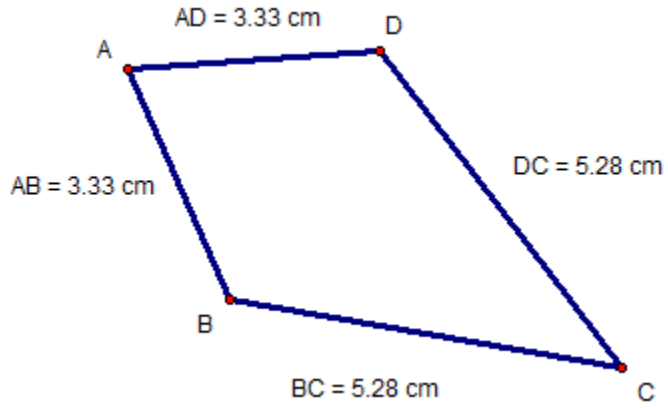
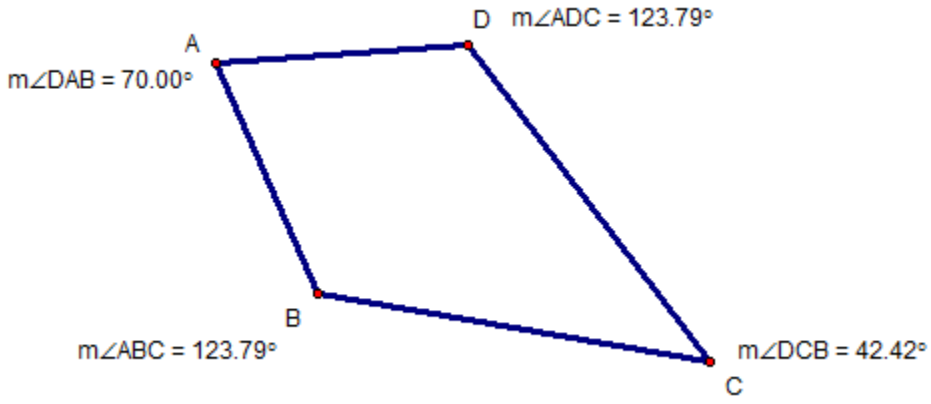
Special Parallelograms – Kites

Today's lesson is about kites. A long time ago, before the age of video games and AIM, kids would fly kites in public parks during the summer months. Contrary to popular belief, kites are NOT parallelograms. The opposite sides of kites are NOT parallel. But I'll tell you what IS true about kites. Besides being fun to fly, two pairs of adjacent sides are COUNGRUENT. Here's a kite below:



So the **first property** of a kite is that two pairs of adjacent sides are congruent. Notice that adjacent sides AD and AE are congruent. Notice also that DC and BC are congruent. There are *no parallel sides.*

A **second property** of a kite is that *one pair* of *opposite angles* are congruent. In this case, $\angle ADC = \angle ABC$. I'll show you in the figure below:

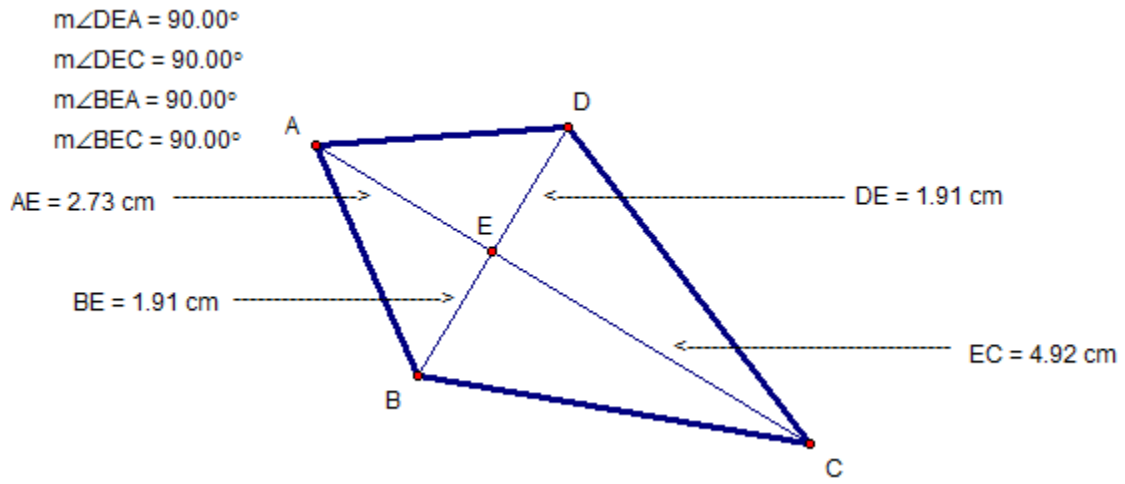


Notice in the figure above that only *one* pair of opposite angles are congruent. The other pair are clearly *NOT* congruent. Angles ADC and ABC are both 123.79^0, however angles DAB and DCB are different!

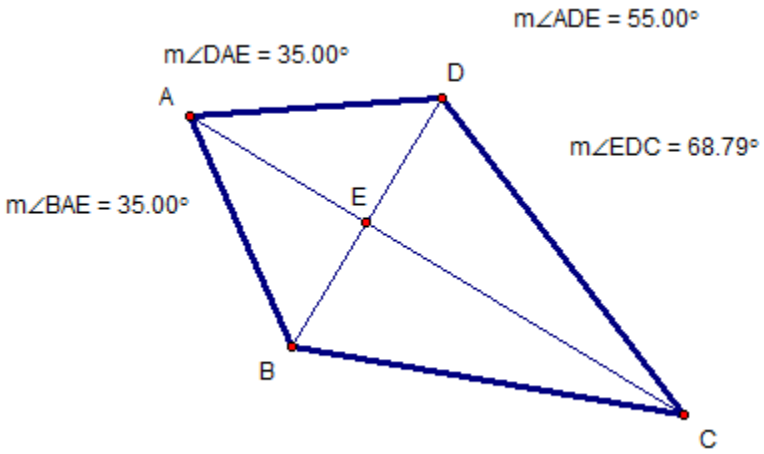
A **third property** of a kite is that the diagonals are *perpendicular*. That means that they form **right angles** where they intersect each other. Remember. To intersect does *NOT* mean to bisect! To bisect means to divide into 2 equal segments. In the case of a kite, only one diagonal bisects the other.

You can see in the figure below that line segments AC and BD are perpendicular to each other (they form right angles). You can also see that diagonal AC bisects line diagonal BD, however diagonal BD does *NOT* bisect AC.

You can see that AE and EC have *different* lengths. So a **fourth property** is that only one diagonal is bisected by the other diagonal.



A **fifth** and final property of a kite is that the same diagonal that bisects the other diagonal also bisects two opposite angles. Look in the figure below:



Notice how diagonal CA bisects $\angle DAB$. However clearly diagonal BD does NOT bisect angle ADC or angle ABC. Who would ever have guessed that there would be so many properties in a common flying instrument like a kite? Interesting, isn't it?

So you need to write down the following theorems:

1. **Properties of a kite**
2. **Two pairs of adjacent sides are coungruent.**

3. **One pair of opposite angles are congruent.**
4. **The diagonals are perpendicular.**
5. **One diagonal bisects the other diagonal and the two opposite angles.**

Study these figures while reviewing the properties of a kite. The important thing is to ***understand*** the properties, not simply memorizing what I've written above.