Complementary and Supplementary Angles

> **REMEMBER**
>
> Two angles are called complementary angles if the sum of their measures is 90°.
>
> Two angles are called supplementary angles if the sum of their measures is 180°.
>
> Example: The measures of two complementary angles are in the ratio of 1:5. Find the measure in degrees of the smaller angle.
>
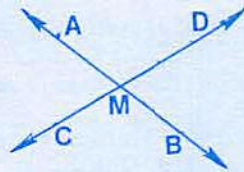> Let x = smaller angle
> 5x = larger angle
>
> $$x + 5x = 90$$
> $$6x = 90$$
> $$x = 15$$
>
> smaller angle = 15°

1. The measures of two complementary angles are in the ratio of 1:8. Find the measure of the larger angle.
   _____

2. The measure of two supplementary angles are in the ratio of 1:4. Find the number of degrees in the smaller angle.
   _____

3. Two angles are complementary and congruent. How many degrees are there in each angle?
   _____

4. If the number of degrees in one angle is x, find the number of degrees in its supplement.
   _____

5. One angle is twice another. If the angles are supplementary, find the number of degrees in the smaller angle.
   _____

6. Two complementary angles are in the ratio of 2:3. Find the number of degrees in the measure of the smaller angle.
   _____

7. Two supplementary angles are in the ratio of 4 to 5. Find the number of degrees in the larger angle.
   _____

8. The number of degrees in three angles are 50, 30, and 10. Are these angles complementary? (yes or no)
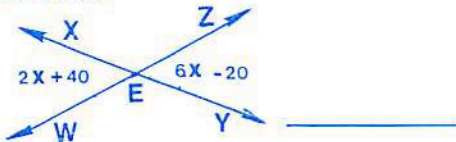   _____

Vertical Angles

In the diagram above lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at M. ∠ AMC and ∠ DMB are opposite each other and are called vertical angles. ∠ AMC and ∠ DMB are also equal in measure.
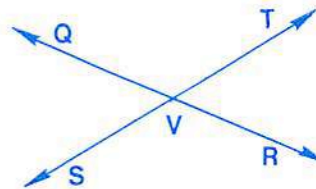
Example: In the diagram above vertical angles AMD and CMB are represented by $(2x + 20)$ and $(x + 60)$ respectively. Find the value of x.

$$2x + 20 = x + 60$$
$$2x - x = 60 - 20$$
$$x = 40 \quad \text{Ans.}$$

1. As shown in the diagram $\overleftrightarrow{XY}$ and $\overleftrightarrow{WZ}$ intersect at E. If ∠ XEW is represented by $(2x + 40)$ and ∠ ZEY by $(6x - 20)$, find the value of x.

2. Two vertical angles are represented by $(3x - 10)$ and $(x + 30)$. Find the value of x.

3. In the diagram, ∠ 1 = $(5x + 5)$ and ∠ 2 = $(2x + 35)$. Find the number of degrees in ∠ 1.
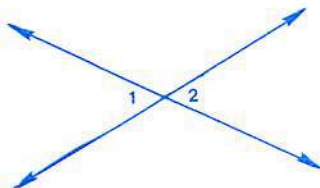
4. In the accompanying diagram, $\overleftrightarrow{QR}$ intersects $\overleftrightarrow{ST}$ at V, and m ∠ QVS = 30. If m ∠ TVR = $5x - 40$, find x.

5. As shown in the accompanying diagram, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at E. If ∠ CEB is represented by $(5x - 8)$ and ∠ AED is represented by $(x + 36)$, find the value of x.