In this activity you will transform triangles and discover some interesting facts about the angles of any triangle.

• Open geometric functions.org/curriculum/congruence/triangle-sum-theorem.

## PAGE 1

- 1. Press the Animate button. When it finishes, turn tracing off, and drag both orange angle slider points to see how they work.
- 2. Adjust the slider to put  $A'_{\bullet}$  on  $B_{\bullet}$  and  $B'_{B'}$  on  $A'_{\bullet}$ :
- **Q1**. What angle did you rotate by? \_\_\_\_\_
- Q2 Where did you place the center of rotation?

## PAGE 2

- 3. Adjust the left slider to put *A*' onto *B* and to put *B*' onto *A*.
- 4. Adjust the right slider to put *B*" onto *C* and to put *C*" onto *B*.
- Q3 What angles did you use? Where did you put the centers of rotation?
- **Q4** What do you notice about the three angles next to each other at point *B*?

## PAGE 3

On this page you will do the same construction yourself.

- 5. Tap the Rotate tool. Then tap , B, and on the original triangle to attach the glowing points to them. Also tap or drag the center point of the angle slider to position it.
- 6. Adust the angle slider to match points *A*' to *B* and *B*' to *A*, as you did on page 2.
- Repeat steps 5 and 6 to rotate another copy of the triangle to match points *B* and *C*. (Match points *C*' to *B* and *B*' to *C*.) Your resulting construction should be similar to the one on page 2.

**Q5** What is your conclusion about the sum of the interior angles of a triangle?

Q6	What angles did you use,	and where did ye	ou place the rotat	tion centers?
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**Q7** If you change the triangle's shape by dragging points *A*, *B*, and *C* does the construction hold together? If not, what do you have to do to fix it?

## PAGE 4

On this page you will modify your construction so that it always holds together.

- 8. Before using the Rotate tool, use a different tool to construct the points where the center of rotation should be for each rotation.
- 9. Finish the construction as you did on page 3. When you use the Rotate tool, be sure to attach the center of rotation to the points you already constructed.
- **Q8** Try many different triangle shapes and sizes by dragging points *A*, *B*, and *C*. Does the construction always hold together? What does this mean for your conclusion?
- **Q9** Measure angles *A*, *B*, and *C*, and calculate their sum. What result do you get? How does this relate to your conclusion?
- **Q10** On page 5, figure out a way to do a similar construction using other transformations, not just two rotations. Describe and illustrate your method.