

# Unit 1 Lesson 14: Parallel Lines and the Angles in a Triangle

## 1 True or False: Computational Relationships (Warm up)

### Student Task Statement

Is each equation true or false?

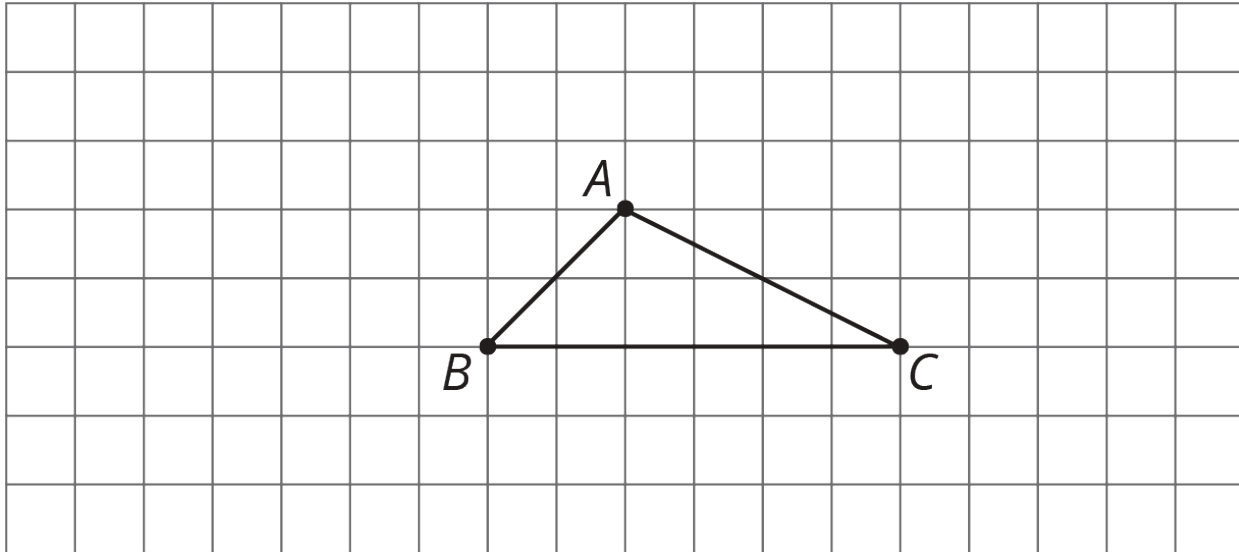
$$62 - 28 = 60 - 30$$

$$3 \cdot -8 = (2 \cdot -8) - 8$$

$$\frac{16}{-2} + \frac{24}{-2} = \frac{40}{-2}$$

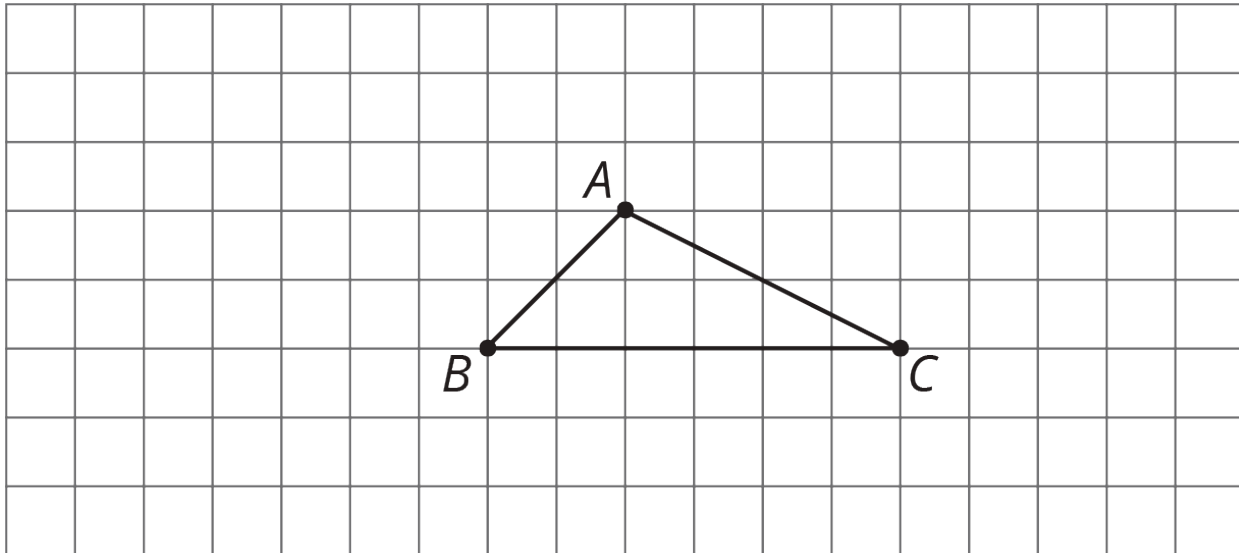
## 2 Angle Plus Two

### Images for Launch



### Student Task Statement

Here is triangle  $ABC$ .



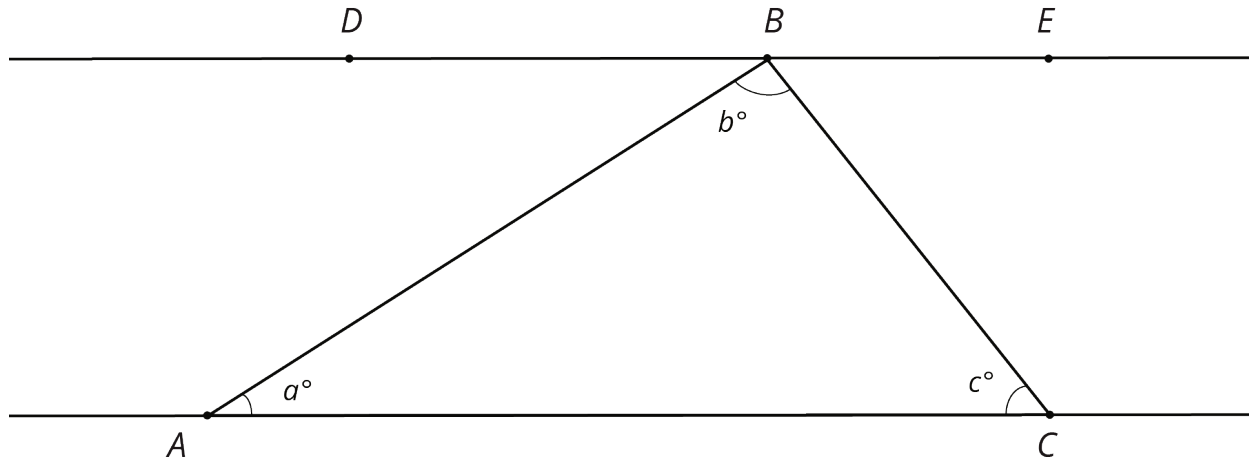
1. Rotate triangle  $ABC$   $180^\circ$  around the midpoint of side  $AC$ . Label the new vertex  $D$ .
2. Rotate triangle  $ABC$   $180^\circ$  around the midpoint of side  $AB$ . Label the new vertex  $E$ .
3. Look at angles  $EAB$ ,  $BAC$ , and  $CAD$ . Without measuring, write what you think is the sum of the measures of these angles. Explain or show your reasoning.
4. Is the measure of angle  $EAB$  equal to the measure of any angle in triangle  $ABC$ ? If so, which one? If not, how do you know?

5. Is the measure of angle  $CAD$  equal to the measure of any angle in triangle  $ABC$ ? If so, which one? If not, how do you know?
6. What is the sum of the measures of angles  $ABC$ ,  $BAC$ , and  $ACB$ ?

### 3 Every Triangle in the World

#### Student Task Statement

Here is  $\triangle ABC$ . Line  $DE$  is parallel to line  $AC$ .

