

Angles

Look around the room. There are many geometric shapes. The study of geometry helps us to understand the mathematics around us both manmade and in nature. Just open your eyes and you will find lots of geometric shapes and patterns.

First, we'll analyze the structure of an angle. To help us become more familiar with the size of angles, we'll take a look at some common angles that occur often that we will refer to as benchmark angles. Use them to help you determine the size of angles.

To measure angles use a protractor. The protractor has two sets of numbers. Remember the bottom ray that you start with is starting out at 0 degrees. Use the set of numbers that progress upward from 0.

Angles may be turned in any direction and that will not affect the size of the angle. Also, the length of the rays may be extended without changing the size of the angles.

Parts and Properties of an Angle

Measuring Angles

Benchmark Angles

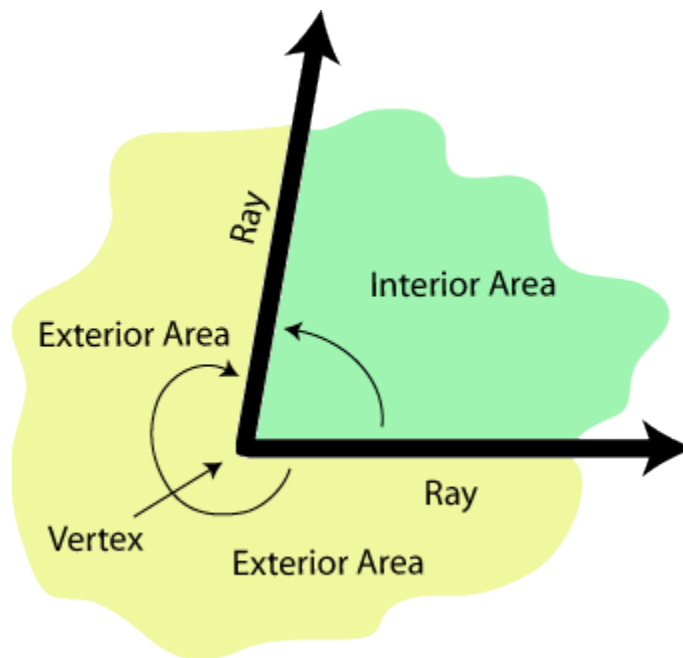
Angles are Degrees of Rotation

Parts and Properties of an Angle

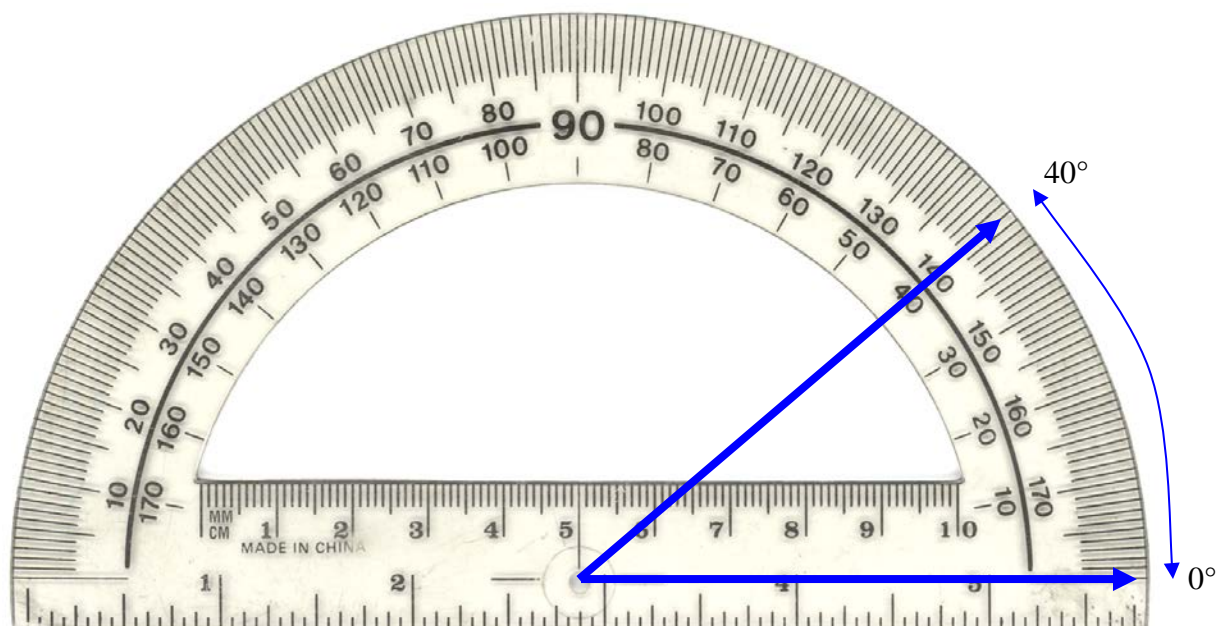
An angle is formed when two **rays** meet at a common point called the **vertex**.

