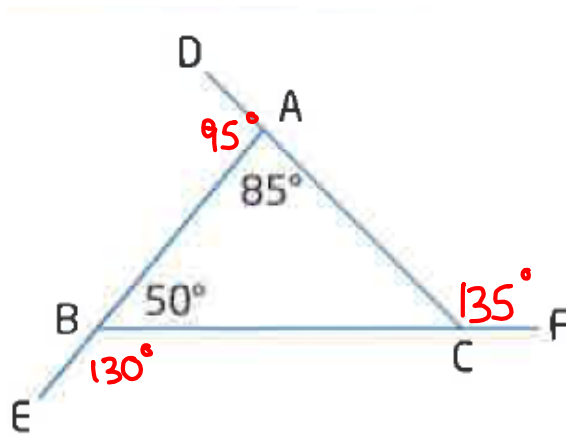


The sum of the **exterior angles** of a triangle is 360 degrees.



Example 1

Find the measures of the exterior angles in $\triangle ABC$



Note: at vertex A and B, the interior and exterior angles are supplementary angles (form an angle of 180 degrees)

$$\angle DAB = 180 - 85 = 95^\circ \text{ (supplementary)}$$

$$\angle EBC = 180 - 50 = 130^\circ \text{ (supplementary)}$$

$\angle ACF$

Method 1:

Since the exterior angle at a vertex of a triangle is equal to the sum of the interior angles at the other two vertices...

$$\angle ACF = 85 + 50 = 135^\circ$$

Method 2:

Since the sum of the exterior angles of a triangle is 360 degrees...

$$\angle ACF = 360 - 130 - 95 = 135^\circ$$

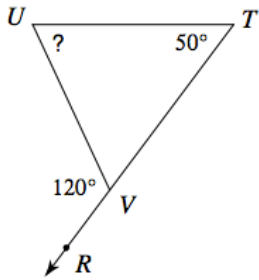
The measures of the three exterior angles are:

$$\angle DAB = 95^\circ$$

$$\angle EBC = 130^\circ$$

$$\angle ACF = 135^\circ$$

Example 2 Find the measure of the indicated angle

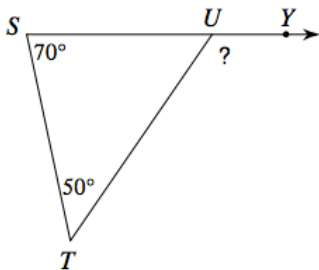


$$\angle VUT + 50 = 120$$

$$\angle VUT = 120 - 50$$

$$\angle VUT = 70^\circ$$

Example 3 Find the measure of the indicated angle

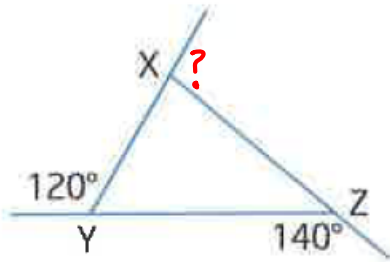


$$\angle TU Y = 50 + 70$$

$$\angle TU Y = 120^\circ$$

Example 4

Find the measure of the exterior angle at vertex X.

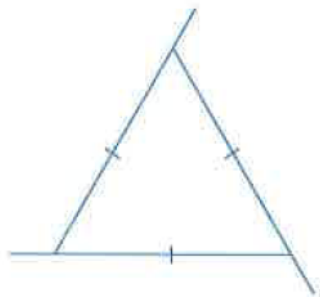


$$? = 360 - 120 - 140$$

$$? = 100^\circ$$

Example 5

What is the measure of each exterior angle of an equilateral triangle?



All angles in an equilateral triangle are EQUAL.

Therefore all three interior angles are...

$$= \frac{180}{3} = 60^\circ$$

At each vertex, the interior angle and exterior angle are supplementary, meaning they sum to 180° .

Therefore all three exterior angles are... $= 180 - 60 = 120^\circ$

Do Your Homework!