

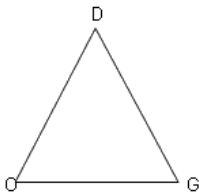
12.6 Triangles

In a plane, figures formed by three line segments are called **TRIANGLES**.

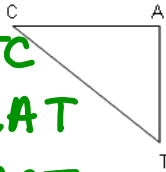
Triangles are named by their **vertices** (the endpoints of the line segments).

Example 1: How would you name the following triangles?

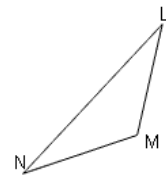
$\triangle DOG$   
 $\triangle GOD$   
 $\triangle OGD$   
 $\triangle ODG$   
 $\triangle DGO$   
 $\triangle GDO$



$\triangle CTA$   
 $\triangle ATC$   
 $\triangle CAT$   
 $\triangle ACT$   
 $\triangle TAC$   
 $\triangle TCA$



$\triangle LMN$   
 $\triangle MLN$   
 $\triangle MNL$   
 $\triangle LNM$   
 $\triangle NML$   
 $\triangle NLM$



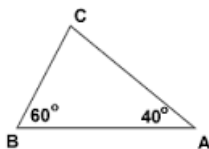
There are three angles in every triangle.

There is also a unique relationship among the measures of these three angles.

**ANGLES OF A TRIANGLE**

The sum of the measures of the angles of a triangle is  $180^\circ$

Example 2: Find the value of the missing angle.

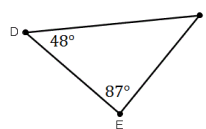


$$40 + 60 + c = 180$$

$$100 + c = 180$$

$$\begin{array}{r} 100 + c = 180 \\ -100 \quad -100 \\ \hline \end{array}$$

$\angle C = 80^\circ$



$$48 + 87 + v = 180$$

$$135 + v = 180$$

$$\begin{array}{r} 135 + v = 180 \\ -135 \quad -135 \\ \hline \end{array}$$

$\angle V = 45^\circ$

A triangle can also be classified according to its angles.

*less than 90°*  
 An **acute triangle** has three acute angles.



*exactly 90°*  
 A **right triangle** has one right angle.



*more than 90° (less than 180°)*  
 An **obtuse triangle** has one obtuse angle.



Example 3: Find the value of the missing angle. Then classify each triangle as acute, right, or obtuse.

*Right Δ*

$$40 + 90 + x = 180$$

$$130 + x = 180$$

$$\begin{array}{r} 130 + x = 180 \\ -130 \quad -130 \\ \hline x = 50 \end{array}$$

**x = 50**

*acute Δ*

$$65 + 57 + y = 180$$

$$122 + y = 180$$

$$\begin{array}{r} 122 + y = 180 \\ -122 \quad -122 \\ \hline y = 58 \end{array}$$

**y = 58**

*acute Δ*

$$85 + 50 + z = 180$$

$$135 + z = 180$$

$$\begin{array}{r} 135 + z = 180 \\ -135 \quad -135 \\ \hline z = 45 \end{array}$$

**z = 45**

*obtuse Δ*

$$20 + 130 + h = 180$$

$$150 + h = 180$$

$$\begin{array}{r} 150 + h = 180 \\ -150 \quad -150 \\ \hline h = 30 \end{array}$$

**h = 30**