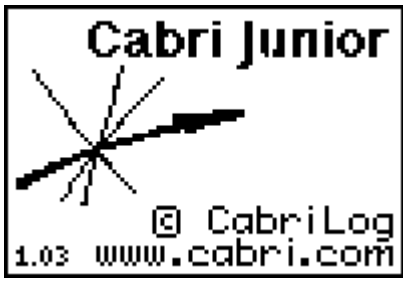
Activity 7 SAS Triangle Congruence

Two triangles are considered to be congruent if all three sides have the same length and all three angles have the same degree measure. However, to show that two triangles are congruent, we need only to show that certain sets corresponding sides and angles are congruent. This activity will lead you through the second of these triangle congruence postulates – that if all two pairs of corresponding sides are congruent as well as the angles contained by these sides, then the two triangles are congruent and all remaining sides and angles must be congruent.

Let us try some basic triangle constructions to help us get familiar with Cabri Jr.

First, turn on your TI-84 and press the APPS key. Arrow down until you see Cabri Jr and press [ENTER]. You should now see this introduction screen.




To begin the program, press any key. If a drawing comes up on the screen, press the [Y=] key (note the F1 above and to the right of the key – this program uses F1, F2, F3, F4, F5 names instead of the regular key names) and arrow down to NEW. It will ask you if you would like to save the changes. Press the [2nd] key and then enter to not save the changes.

We are now ready to begin.

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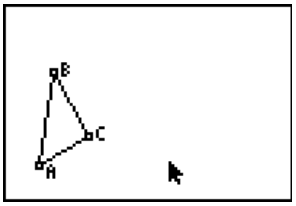
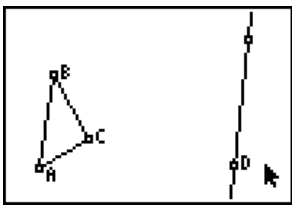
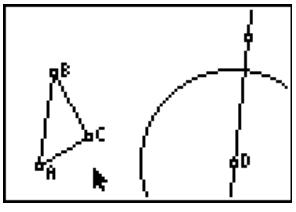
To begin, construct a triangle ABC. As before, you may wish to refrain from labeling points in order to keep the screen cleaner.



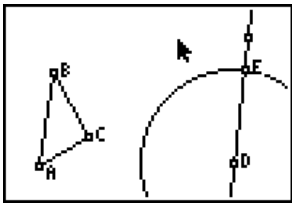

Construct point D anywhere else on the screen. For the rest of this construction, point D will correspond to point A in the original triangle. Construct a line through D.



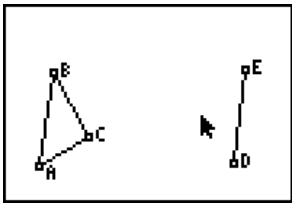

Use the Compass tool with center D and radius AB to construct a circle that passes through the new line.



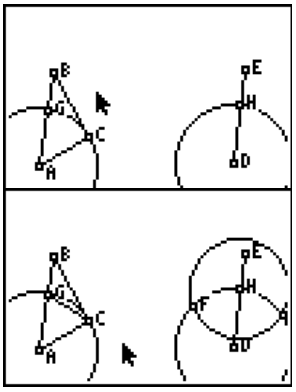
Use the Intersection tool to find the point(s) of intersection of this circle with the line. Label this point E.



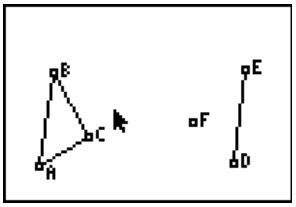

Hide the circle, the line and the second control point for the line. Construct a line segment that joins point D to point E. We should now have a line segment DE that has the same length as AB.



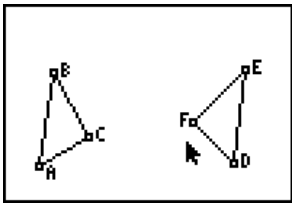

Copy <BAC at point D. If necessary, refer to the detailed instructions in Activity 5. To begin, use the Compass tool with center C and radius AC to construct circles with centers A and D. Label the point of intersection of the circle and AB as G and the intersection of the second circle with DE as H.
Use the Compass tool with center H and radius CG to construct a new circle. Label the point of intersection of the two circles as point F.



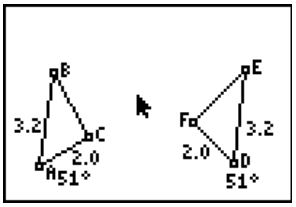

Hide all of the circles as well as points G and H.



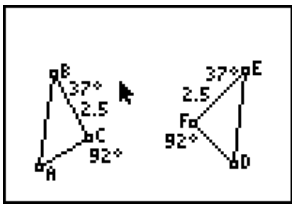

Complete the new triangle by connecting F to D and E with line segments.



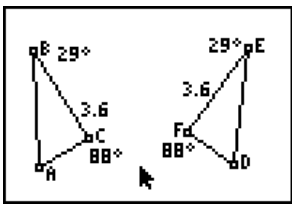

Measure lines segments AB, AC and angle BAC in the original triangle and line segments DE, DF and angle EDF in the new triangle. Note that these are all congruent.



Measure the remaining line segments and angles in both triangles. We should find that the corresponding sides and angles are congruent. Note that the original measurements have been hidden in order to not clutter up the diagram.




Drag any of the points A, B or C to alter the measurements of sides and/or angles in the original triangles. Describe what happens to the corresponding measurements in the new triangle.




When the first circle was drawn through point D, there are two possible points of intersection. Would the construction work just as well if you had selected the second point?

Would it matter if the triangle were right angled? What about obtuse or isosceles?