

# Complementary and Supplementary Angles

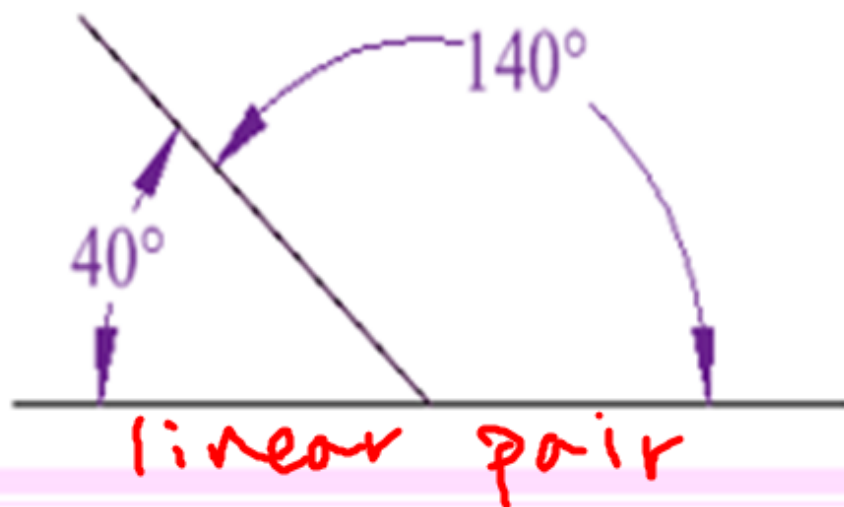


If the two angles add to  $180^\circ$ , we say they "**Supplement**" each other.

**Supplement** comes from Latin *supplere*, to complete or "supply" what is needed.

These two angles ( $140^\circ$  and  $40^\circ$ ) are Supplementary Angles, because they add up to  $180^\circ$ .

Notice that together they make a straight angle.



When the sum of two angles add up to  $180^\circ$  they are called

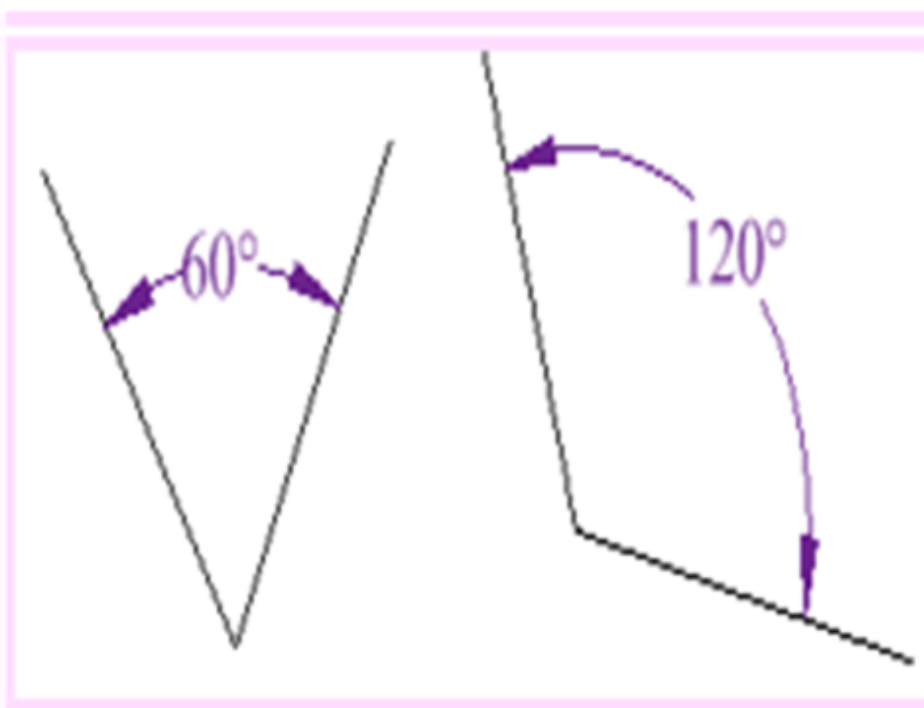


2 angles whose measures add to  $180^\circ$

But the angles don't have to be together. **(adjacent)**

These two are supplementary because  $60^\circ + 120^\circ = 180^\circ$

Don't have to be a linear pair.



