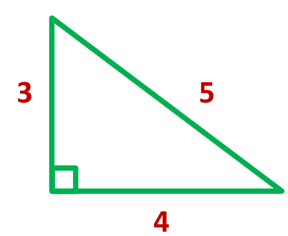
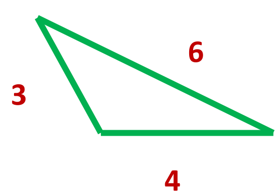
The right angle is important in construction, and it is also an important part of defining triangles by their angle measure. A right triangle has exactly one right angle (90°). An acute triangle has three angles which measure less than 90°. An obtuse triangle has one angle which measures more than 90°. As a reminder, the three interior angles of any triangle measure 180°.

In the past, we had to know the angle measures of a triangle – or at least the measure of two of the three angles – to determine if a triangle was acute, right or obtuse. But how can we tell what type of triangle we have if we are given the side lengths instead of the angle measures?

With the Pythagorean Theorem ($a^2 + b^2 = c^2$), we now know that if the sum of the squares of the two shorter sides (legs) is equal to the square of the longest side (hypotenuse), we have a right triangle. One of the more common examples is the Pythagorean Triplet 3, 4, 5. Let's use it to discover how to determine if a non-right triangle is acute or obtuse.



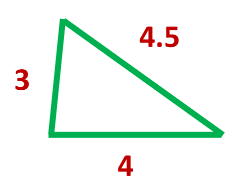
Let us bend the left side of the triangle backwards, opening it up to an obtuse triangle. We will keep the shorter side lengths the same, 3 and 4, but the longest side will increase. In our example, the new longest side length will be 6.



How will this affect our calculations? Is $3^2 + 4^2$ greater than or less than 6^2? $9 + 16 < 36$. Therefore we will say that if the sum of the squares of the two shorter sides is less than the square of the longest side, the triangle is obtuse.

To check this, we will bend the left side of the triangle forward, shortening the longest side to an acute triangle. In this example, the new longest side length will be 4.5.

What will this do to our calculations? Is $3^2 + 4^2$ greater than or less than 4.5^2? $9 + 16 > 20.25$. Therefore we will say that if the sum of the squares of the two shorter sides is greater than the square of the longest side, the triangle is acute.



Here is a table of our findings:

If:	*Then we have a(n):*
$a^2 + b^2 < c^2$	obtuse triangle
$a^2 + b^2 = c^2$	right triangle
$a^2 + b^2 > c^2$	acute triangle

Note: An isosceles triangle that has two sides longer than the third is acute.

Use the Pythagorean Theorem to classify each triangle as acute, right or obtuse.

Show all work on a separate sheet of paper with your name on it.

Side Lengths:

10	24	25
1.0	1.4	1.0
8	7	5
6	15	17
33	56	65
11	9	14
12	35	37
6	12	14