The measure of an angle is the amount of **circular rotation** about a point starting with a ray and ending with a second ray. For this angle, the measure is **80°** .

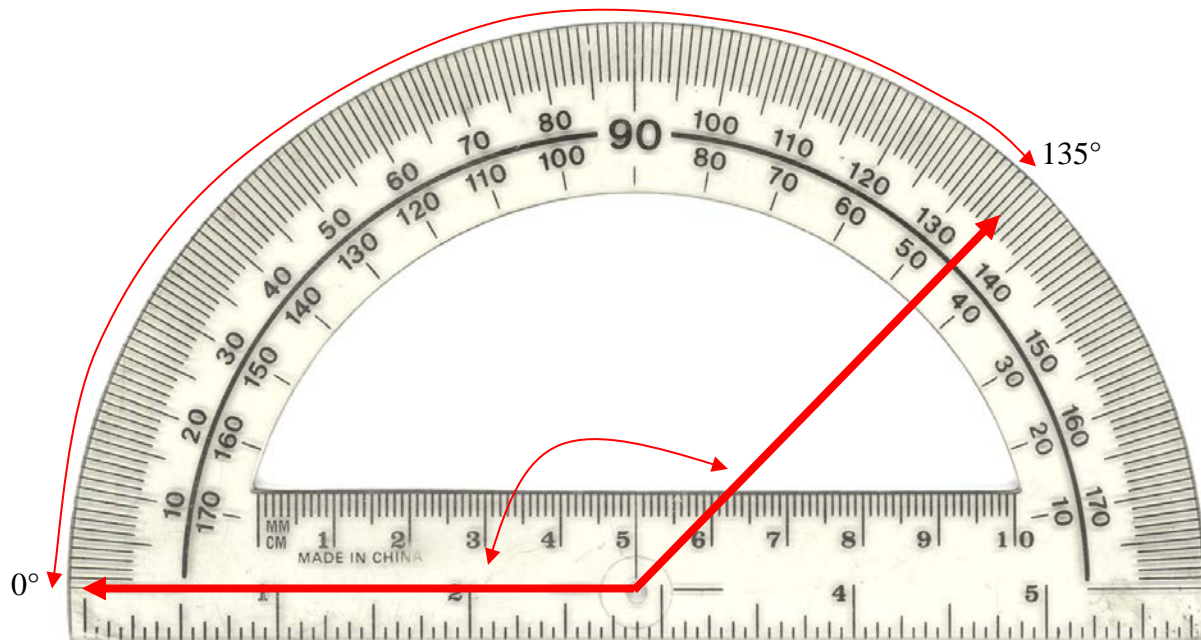
The area within the two rays is called the **interior** of an angle, represented by the green shading in the picture. The area outside the two rays is called the **exterior** of an angle, represented by the yellow shading in the picture.