5. If the measure of an angle is  $103^\circ$ , we say the measure of its supplement is:

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- A  $93^\circ$
- B  $180^\circ$
- C  $77^\circ$

$$180 - 103 = 77^\circ$$

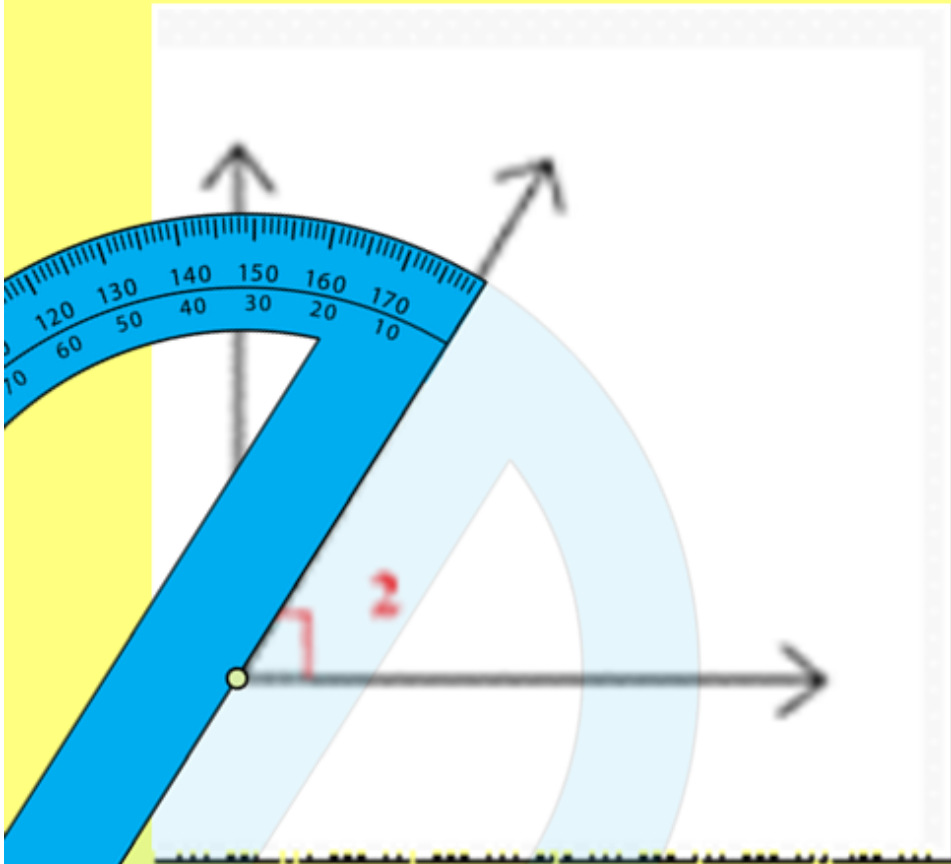


6. Let's measure angles 1 and 2 from the figure below.

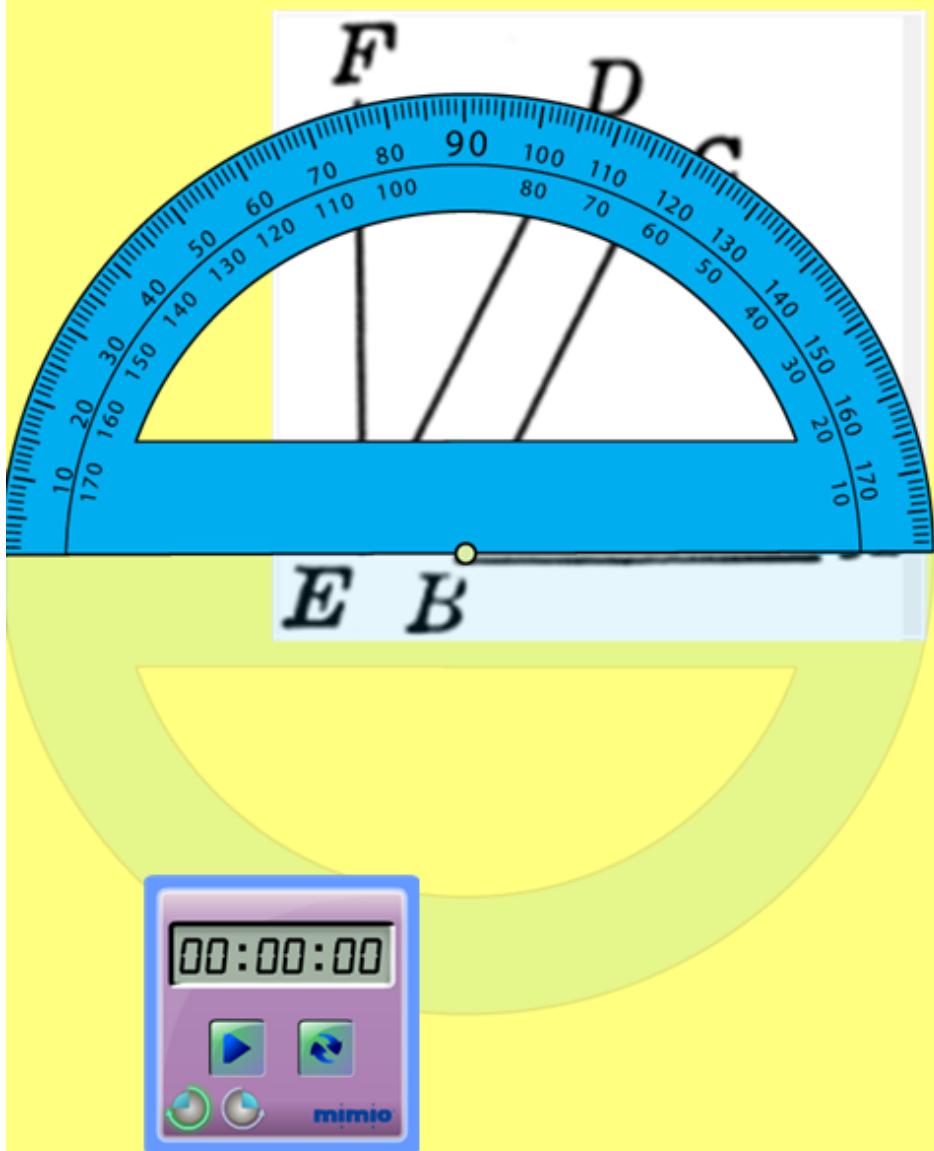
$$\angle 1 \approx 30^\circ \quad \angle 2 \approx 60^\circ$$

