

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) $m\angle B = 75^\circ$
 $37 + 68 + \angle B = 180$

2) $m\angle T = 105^\circ$
 $180 - 50 - 25 = 105$
 $\angle VRT = 155 = 25$

3) $m\angle 1 = 45^\circ$
 $m\angle 2 = 75^\circ$
 $m\angle 3 = 70$
 ALT INT L's

4) $m\angle A = 55^\circ$
 $m\angle C = 50^\circ$
 $m\angle D = 50$

5) $m\angle 1 = 58^\circ$
 $m\angle 2 = 34^\circ$
 ALT INT L's

6) $m\angle 1 + m\angle 2 + m\angle 3 = 180^\circ$
 $m\angle 4 + m\angle 5 + m\angle 6 = 360^\circ$

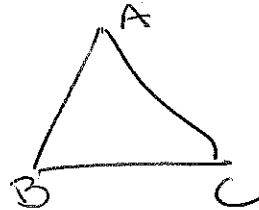
7) $m\angle R = 55^\circ$
 $m\angle NOT = 60^\circ$
 $m\angle NOR = 95^\circ$

8) $m\angle E = 80$

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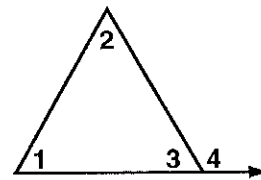
► In Problems 9 – 11, the measurements of two angles of a triangle (ABC) are given. Find the unknown angle. If it is not possible to construct a triangle with the given measurements, write "not possible."

	m∠A	m∠B	m∠C
9)	90	24	66°
10)	120	95	NOT POSSIBLE
11)	60	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∠1	m∠2	m∠3	m∠4
12)	55	20	105	75
13)	NOT POSS	94	NOT POSS	63
14)	65	25	90	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? 60

16) If two angles of a right triangle are congruent, what are their measures? 45

17) A right triangle has one acute angle measuring 37. What does the other acute angle measure? 53

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? 29.6° AND 60.4

19) A triangle has angles with measures $2x + 5$, $2x - 10$, and $x + 15$. Find the measure of each angle. 34, 73°, 58°

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. 25, 75, 80



$$\begin{aligned}
 x + 3x &= 100 \\
 4x &= 100 \\
 x &= 25
 \end{aligned}$$

$$\angle s = 25, 75 + 80$$

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.