Measuring Angles



The starting ray, in this case, the bottom ray, is at 0° . Read the other ray. The ray is passing through both 40° and 140° . You must decide which number makes sense. Think about a right angle – it measures 90° . This angle is not as open as a right angle; thus, you would read the smaller number. This angle measures 40° . Notice the numbers near the bottom ray, the lower set of numbers start at 0, then 10, 20, etc. That is the set of numbers that is used to read this angle. The starting ray starts at 0° . This is an **acute angle** because it measures more than 0° and less than 90° .

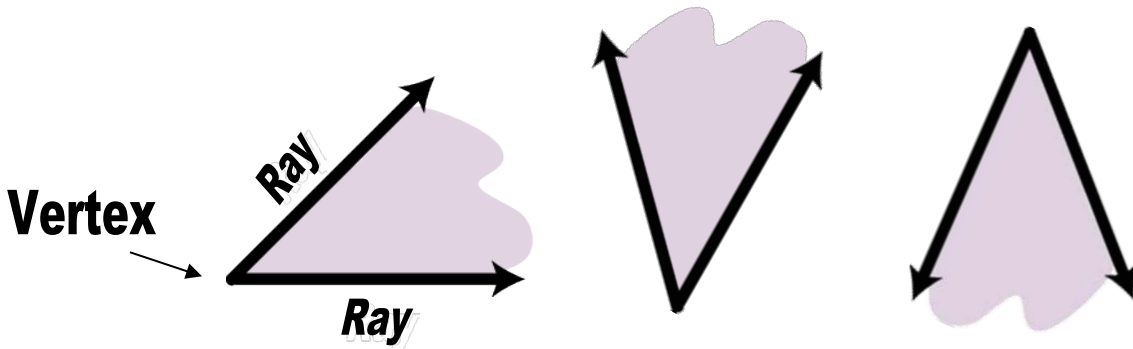


The starting ray, in this case, the bottom ray, is at 0° . Read the other ray. The ray is passing through both 45° and 135° . You must decide which number makes sense. Think about a right angle – it measures 90° . This angle is open wider than a right angle; thus, you would read the larger number. This angle measures 135° . Notice the numbers near the bottom ray, the upper set of numbers start at 0, then 10, 20, etc. That is the set of numbers that is used to read this angle. The starting ray starts at 0° . This is an **obtuse angle** because it measure more than 90° and less than 180° .

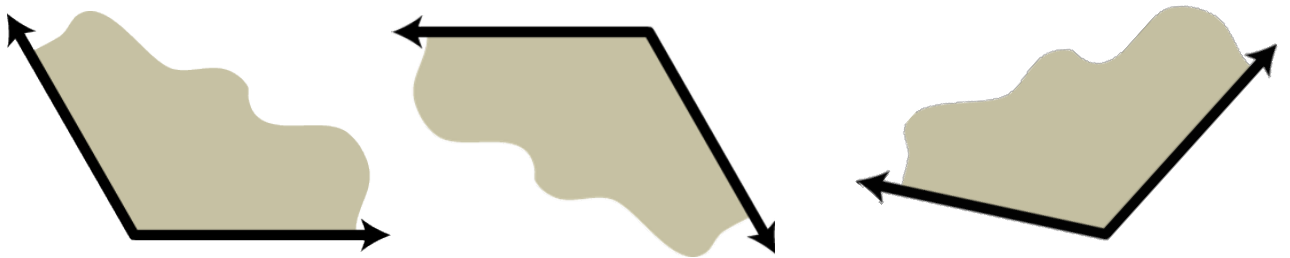
Benchmark Angles

Here are some angles to help measure angles. Use these angles to estimate the size of the angle to be drawn.

