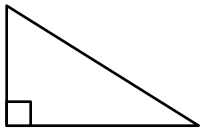
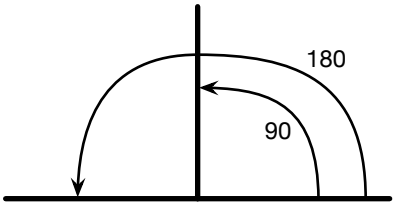
Cayuga Heights 5th Grade Math Club
Problems for October 23, 2015

We saw that when shapes get bigger or smaller, their length, area, and volume change in different ways. One kind of dimension doesn't change at all, though: angles. In two shapes that are similar, all of their angles will be equal. For example, two triangles are similar if and only if of all their angles are equal.

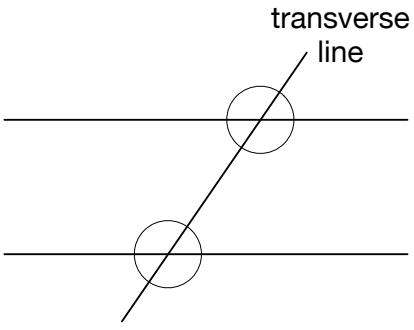
Remember that angles are measured in degrees. A right angle, like in a square, is 90 degree angle (90°). A triangle with one right angle is called a *right triangle*. Two right angles added together makes a 180° angle, which doesn't look like an angle at all. We can even have angles over more than 180°. A full circle is a 360° angle. (Why 360? Blame it on the ancient Babylonians, who really liked the number 60 and its multiples. They're the same people who are responsible for our clocks measuring everything in 60's.)

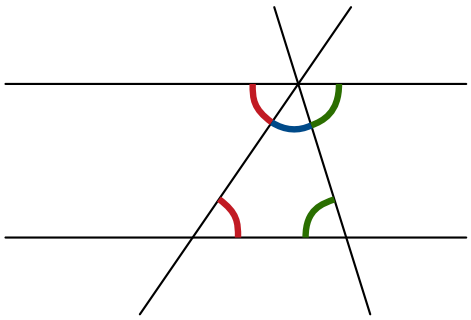


right triangle



Two lines are *parallel* if they never intersect each other. Intuitively, they go in the same direction and are always the same distance apart. If we add a third line that intersects both the lines, it is called a *transverse line*. The interesting thing is that the transverse line makes the same angles with both of the parallel lines.





Can you find all the equal angles?

Can a triangle have two right angles? No, because two of its sides would have to be parallel. Another way to see this is that the sum of the angles in a triangle is always 180°. We can see this by drawing a triangle and then adding a extra line that goes through one corner and is parallel to the opposite side. The three angles around that corner are the same as the three angles in the triangle, and we can see that they add up to 180°.

1. In a right triangle, one of the angles is 45°. What is the measure of the other angle that is not a right angle? (This is called an *isoceles right triangle*.)

2. In an *equilateral triangle*, all three angles are the same and all three sides have the same length. What is the measure of its angles?

3. What is the sum of the angles in a rectangle?

4. What is the sum of the angles in a parallelogram?

5. Emile's new kite is kite-shaped, with two 90° angles and one 120° angle at the top. What is the measure of the bottom angle? (Hint: draw a picture and put a line down the center.)

6. The shadow of the tree in Sean's back yard is 20 feet long. The shadow of his one-foot ruler is 4 inches long. How tall is the tree?