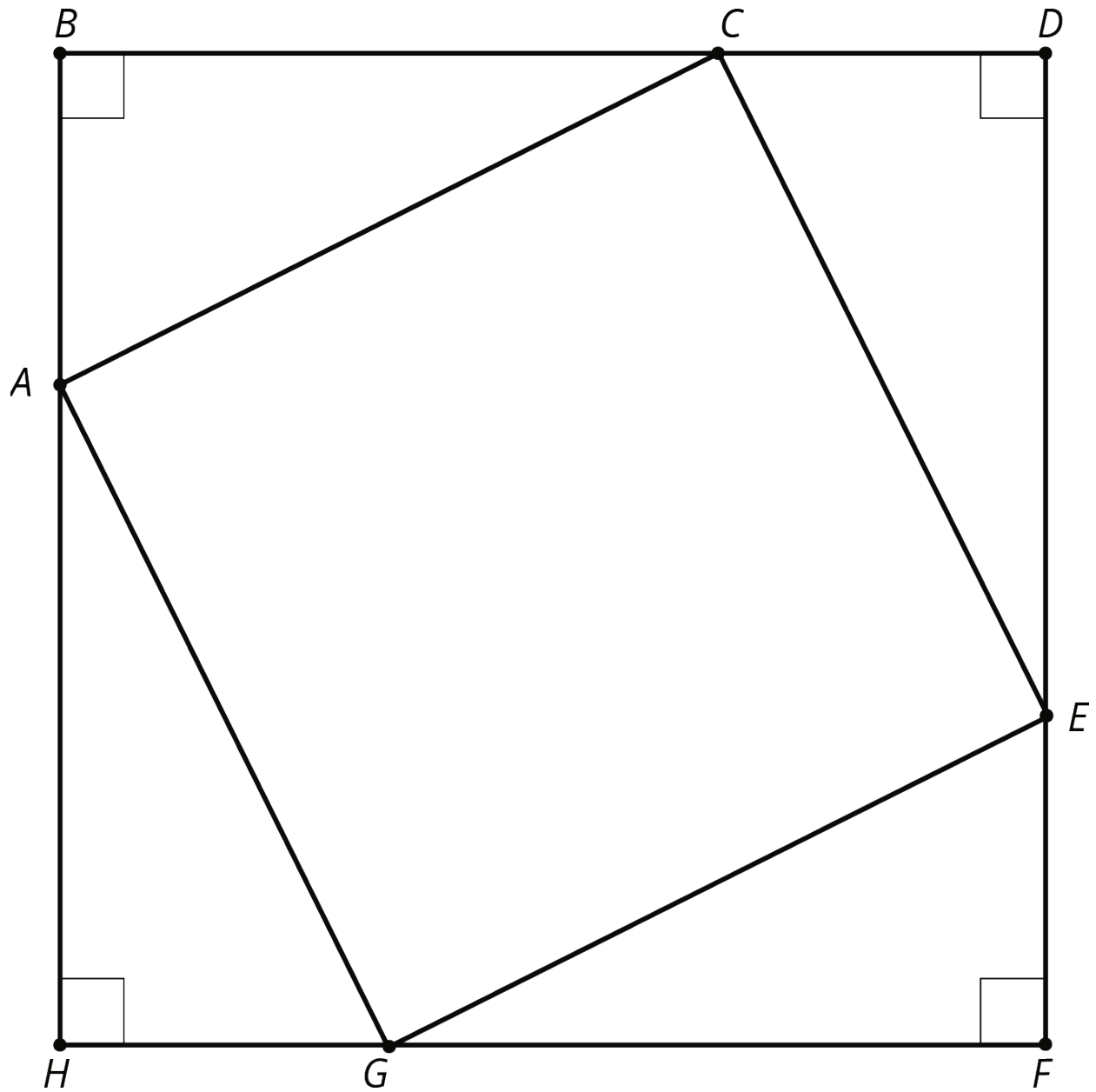


1. What is  $m\angle DBA + b + m\angle CBE$ ? Explain how you know.
2. Use your answer to explain why  $a + b + c = 180$ .
3. Explain why your argument will work for *any* triangle: that is, explain why the sum of the angle measures in *any* triangle is  $180^\circ$ .

## 4 Four Triangles Revisited (Optional)

### Student Task Statement

This diagram shows a square  $BDFH$  that has been made by images of triangle  $ABC$  under rigid transformations.



Given that angle  $BAC$  measures 53 degrees, find as many other angle measures as you can.