Geometry Lesson 1
Introduction to Geometry (Grades 9-12)

Instruction 1-4
Triangles

Now, let's take a look at the various kinds of figures. This will be helpful when their properties and relationships are discussed in detail. Right now we will just concern ourselves with learning the definitions of these figures and identifying them. So you can recognize them when we talk about their relationships and properties.

Triangles

One of the figures in geometry that is frequently encountered is triangle. A **triangle** is a closed figure formed by three segments. No pair of the segments are on the same line (Figure 1.16). A triangle is denoted by sign Δ followed by the labels of its vertices. For example the triangle in Figure 1.16 is denoted by ΔABC.

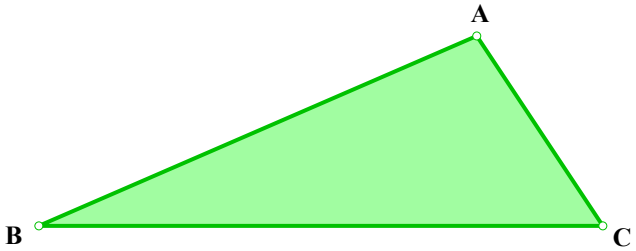

Figure 1.16

Each triangle has three interior angles and six exterior angles. An interior angle is formed by two sides of the triangle. $\angle CAB$, $\angle CBA$, and $\angle BAC$ are interior angles in ΔABC (Figure 1.17). An exterior angle is formed by a side and the extension of the side adjacent to it. For example, $\angle ABD$ and $\angle CAE$ are two exterior angles in ΔABC (Figure 1.17). Sum of the interior angles in any triangle is 180°.

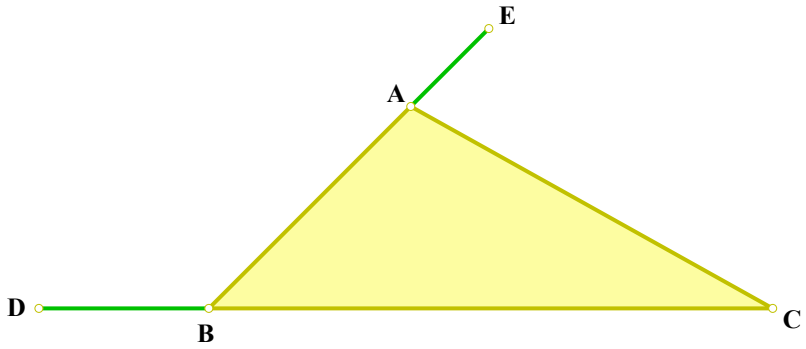

Figure 1.17

Classification of Triangles

Basically, triangles are classified by the nature of their angles or their sides.

By Angles:

Right Triangle. If one of the interior angles in a triangle measures 90˚, it is called a **right triangle** (Figure 1.18). The sum of the other two angles in a right triangle is 90˚.

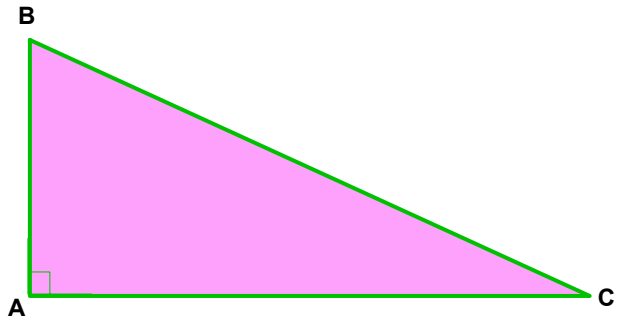

Figure 1.18

Obtuse Triangle. If the measure of one of the interior angles in a triangle is greater than 90˚, it is called an **obtuse triangle** (Figure 1.19).The measure of the other angles are always less than 90˚.

