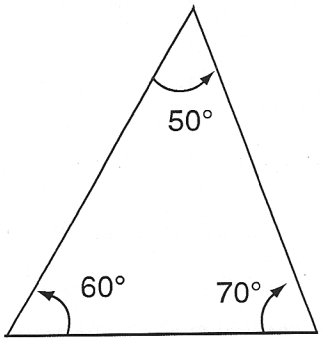
Facts to Know *(cont.)*

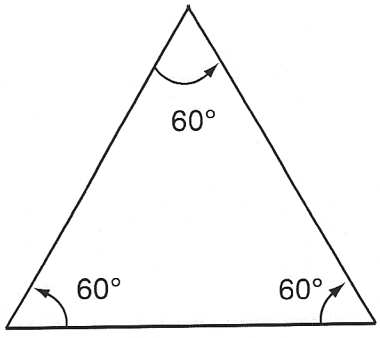
Triangles Named by the Sizes of Their Angles

Triangles are named according to either their largest angle or the lengths of their sides. You may want to review Unit 2, "How to Understand Angles," before beginning this unit.

Acute Triangle

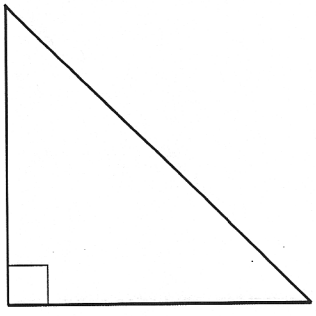
If each angle in a triangle is less than 90° (an acute angle), the triangle is an *acute triangle.*

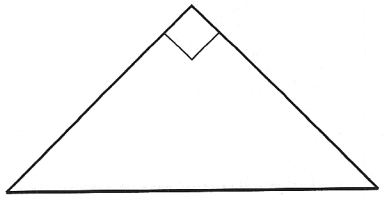




Right Triangle

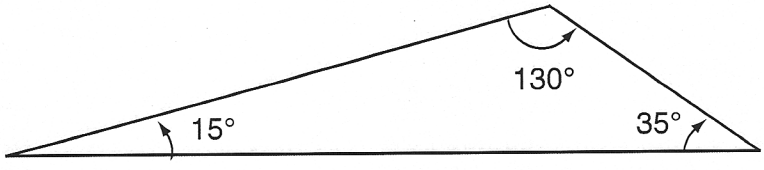
A triangle with a right angle (an angle that measures 90°) is a *right triangle.* The □ symbol indicates a right triangle.





Obtuse Triangle

If one angle of the triangle is greater than 90° (an obtuse angle), it is an *obtuse triangle.*



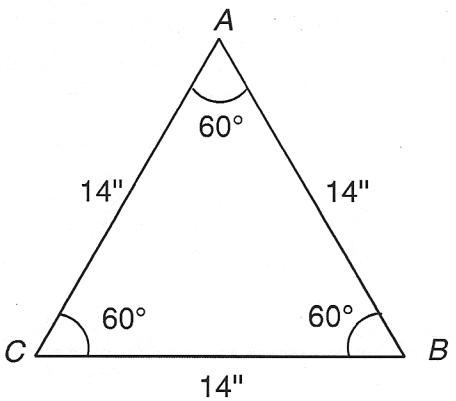
Note: No triangle can have more than one obtuse or one right angle.

Facts to Know *(cont.)*

Triangles Named by the Length of Their Sides

Equilateral Triangle

Equi means "equal" and *lateral* means "sides." An *equilateral triangle* has three sides of the same length. An equilateral triangle also has three equal angles.



Sides: $AB = BC = CA$
Angles: $\angle A = \angle B = \angle C$

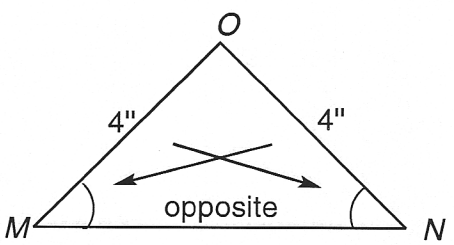
Isosceles Triangle

An *isosceles triangle* is a triangle with two equal sides. An isosceles triangle also has two equal angles because it has two equal sides. Angles that are opposite equal sides are also equal.

Side MO = Side ON

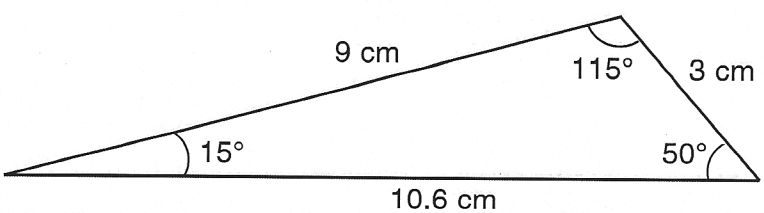
$\angle M$ is opposite side ON
and $\angle N$ is opposite MO

So, $\angle M = \angle N$.



Scalene Triangle

A *scalene triangle* is a triangle with no equal sides. Because there are no equal sides, there are no equal angles. All the angles have different measures.



