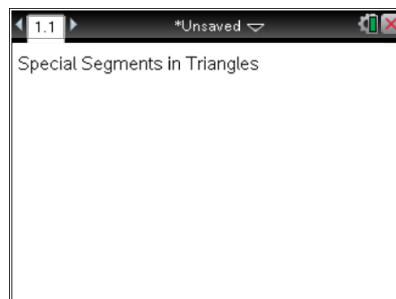## Special Segments in Triangles
MATH NSPIRED

Activity Overview:

In this activity, you will create four special segments from a given vertex in a triangle.

Materials
• *Technology needed (TI-Nspire™ handheld, computer software)*

Step 1   Preparing the document

1. Press [⌂ on] > **New Document > Add Notes**.

2. Type "Creating Special Segments in Triangles". **Note:** To obtain capital letters, use the [⇧shift] key.

3. Press [ctrl] > [I] > **Add Geometry**.

4. Press **Menu > View > Hide Scale**.

5. Press **Menu > Settings**. Select "Fix 0" for Display Digits. Press [tab] to OK, and press [🖱] or [enter].

Step 2   Creating triangle ABC

1. Press **Menu > Shapes > Triangle**.

2. Move the cursor to a convenient location, and press [🖱] to create a vertex. Immediately press [⇧shift] [A] to label the vertex. (See the figure at the right.)

3. Move the cursor to a new location, and press [🖱] to place a second vertex. Immediately press [⇧shift] [B] to label the vertex.

4. Move the cursor to a new location and press [🖱] to create the third vertex. Immediately press [⇧shift] [C] to label the vertex.

5. Press [esc] to exit the **Triangle** tool.
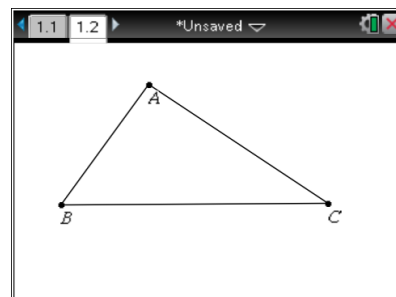
Step 3   Constructing the median

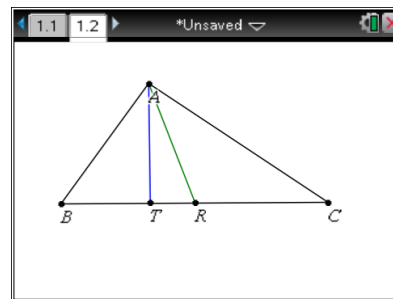1. Press **Menu > Construction > Midpoint**.

2. Click anywhere on $\overline{BC}$, and then immediately label the point by pressing [⇧shift] [R]. Press [esc].

3. Press **Menu > Points & Lines > Segment** to create $\overline{AR}$.

4. Move the cursor to point *A* and press [🖱]**.** Then, move the cursor to point *RI,* and press [🖱].

5. Press [esc] to exit the **Segment** tool.

6. If desired, right-click ([ctrl] [menu]) on the segment, and add Color.
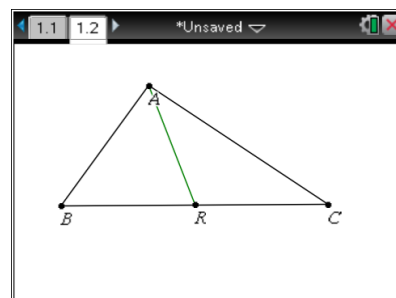
Step 4   Constructing the altitude

1.   Press **Menu > Construction > Perpendicular**.

2.   Click on *A* and $\overline{BC}$.

3.   Press **Menu > Points & Lines > Intersection Point(s)**.

4.   Click on the perpendicular line, and then click on $\overline{BC}$. Label the intersection point by pressing [⇧shift] [T]. Press [esc].

5.   Press **Menu > Points & Lines > Segment** to create $\overline{AT}$.

6.   Click on point *A,* then point *T.* Press [esc].

7.   Hide the perpendicular line by pressing **Menu > Actions > Hide/Show.** Click on a part of the line that does not contain $\overline{AT}$.

