

Triangles: Interior and Exterior Angles: *Follow-up Worksheet (High School)*

NAME(S): \_\_\_\_\_ CLASS: \_\_\_\_\_ DATE: \_\_\_\_\_

**Applying Theorems** .....

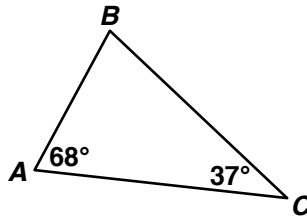
Review the following theorems. Then complete Problems 1 – 8.

**Triangle Sum Theorem:** The sum of the measures of the angles of a triangle is 180.

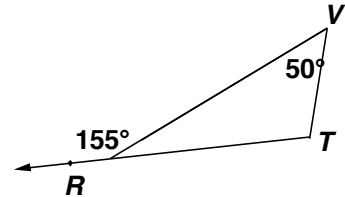
**Exterior Angle Theorem:** The measure of each exterior angle of a triangle equals the sum of the measures of its two remote interior angles.

► Determine the value of the unknown(s).

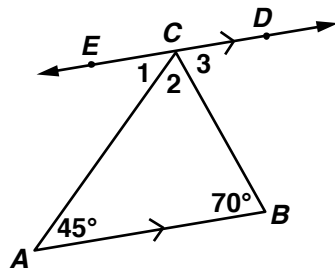
1)  $m\angle B =$



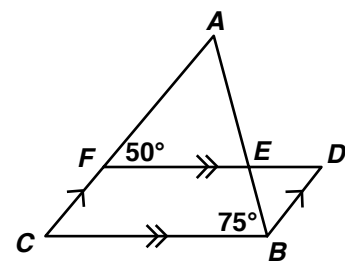
2)  $m\angle T =$



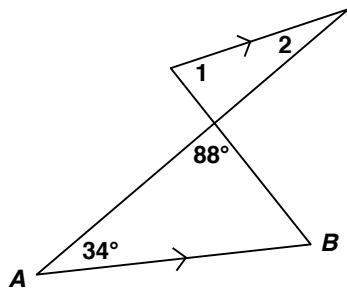
3)  $m\angle 1 =$   
 $m\angle 2 =$   
 $m\angle 3 =$



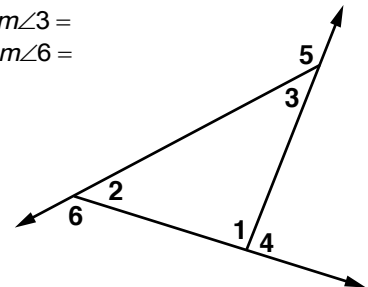
4)  $m\angle A =$   
 $m\angle C =$   
 $m\angle D =$



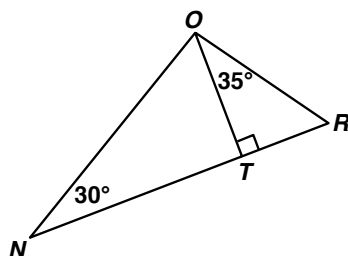
5)  $m\angle 1 =$   
 $m\angle 2 =$



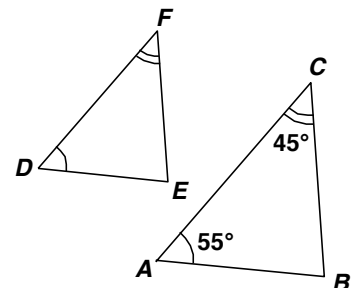
6)  $m\angle 1 + m\angle 2 + m\angle 3 =$   
 $m\angle 4 + m\angle 5 + m\angle 6 =$



7)  $m\angle R =$   
 $m\angle NOT =$   
 $m\angle NOR =$



8)  $m\angle E =$



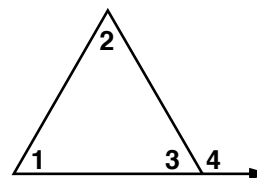
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- In Problems 9 – 11, the measurements of two angles of a triangle (ABC) are given. Find the unknown angle. If it is not possible to construct a triangle with the given measurements, write “not possible.”

	$m\angle A$	$m\angle B$	$m\angle C$
9)	90	24	
10)	120	95	
11)		60	60

- Use the figure to the right to help you find the unknown angles in Problems 12 – 14. If it is not possible to construct the figure using the given measurements, write “not possible.”

	$m\angle 1$	$m\angle 2$	$m\angle 3$	$m\angle 4$
12)	55			75
13)		94		63
14)		25	90	



- Find the measures of the unknown angles described in Problems 15 – 20. When appropriate, give answers to the nearest tenth.

- 15) If all three angles of a triangle are congruent, what is the measure of each angle? \_\_\_\_\_
- 16) If two angles of a right triangle are congruent, what are their measures? \_\_\_\_\_
- 17) A right triangle has one acute angle measuring 37. What does the other acute angle measure? \_\_\_\_\_
- 18) In a right triangle, if the measures of the other two angles are  $2x - 4$  and  $3x + 10$ , what are the measures of these two angles?
- 19) A triangle has angles with measures  $2x + 5$ ,  $2x - 10$ , and  $x + 15$ . Find the measure of each angle.
- 20) One angle of a triangle is three times as large as the second angle. The exterior angle at the third vertex is 100. Find the measures of all three interior angles.

**Challenge Problem** .....

- 21) The Triangle Sum Theorem and the Exterior Angle Theorem, along with other basic concepts of plane geometry, change on the surface of a sphere. For example, use the figure to the right and try to sketch a triangle with three right angles. Explain how these two theorems change in a 3-dimensional or non-Euclidean world.

