

Math 8 –Unit 1–Transformation & Cong–Parallel Lines & Angles in a Triangle		Lesson 16
<i>Students will be able to:</i>	<i>Explain using pictures why the sum of the angles in any triangle is 180 degrees.</i>	Date:

Let's see why the angles in a triangle add to 180 degrees.

Lesson 16.1: True or False: Computational Relationships

Is each equation true or false?

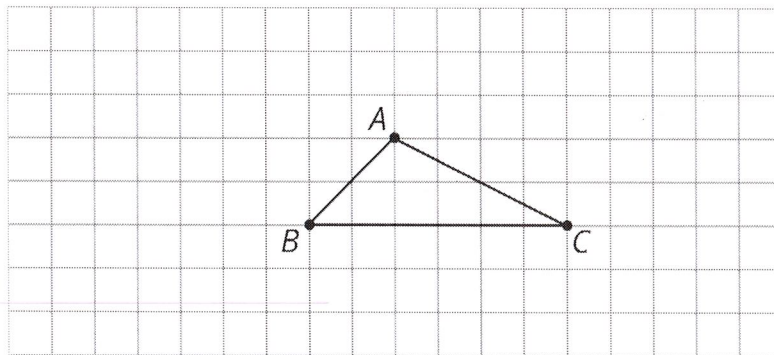
$$62 - 28 = 60 - 30$$

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

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

Lesson 16.2: Angle Plus Two

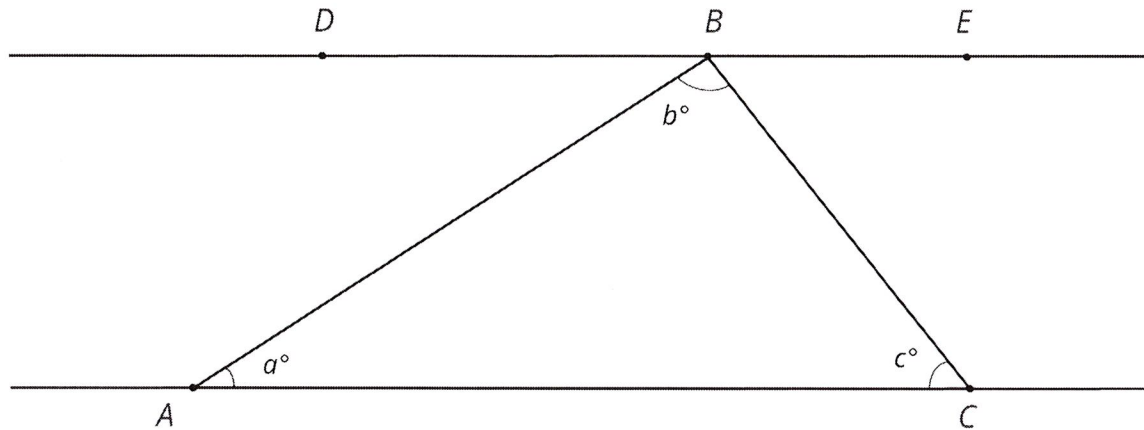
Here is triangle *ABC*.



1. Rotate triangle *ABC* 180° around the midpoint of side *AC*. Label the new vertex *D*.
2. Rotate triangle *ABC* 180° 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*?

Lesson 16.3: Every Triangle in the World

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° .

Are you ready for more?

1. Using a ruler, create a few quadrilaterals. Use a protractor to measure the four angles inside the quadrilateral. What is the sum of these four angle measures?
2. Come up with an explanation for why anything you notice must be true (hint: draw one diagonal in each quadrilateral).