What do you notice about the sum of their measures?

$$60^\circ + 30^\circ = 90^\circ$$



Measure  $\angle DEF$  and  $\angle ABC$  from the figure.



What do you notice about the sum of their measures?

$$m\angle DEF = 25^\circ$$

$$m\angle CBA = 65^\circ$$

whose measures



If the two angles add to  $90^\circ$ , we say they "Complement" each other.

$90^\circ$

$5$   
 $180^\circ$

**Complementary** comes from Latin *completum* meaning "completed" ... because the right angle is thought of as being a complete (full) angle.



When the sum of two angles is  $90^\circ$ , we say the two angles are complementary.

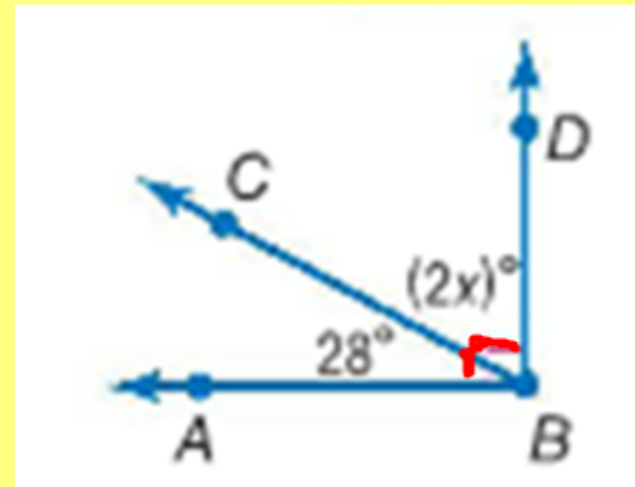
If an angle measures  $36^\circ$ , we say the measure of its complement is



$54^\circ$



7. In the figure at the right, the two angles are complementary, find the value of  $x$ .



$$\begin{array}{r} 2x + 28 = 90 \\ \quad -28 \quad -28 \\ \hline 2x = 62 \\ \frac{2x}{2} = \frac{62}{2} \\ x = 31 \end{array}$$

7. What is the value of  $x$  in the angle given?

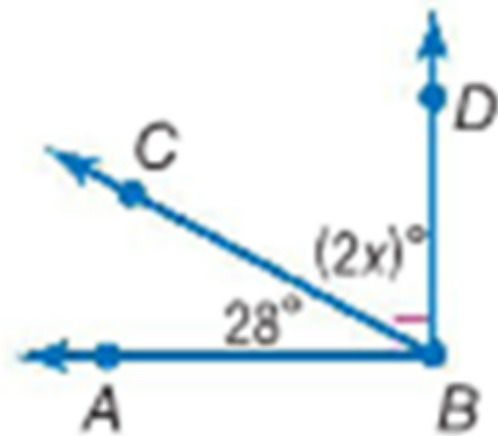
**A**  $x = 62$

**B**  $x = 90$

**C**  $x = 28$

**D**  $x = 52$

**E**  $x = 31$



8. In the figure below, the angles shown are supplementary. Find the value of  $x$ . What is the measure of the angle labeled  $3x$ ?



