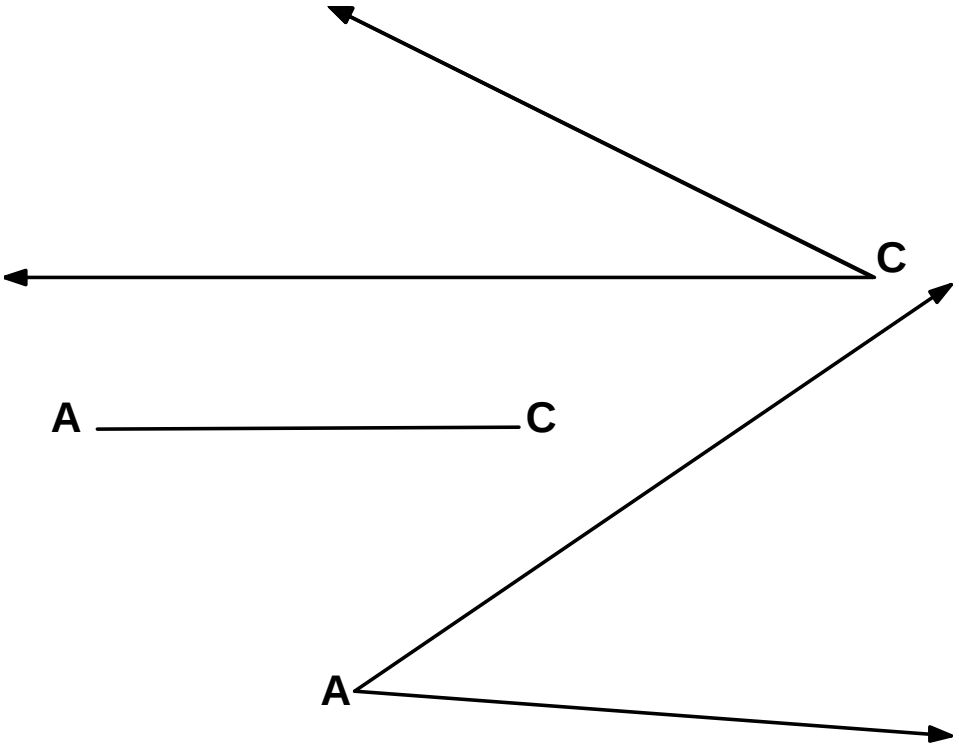
10.2 Other Congruence Properties

So far we have learned that triangles can be found congruent by SSS and by SAS.
What about ASA? Let's explore.

Construct $\triangle ABC$ using the given $\angle A$, $\angle C$ and side $\overline{AC}$:

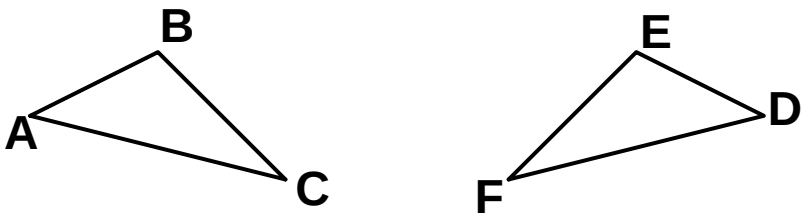


Check with the people around you to see whether or not your triangle is the same size and shape as theirs.

This illustrates the property of congruence called Angle, Side, Angle, or ASA:

ANGLE, SIDE, ANGLE (ASA): If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, respectively, then the triangles are congruent.

Can you show that these two triangles are congruent, given that $\angle A \cong \angle D$, $\angle B \cong \angle E$, and $\overline{AC} \cong \overline{DF}$?

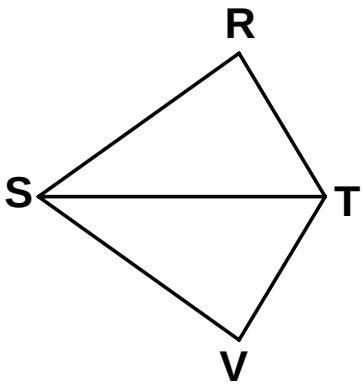


So, it follows from ASA that if you know that any two pairs of corresponding angles of two triangles are congruent and one pair of sides are congruent, the two triangles are congruent. Therefore, we have yet another congruence property:

ANGLE, ANGLE, SIDE (AAS): If two angles and a corresponding side of one triangle are congruent to two angles and a corresponding side of another triangle, respectively, then the two trianlges are congruent.

Let's try some problems now:

1. Given that angle $\angle R$ and $\angle V$ are right angles and $\angle RST \cong \angle VST$, show that $\triangle RST \cong \triangle VST$.



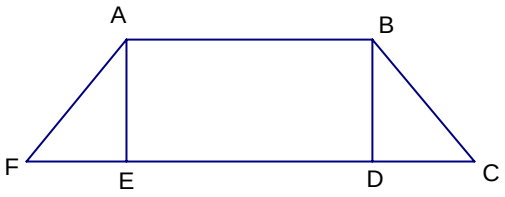
2. Prove that the opposite sides of a parallelogram are congruent.

Now let's look at Table 10-1 on page 665 for some definitions and properties of specific types of quadrilaterals.

In groups, try these two informal proofs. You will need to sketch a figure for each problem. Be ready to present your proof to the class.

1. Given: ABCE is a rectangle, $\angle F \cong \angle C$

   Prove: 1) ABCF is a trapezoid
   2) $\overline{AF} \cong \overline{BC}$



2. NOW TRY THIS 10-8 on page 664
   If the diagonals of a quadrilateral bisect each other, then the quadrilateral must be a parallelogram.