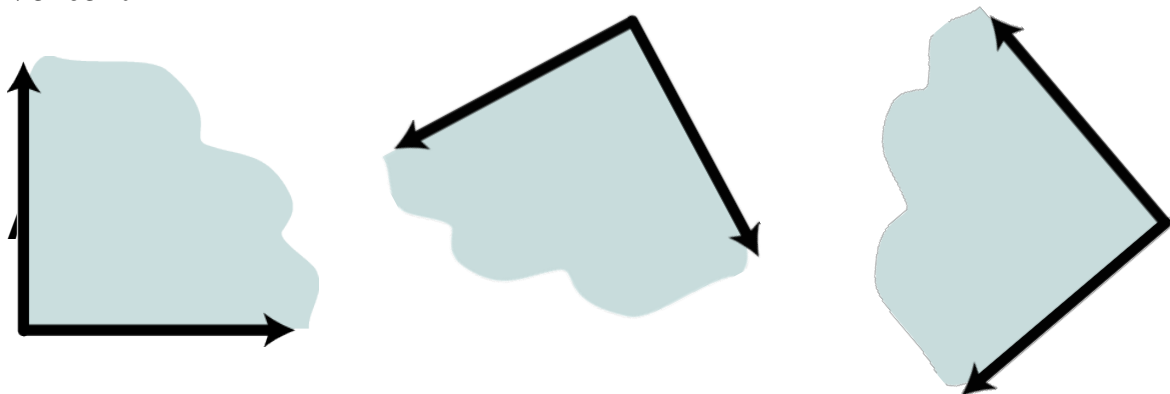
All of these angles are 45° . *The manner in which they are turned does not affect the size of the angle.* The rays form a 45° at the vertex.



All of these angles are 120° . The rays form a 120° at the vertex.



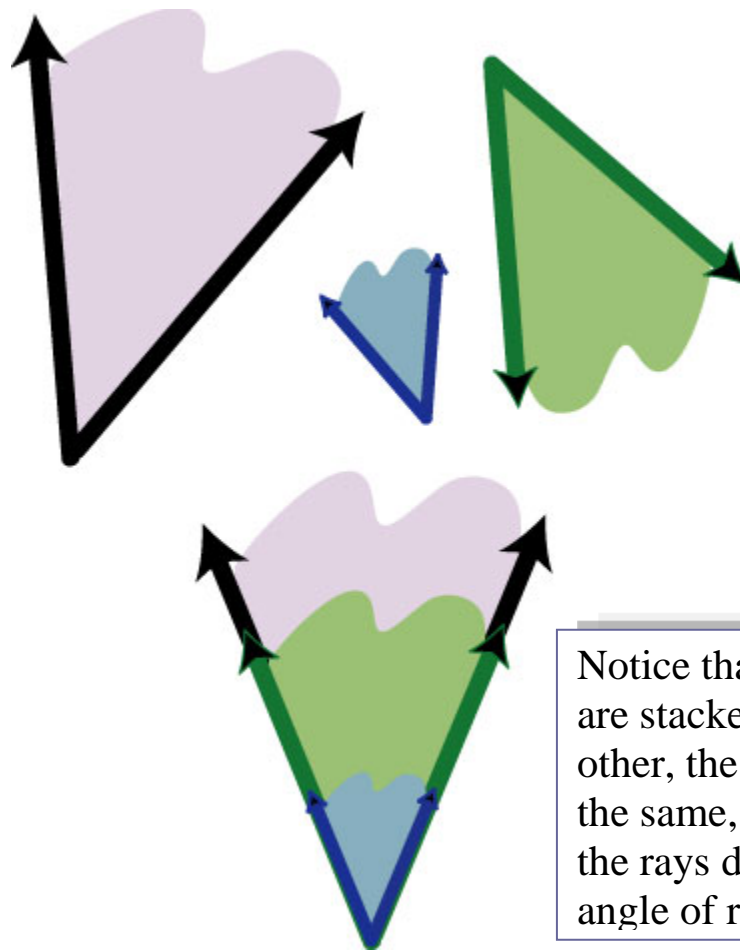
All of these angles are 90° . The rays form a 90° angle at the vertex.



Degrees of Rotation

An angle is formed when two **rays** meet at a common point called the **vertex**.

The measure of an angle is the amount of **circular rotation** about a point starting with a ray and ending with a second ray. All of these angles measure **45°**.



Notice that when the angles are stacked on top of each other, the degree of rotation is the same, **45°**. The length of the rays does not affect the angle of rotation.