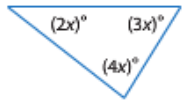
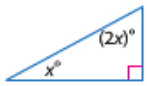
B **ALGEBRA** Find the value of x. Then find the measure of each angle.

30.



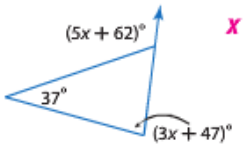
$x = 20$; 40, 60, 80

31.



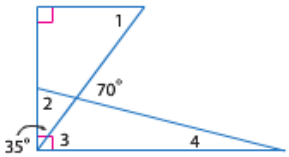
$x = 30$; 30, 60

32.



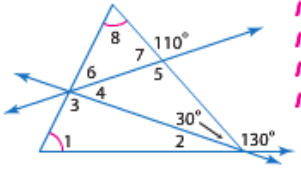
$x = 11$; 80, 117

36.



$m\angle 1 = 55$,
$m\angle 2 = 75$,
$m\angle 4 = 15$,
$m\angle 3 = 55$

37.



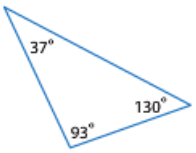
$m\angle 1 = 65$, $m\angle 2 = 20$,
$m\angle 3 = 95$, $m\angle 4 = 40$,
$m\angle 5 = 110$, $m\angle 6 = 45$,
$m\angle 7 = 70$, $m\angle 8 = 65$

38. Obtuse; the sum of the measures of the three angles of a triangle is 180. So, $(15x + 1) + (6x + 5) + (4x - 1) = 180$ and $x = 7$. Substituting 7 into the expressions for each angle, the angle measures are 106, 47, and 27. Since the triangle has an obtuse angle, it is obtuse.

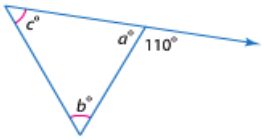
39. **ALGEBRA** The measure of the larger acute angle in a right triangle is two degrees less than three times the measure of the smaller acute angle. Find the measure of each angle. 67°, 23°

H.O.T. Problems Use Higher-Order Thinking Skills

46. CCSS **CRITIQUE** Curtis measured and labeled the angles of the triangle as shown. Arnoldo says that at least one of his measures is incorrect. Explain in at least two different ways how Arnoldo knows that this is true. See Ch. 4 Answer Appendix.

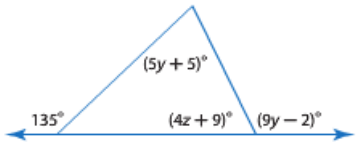


47. **WRITING IN MATH** Explain how you would find the missing measures in the figure shown. See Ch. 4 Answer Appendix.



48. **OPEN ENDED** Construct a right triangle and measure one of the acute angles. Find the measure of the second acute angle using calculation and explain your method. Confirm your result using a protractor. See Ch. 4 Answer Appendix.

49. **CHALLENGE** Find the values of y and z in the figure at the right. $y = 13$, $z = 14$



50. Obtuse; since the exterior angle is acute, the sum of the remote interior angles must be acute, which means the third angle must be obtuse. Therefore, the triangle must be obtuse.

50. **REASONING** If an exterior angle adjacent to $\angle A$ is acute, is $\triangle ABC$ acute, right, obtuse, or can its classification not be determined? Explain your reasoning.

51. **WRITING IN MATH** Explain why a triangle cannot have an obtuse, acute, and a right exterior angle. See Ch. 4 Answer Appendix.

46. Sample answer: Corollary 4.2 states that there can be at most one right or obtuse angle in a triangle. Since this triangle is labeled with two obtuse angle measures, 93 and 130, at least one of these measures must be incorrect. Since by the Triangle Angle Sum Theorem the sum of the interior angles of the triangle must be 180 and $37 + 93 + 130 \neq 180$, at least one of these measures must be incorrect.

47. The measure of $\angle a$ is the supplement of the exterior angle with measure 110, so $\angle a = 180 - 110$ or 70. Because the angles with measures b and c are congruent, $b = c$. Using the Exterior Angle Theorem, $b + c = 110$. By substitution, $b + b = 110$, so $2b = 110$ and $b = 55$. Because $b = c$, $c = 55$.

48. Sample answer:

I found the measure of the second angle by subtracting the first angle from 90° since the acute angles of a right triangle are complementary.

51. Sample answer: Since an exterior angle is acute, the adjacent angle must be obtuse. Since another exterior angle is right, the adjacent angle must be right. A triangle cannot contain both a right and an obtuse angle because it would be more than 180 degrees. Therefore, a triangle cannot have an obtuse, acute, and a right exterior angle.