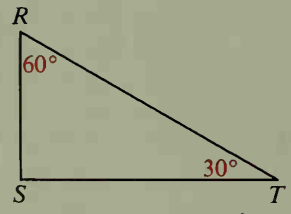
Theorems about Angles and Perpendicular Lines

Objectives

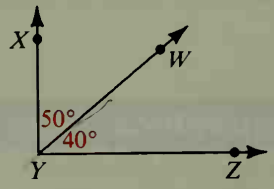
1. Apply the definitions of complementary and supplementary angles.
2. State and use the theorem about vertical angles.
3. Apply the definition and theorems about perpendicular lines.
4. State and apply the theorems about angles supplementary to, or complementary to, congruent angles.
5. Plan proofs and then write them in two-column form.

2-4 *Special Pairs of Angles*

Complementary angles (cōmp. ∡s) are two angles whose measures have the sum 90. Each angle is called a *complement* of the other.

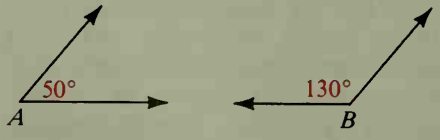


$\angle R$ and $\angle T$ are complementary.

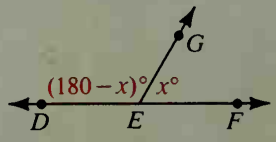


$\angle XYW$ is a complement of $\angle WYZ$.

Supplementary angles (supp. ∡s) are two angles whose measures have the sum 180. Each angle is called a *supplement* of the other.



$\angle A$ and $\angle B$ are supplementary.



$\angle DEG$ is a supplement of $\angle GEF$.

Example 1 A supplement of an angle is three times as large as a complement of the angle. Find the measure of the angle.

Solution Let x = the measure of the angle.
Then $180 - x$ = the measure of its supplement,
and $90 - x$ = the measure of its complement.

$$180 - x = 3(90 - x)$$
$$180 - x = 270 - 3x$$
$$2x = 90$$
$$x = 45$$

The measure of the angle is 45.