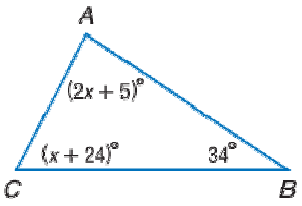
Lesson 4-1

Example 1

TECHNICAL ART An artist is using the figure at the right to create a diagram for a publication. Using the triangle-sum theorem, find $m\angle A$.



Solution

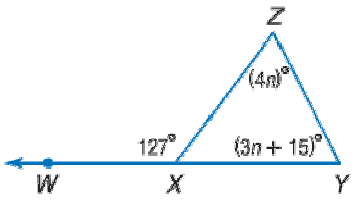
From the triangle-sum theorem, you know that the sum of the measure of the angles of a triangle is 180°. Use this fact to write and solve an equation.

$$\begin{aligned} m\angle A + m\angle B + m\angle C &= 180 \\ (2x + 5) + 34 + (x + 24) &= 180 \quad \text{Combine like terms.} \\ 3x + 63 &= 180 \quad \text{Add - 63 to each side.} \\ 3x &= 117 \quad \text{Divide each side by 3.} \\ x &= 39 \end{aligned}$$

So, the value of x is 39. From the figure $m\angle A = (2x + 5)°$.
Substituting 39 for x, $m\angle A = (2 \cdot 39 + 5)° = (78 + 5)° = 83°$.

Example 2

In the figure at the right, find $m\angle XYZ$.



Solution

Notice that $\angle WXZ$ is an exterior angle, while $\angle XYZ$ and $\angle XZY$ are nonadjacent interior angles. Use the exterior angle theorem to write and solve an equation.

$$\begin{aligned} m\angle WXZ &= m\angle XZY + m\angle XYZ \\ 127 &= 4n + (3n + 15) \quad \text{Combine like terms.} \\ 127 &= 7n + 15 \quad \text{Add -15 to each side.} \\ 112 &= 7n \quad \text{Divide each side by 7.} \\ 16 &= n \end{aligned}$$

So, the value of n is 16. From the figure, $m\angle XYZ = (3n + 15)°$.
Substituting 16 for n, $m\angle XYZ = (3 \cdot 16 + 15)° = (48 + 15)° = 63°$.