8.   Press [esc] to exit the **Hide/Show** tool. **Note:** If points *T* and *R* are close together, grab and drag point *A* to change the shape of the triangle to make the two points farther apart.

9.   If desired, right-click ([ctrl] [menu]) on the segment and add Color.

Step 5   Constructing the angle bisector

1.   Press **Menu > Construction > Angle Bisector**.

2.   Click on point *B*, then point *A* (the vertex), and finally point *C*. Press [esc].

3.   Press **Menu > Points & Lines > Intersection Point(s)**.

4.   Click anywhere on the angle bisector and then on $\overline{BC}$. Label the intersection point by pressing [⇧shift] [N]. Press [esc].

5.   Press **Menu > Points & Lines > Segment** to create $\overline{AN}$.

6.   Click on point *A* and then *N*. Press [esc].

7.   Hide the angle bisector by pressing **Menu > Actions > Hide/Show.** Click on any part of the angle bisector that does not contain $\overline{AN}$.

8.   Press [esc] to exit the **Hide/Show** tool.

9.   If desired, right-click ([ctrl] [menu]) on the segment and add Color.
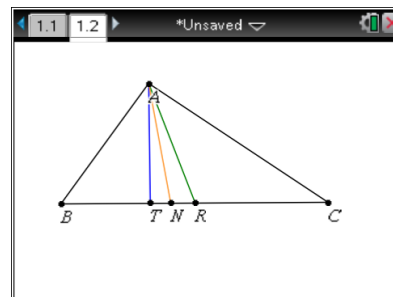
Step 6 Constructing the perpendicular bisector of $\overline{BC}$

1. Press **Menu > Construction > Perpendicular Bisector**.

2. Click on $\overline{BC}$. Press [esc].

3. If the top of the perpendicular bisector is not above and outside the triangle, grab the top of the perpendicular bisector by holding down the click key [✋] for a few seconds. Then, pull it up so that the top of the segment is above and outside the triangle.

4. Press **Menu > Points & Lines > Point On**.

5. Click on the perpendicular bisector at a spot outside the triangle to select the line. Click a second time to place a point on it. Label the point by pressing [⇧shift] [P].

6. Press [esc] to exit the **Points & Lines** tool.

7. If desired, right-click ([ctrl] [menu]) on the line, and add Color.
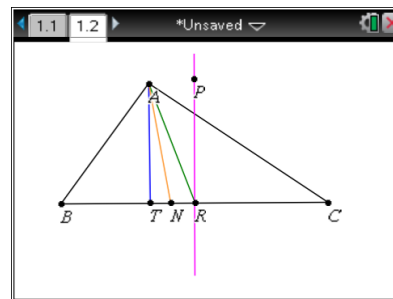
### Step 7 Resizing triangle *ABC*

1. Move the cursor over any vertex and press [ctrl] [✋] to grab it.

2. Use the touchpad to make the triangle larger or smaller by moving the vertex that was "grabbed."

3. Press [esc].

Step 8 Cloning the figure

Clone page 1.2 so that if a mistake is made, or the figure gets congested, another figure will be ready to use.

1. Stay on page 1.2. To see all the pages, press [ctrl] ▲.

2. To copy page 1.2, press [ctrl] [C].

3. To paste page 1.2, press [ctrl] [V].

4. Repeat step 3 as many times as desired.

5. Press [ctrl] ▼.
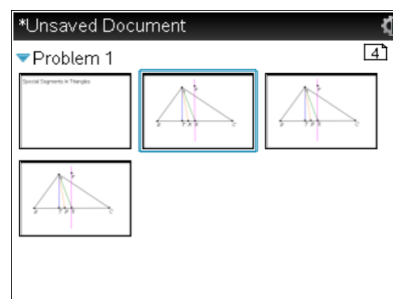
Step 9 Saving the document

1. Press [doc▾] > **File > File Save As.**

2. Save in an appropriate folder. Use the file name "Special_Segments_in_Triangles." Tab to **Save** and press [enter].