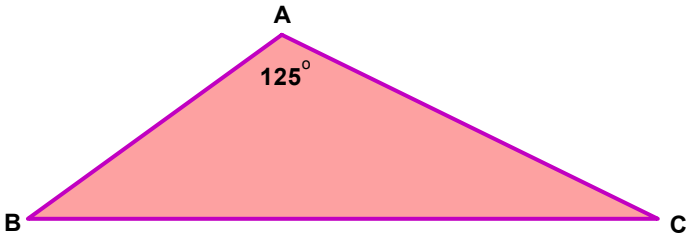

Figure 1.19

Acute Triangle. If the measure of each interior angle in a triangle is less than 90˚, it is called an **acuter triangle** (Figure 1.20).

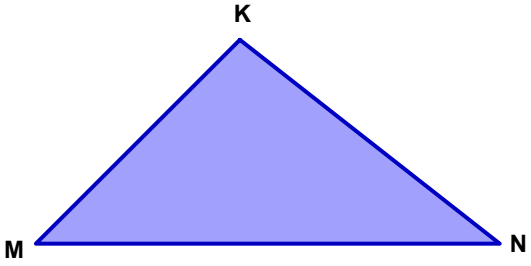

Figure 1.20

Equiangular Triangle. If the interior angles of a triangle are congruent, it is called an equiangular triangle. The measure of each interior angle in an **equiangular triangle** is 60˚.

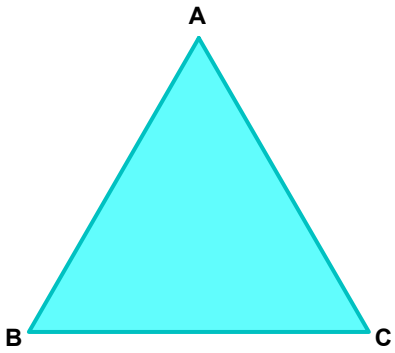

Figure 1.21

By Sides:

Scalene Triangle. In a scalene triangle all the sides have different measures (Figure 1.22).

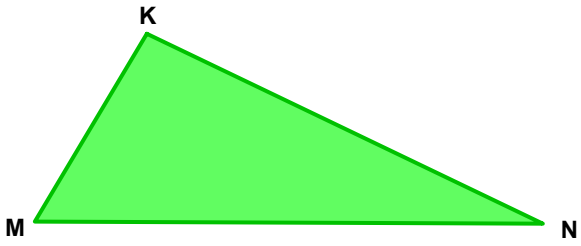

Figure 1.22

Isosceles Triangle. In an **isosceles triangle**, two sides are congruent. The congruent sides are called the **legs** of the triangle. The angle included by the legs is called the **vertex-angle** and the side opposite the vertex-angle is called the **base**. For example in isosceles triangle *DEF* (Figure 1.23), with $\overline{DE} \cong \overline{DF}$, the legs are $\overline{DE}$ and $\overline{DF}$. As a result, $\angle D$ is the vertex-angle and $\overline{EF}$ is the base. In an isosceles triangle, the angles at the ends of the base are congruent.

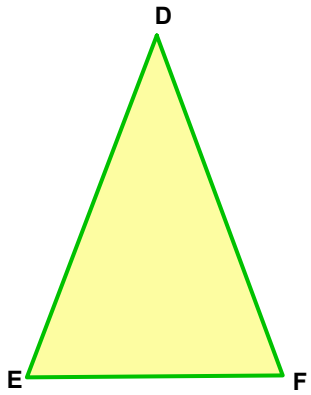

Figure 1.23

Equilateral Triangle. In an equilateral triangle, all the sides are congruent (Figure 1.24). Also, in an equilateral triangle all the interior angles are congruent. So we can consider an equilateral triangle as same as an equiangular triangle.

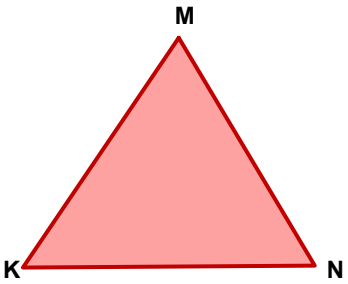

Figure 1.24