

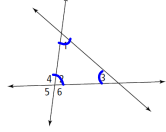
"Exterior Angles of Triangles"

1. Topic Opener:

Launch

State how the sum of the measures of angles 1, 2, and 3 compares to the sum of the measures of angles 4, 5, and 6. You cannot use a protractor. Justify your reasoning.

$\angle 1 + \angle 2 + \angle 3 = 180^\circ$
 $\angle 4 + \angle 5 = 180^\circ$
 $\angle 5 + \angle 6 = 180^\circ$



$\angle 2 = \angle 5$ - Vertical \angle s
 $\angle 4 = \angle 6$ - Vertical \angle s

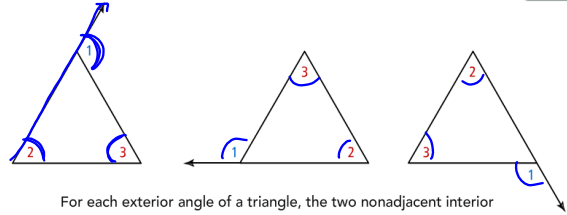
Reflect

Would using a protractor make this problem easier? Explain.

2. Follow along as the Intro is discussed.

Intro

An exterior angle of a triangle is an angle formed by a side and an extension of an adjacent side.

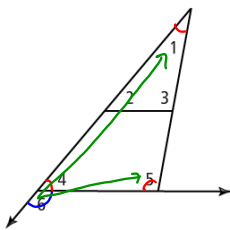


For each exterior angle of a triangle, the two nonadjacent interior angles are its **remote interior angles**.

3. Complete Example #1.

Got It?

Which are the two remote interior angles of $\angle 6$?



$\angle 1 + \angle 5$

4. Study the Key Concept Information.

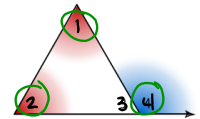
The measure of an exterior angle of a triangle equals the sum of the measures of its two remote interior angles.

$m\angle 1 + m\angle 2 + m\angle 3 = 180^\circ$ because the sum of the measures of the interior angles of a triangle equals 180° .

$m\angle 3 + m\angle 4 = 180^\circ$ because $\angle 3$ and $\angle 4$ form a straight angle.

$m\angle 1 + m\angle 2 + m\angle 3 = m\angle 3 + m\angle 4$, by substitution.

$m\angle 1 + m\angle 2 = m\angle 4$, by subtraction.

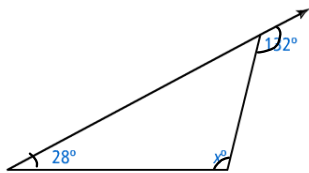


$m\angle 1 + m\angle 2 + m\angle 3 = m\angle 3 + m\angle 4$
 $\quad \quad \quad - m\angle 3 \quad - m\angle 3$
 $\hline m\angle 1 + m\angle 2 = m\angle 4$

5. Complete Example #2.

Got It?

What is the value of x ?

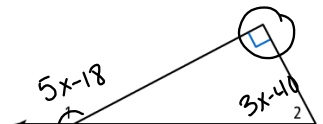


$132^\circ = 28^\circ + x$
 $x = 104^\circ$

6. Complete Example #3.

Got It?

Given $m\angle 1 = (5x - 18)^\circ$ and $m\angle 2 = (3x - 40)^\circ$, what is $m\angle 1$?



$5x - 18 = 3x - 40 + 90$
 $5x - 18 = 3x + 50$
 $\quad +18 \quad +18$
 $\hline 5x = 3x + 68$
 $\quad -3x \quad -3x$
 $\hline 2x = 68$
 $\quad \quad \quad \frac{2}{2} \quad \frac{2}{2}$
 $x = 34$

$m\angle 1 = 5x - 18$
 $m\angle 1 = 5(34) - 18$
 $m\angle 1 = 170 - 18$
 $m\angle 1 = 152^\circ$