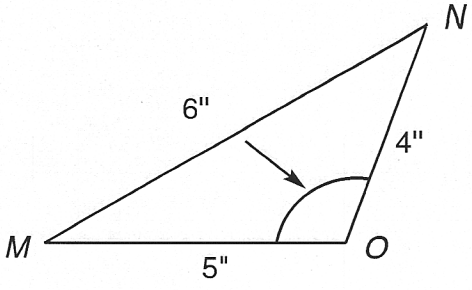
6 How to · · · · · · · · · · Learn More About Triangles

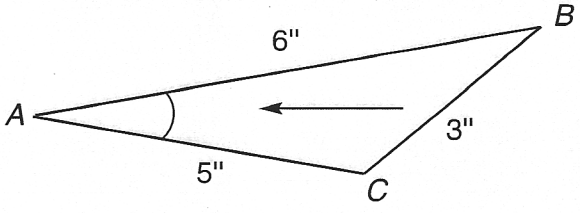
Facts to Know

Knowing the lengths of a triangle's sides can tell you something about its angles. The longest side of a triangle is the side opposite the largest angle. The shortest side is the side opposite the smallest angle.

Examining Triangles

Here are some examples showing the link between the length of a triangle's sides and its angles.





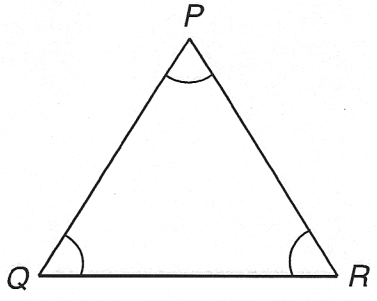
- *MN* is the longest side, so $\angle O$, which is opposite *MN*, is the largest angle.

- *BC* is the shortest side, so $\angle A$, which is opposite *BC*, is the smallest angle.

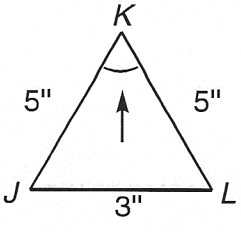
- Equilateral triangles have no longest and shortest sides. Therefore, opposite the three equal sides are three equal angles.

  $PQ = QR = RP$

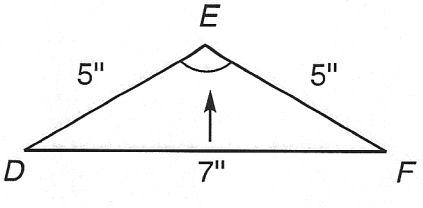
  So, $\angle P = \angle Q = \angle R$



- An isosceles triangle with only two equal sides can have a longest or a shortest side. Look at these two examples:



JL is the shortest side so $\angle K$ is the smallest angle of the triangle.



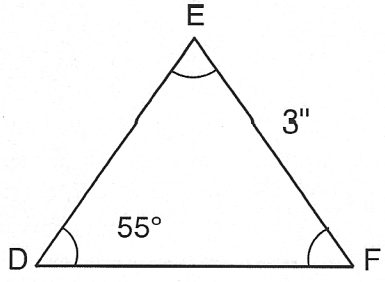
DF is the longest side, so $\angle E$ is the largest angle.

The other two angles in an isosceles triangle are opposite equal sides, so they are equal. Above, $\angle J = \angle L$ and $\angle D = \angle F$.

Facts to Know *(cont.)*

Examining Triangles *(cont.)*

Using the information on the previous page, you can solve problems about triangles—their type and the size of their angles. In addition, you may be able to figure out the size of two angles if one angle and the sides are given. Look at this example that uses △ DEF.



Given: $DE = FE$
$\angle d = 55°$

Problem: Find the number of degrees in $\angle F$ and $\angle E$.

Step 1: Determine if there are any equal sides. Side DE = side FE, so the angles opposite these two sides are equal: $\angle D = \angle F$. Since $\angle D = 55°$, then $\angle F = 55°$, too.

Step 2: Find the number of degrees in $\angle E$. Remember, the sum of all the angles in a triangle is 180°. You know two of them now, $\angle D$ and $\angle F$, which are both 55°. Add the two angles and then subtract the sum from 180° to find $\angle E$.

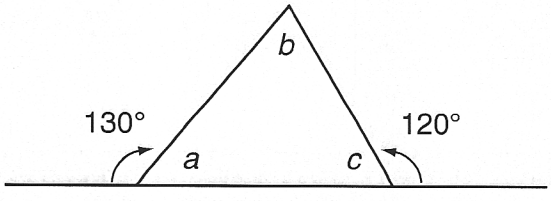
$55 + 55 = 110$
$180 - 110 = 70$
So, $\angle E = 70°$.

Here's another example. This time, you don't know the lengths of the sides, but you can find the measures all three angles.

Step 1: Find the number of degrees in $\angle a$. You know that $\angle$ a and the 130° angle are supplementary, therefore, $\angle a + 130° = 180°$. Subtract to find $\angle a$.

$\angle a = 180° - 130°$
So, $\angle a = 50°$.

Find $\angle b$.



Step 2: Find $\angle c$. You know that $\angle c$ and the 120° angle are supplementary angles, therefore $\angle c + 120° = 180°$; subtract to find $\angle c$.

$\angle c = 180° - 120°$
So, $\angle c = 60°$.

Step 3: Find $\angle b$. The sum of the angles in a triangle is 180°. You know the number of degrees in two of the angles.
$\angle a + \angle c = 50° + 60° = 110°$

$\angle b = 180° - 110°$
So, $\angle b = 70°$.