

NAME \_\_\_\_\_

DATE \_\_\_\_\_

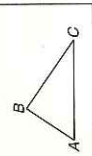
PERIOD \_\_\_\_\_

## 4-2 Study Guide and Intervention

### Angles of Triangles

**Angle Sum Theorem** If the measures of two angles of a triangle are known, the measure of the third angle can always be found.

The sum of the measures of the angles of a triangle is 180.  
In the figure at the right,  $m\angle A + m\angle B + m\angle C = 180$ .



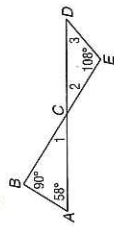
**Example 1** Find  $m\angle T$ .



$$m\angle R + m\angle S + m\angle T = 180$$

$$\begin{aligned} 25 + 35 + m\angle T &= 180 && \text{Angle Sum Theorem} \\ 60 + m\angle T &= 180 && \text{Substitution} \\ m\angle T &= 120 && \text{Subtract 60 from each side.} \end{aligned}$$

**Example 2** Find the missing angle measures.

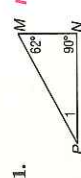


$$\begin{aligned} m\angle 1 + m\angle A + m\angle B &= 180 && \text{Angle Sum Theorem} \\ m\angle 1 + 59 + 90 &= 180 && \text{Substitution} \\ m\angle 1 + 149 &= 180 && \text{Add.} \\ m\angle 1 &= 32 && \text{Subtract 149 from each side.} \end{aligned}$$

$$\begin{aligned} m\angle 2 &= 90 && \text{Vertical angles are congruent.} \\ m\angle 3 + m\angle 2 + m\angle E &= 180 && \text{Angle Sum Theorem} \\ m\angle 3 + 90 + 108 &= 180 && \text{Substitution} \\ m\angle 3 + 198 &= 180 && \text{Add.} \\ m\angle 3 &= -18 && \text{Subtract 198 from each side.} \end{aligned}$$

**Exercises**

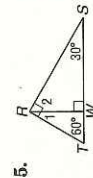
Find the measure of each numbered angle.



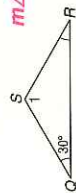
$m\angle 1 = 28$



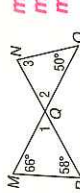
$m\angle 1 = 30,$   
 $m\angle 2 = 60$



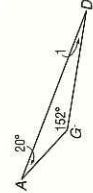
$m\angle 1 = 30,$   
 $m\angle 2 = 60$



$m\angle 1 = 120$



$m\angle 1 = 56,$   
 $m\angle 2 = 56,$   
 $m\angle 3 = 74$



$m\angle 1 = 8$

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## 4-2 Study Guide and Intervention

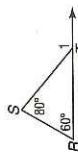
### Angles of Triangles

**Exterior Angle Theorem** At each vertex of a triangle, the angle formed by one side and an extension of the other side is called an **exterior angle** of the triangle. For each adjacent exterior angle of a triangle, the **remote interior angles** are the interior angles that are not adjacent to that exterior angle. In the diagram below,  $\angle B$  and  $\angle A$  are the remote interior angles for exterior  $\angle DCB$ .

The measure of an exterior angle of a triangle is equal to the sum of the measures of the two remote interior angles.  
 $m\angle 1 = m\angle A + m\angle B$



**Example 1** Find  $m\angle 1$ .



$$\begin{aligned} m\angle 1 &= m\angle R + m\angle S && \text{Exterior Angle Theorem} \\ &= 60 + 80 && \text{Substitution} \\ &= 140 && \text{Add.} \end{aligned}$$

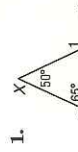
**Example 2** Find  $x$ .



$$\begin{aligned} m\angle PQS &= m\angle R + m\angle S && \text{Exterior Angle Theorem} \\ 78 &= 55 + x && \text{Substitution} \\ 23 &= x && \text{Subtract 55 from each side.} \end{aligned}$$

**Exercises**

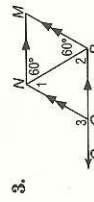
Find the measure of each numbered angle.



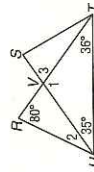
$m\angle 1 = 115$



$m\angle 1 = 60, m\angle 2 = 120$

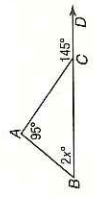


$m\angle 1 = 60, m\angle 2 = 60, m\angle 3 = 120$

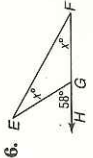


$m\angle 1 = 109, m\angle 2 = 29, m\angle 3 = 71$

Find  $x$ .



25



29