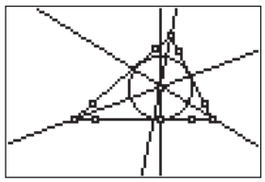
Inscribing a Circle in a Triangle

Approximate Total Time: 25 minutes

ACTIVITY OVERVIEW:

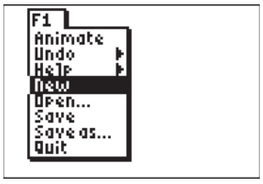
In this activity we will

- Draw a triangle
- Draw the bisector of each angle of the triangle
- Locate the *incenter*
- Find the distance from the *incenter* to a side of the triangle
- Inscribe a circle in the triangle



In Activity 8 we bisected the angles of a triangle and found the incenter of the triangle. How far is it from the incenter to each side of the triangle? We will use this distance as the radius of a circle with center at the *incenter* as we inscribe a circle in a triangle.

NCTM Geometry Standard: Analyze characteristics and properties of 2- and 3-dimensional geometric shapes and develop mathematical arguments about geometric relationships.



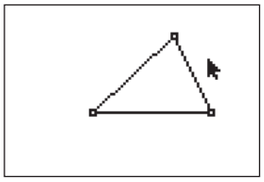
1

Press APPS. Move down to the CabriJr APP and press ENTER. Press ENTER, or any key, to begin using the application.

Press Y= for the F1 menu and select **New**. (If asked to **Save changes?** press ◄ ENTER to choose "No.")

For TI-Navigator™ Users

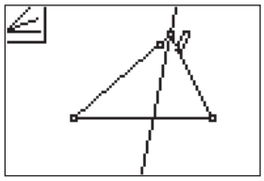
Send an APP VAR: You may have saved the figure from Activity 8 as an APP VAR. If so, send it via TI-Navigator, then have students *Open* the file to begin the activity with the triangle and its angle bisectors already drawn. For help, see page 74.



2

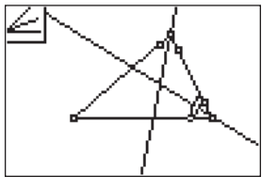
Press WINDOW for F2, move down to **Triangle** and press ENTER. Move to the location of a vertex and press ENTER. Move to the second vertex and press ENTER. Move to the third vertex and press ENTER. Press CLEAR to exit the triangle drawing tool.

Next you will use the tools in F3 to draw the bisector of each angle in the triangle.



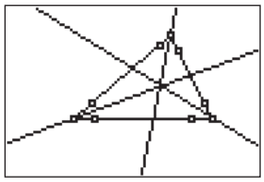
3

Press ZOOM for the F3 menu, move to **Angle Bis.**, and press ENTER. Move the pencil until one side of the triangle is flashing then press ENTER. This marks a point on the side of the triangle. Move until the vertex point flashes and press ENTER. Move until the other side forming the angle is flashing and press ENTER again. You have used 3 points to identify an angle and the angle bisector has been drawn.



4

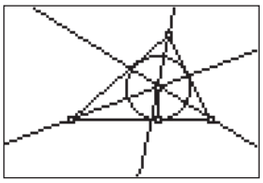
With the **Angle Bis.** tool still active, press ENTER to select that point again OR move to another point on the side of the triangle and press ENTER. Move to the next vertex point and press ENTER, then move to a point on the other side forming the angle and press ENTER.



5

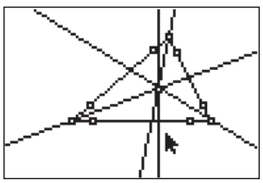
With the **Angle Bis.** tool still active, press ENTER to select that point again OR move to another point on the side of the triangle and press ENTER. Move to the remaining vertex point and press ENTER, then move to a point on the other side forming the angle and press ENTER. Press CLEAR to exit the **Angle Bis.** tool.

Inscribing a Circle in a Triangle



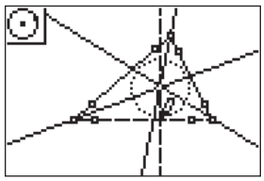
6

The bisectors of the angles of the triangle intersect at a common point. This point is called the *incenter* of the triangle and it is equidistant from the sides of the triangle. The *incenter* is also the center of the circle *inscribed* in the triangle. In the next steps we will find the distance from the *incenter* to a side of the triangle and use this distance as the radius of a circle with its center at the *incenter*.



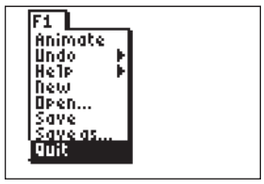
7

Press [ZOOM] for the F3 menu, move to **Perp.**, and press [ENTER]. Move to the *incenter* (two of the angle bisectors will be flashing indicating that you want their intersection) and press [ENTER]. Move the arrow to a side of the triangle and press [ENTER]. You now have a line through the *incenter* and perpendicular to one of the sides of the triangle.



8

Press [WINDOW] for the F2 menu, move to **Circle**, and press [ENTER]. Move the pencil until the *incenter* is flashing and press [ENTER]. Move the pencil until you are at the intersection of the side and the line perpendicular to it. Press [ENTER] when both are flashing to a draw a circle with its center at the *incenter* and with a radius determined by the perpendicular distance from the *incenter* to the side of the triangle. This is the *inscribed* circle.



9

To exit the APP, press [Y=] for the F1 menu. Move to **Quit**, then press [ENTER]. (Or you can press [2nd] [MODE] for [QUIT].)