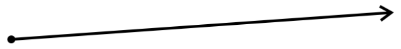
Angle Relationships

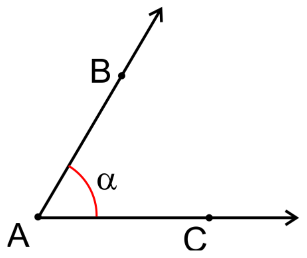
A **ray** has a starting point and continues indefinitely in one direction (indicated by one arrowhead).



An **angle** consists of **two rays that start at the same point**, called the **vertex**. Each ray is called a **side** of the angle.

We can denote the angle on the right as angle BAC, or using the symbol “∠” for “angle,” as ∠BAC.

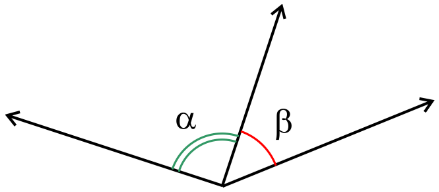
Note that we list the vertex point in the middle: it is ∠B**A**C, not ∠ABC. We could also name it ∠CAB.



In mathematics, we also often denote angles with the beginning letters of the Greek alphabet: α (alpha), β (beta), γ (gamma), and δ (delta). So ∠BAC can also be called “angle α.”

Two angles are **adjacent** if they have a **common vertex and share one side.**

In the image on the right, ∠α and ∠β are adjacent (side-by-side) angles.



1. How many angles do you see in the picture? ________

How many degrees do these angles measure?

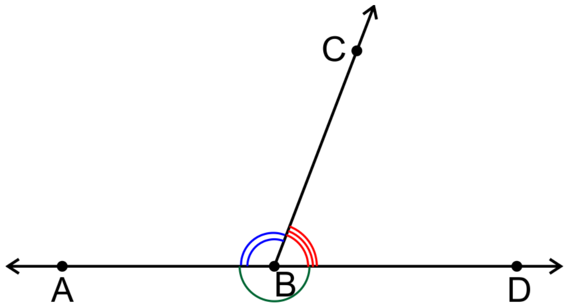
∠ABC = __________°

∠CBD = __________°

∠ABD = __________°

What is the sum of ∠ABC and ∠CBD? _____________°

What is the sum of all three angles? _____________ °



2. Measure the angles. Calculate their sum.

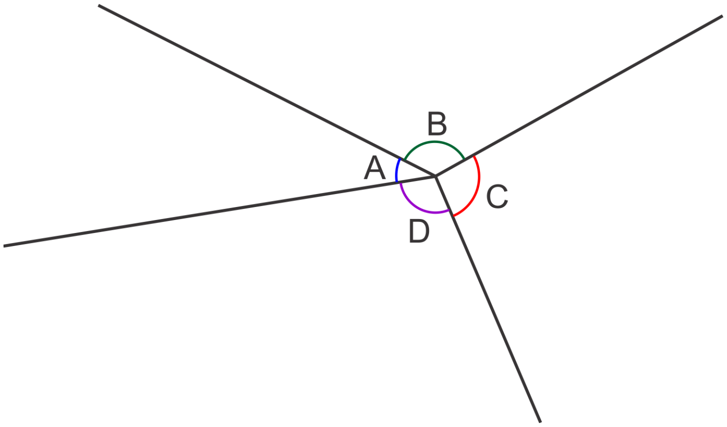
∠A = __________°

∠B = __________°

∠C = __________°

∠D = __________°

Sum of the angles = _________°

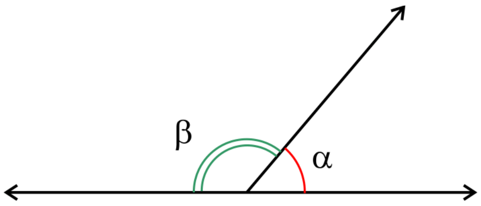


Sample worksheet from
www.MathMammoth.com

The angles ∠α and ∠β in this image are adjacent, and they form a straight angle (an angle of 180 degrees). They are called **supplementary angles**.

Two angles are supplementary if their **sum is 180 degrees:**

$$\angle\alpha + \angle\beta = 180^\circ$$



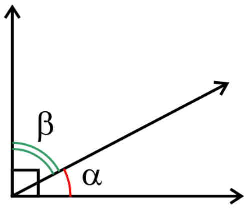
The angles ∠α and ∠β in this image are adjacent, and they form a right angle. They are called **complementary angles**.

Two angles are complementary if their **sum is 90 degrees:**

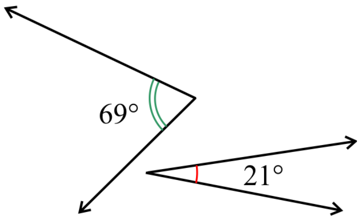
$$\angle\alpha + \angle\beta = 90^\circ$$

We can also say, "α complements β."

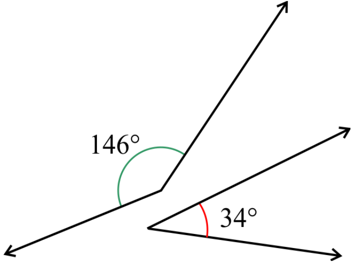
Here's a mnemonic to help you remember the difference: **S**upplementary angles form a **S**traight line, and **C**omplementary angles form a **C**orner (a right angle).



Supplementary angles don't have to be adjacent, and neither do complementary angles.



These are still complementary angles, because 21° + 69° = 90°.



These are still supplementary angles, because 146° + 34° = 180°.

3. **a.** Draw a 38° angle. Then draw an adjacent angle that complements it.

b. Draw an 82° angle. Then draw an adjacent angle that supplements it.

Sample worksheet from
www.MathMammoth.com