$$\begin{array}{r} 123 + 3x = 180 \\ -123 \quad \quad -123 \\ \hline 3x = 57 \quad x = 19^\circ \end{array}$$

8. In the figure given, what is the measure of the angle labeled 3x?

A  $19^\circ$

B  $57^\circ$

C  $123^\circ$



9. If the sum of the measures of two angles is  $90^\circ$ , the angles are supplementary.

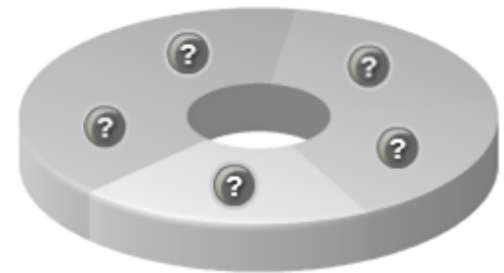
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True

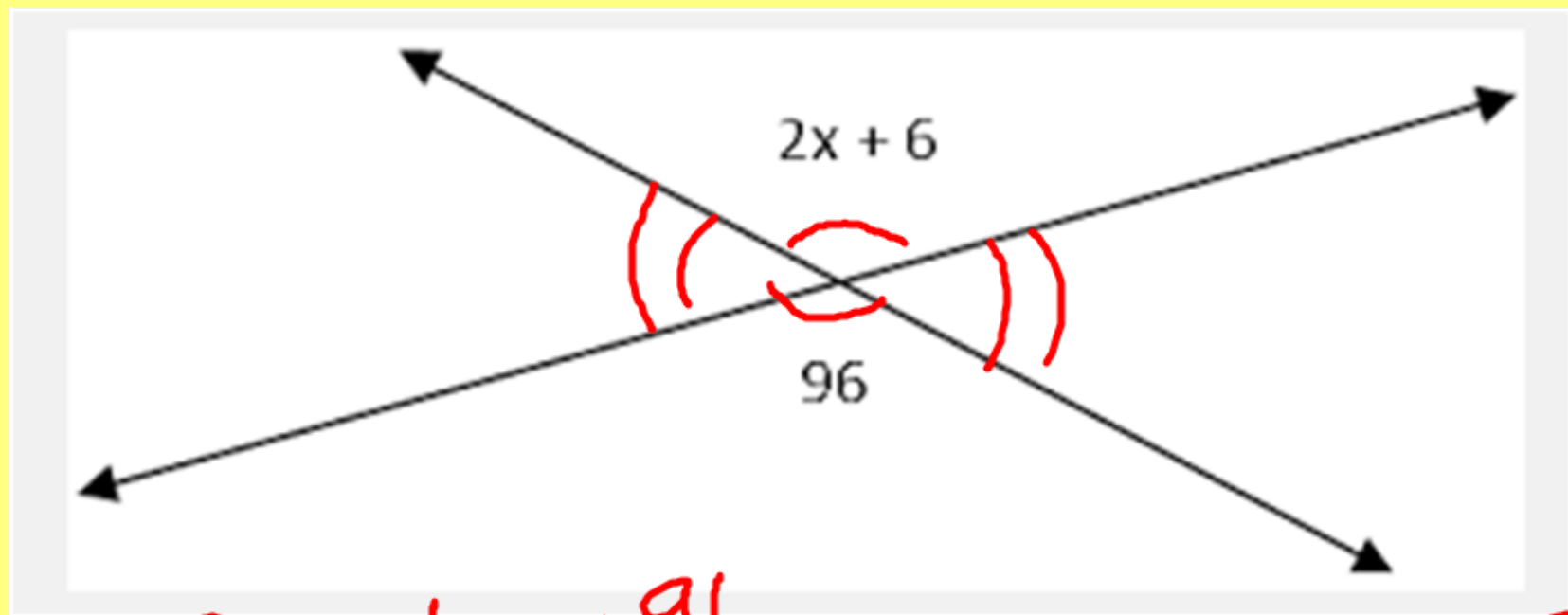


False



10. Using what we know about vertical angles, find the value of  $x$  in the figure below.

Now, using what you know about supplementary angles, find the measures of the other angles.



$$\begin{array}{r} 2x + 6 = 96 \\ -6 \quad -6 \\ \hline 2x = 90 \\ \frac{2x}{2} = \frac{90}{2} \\ x = 45 \end{array}$$

10. The measure of the marked angles in the figure below is:

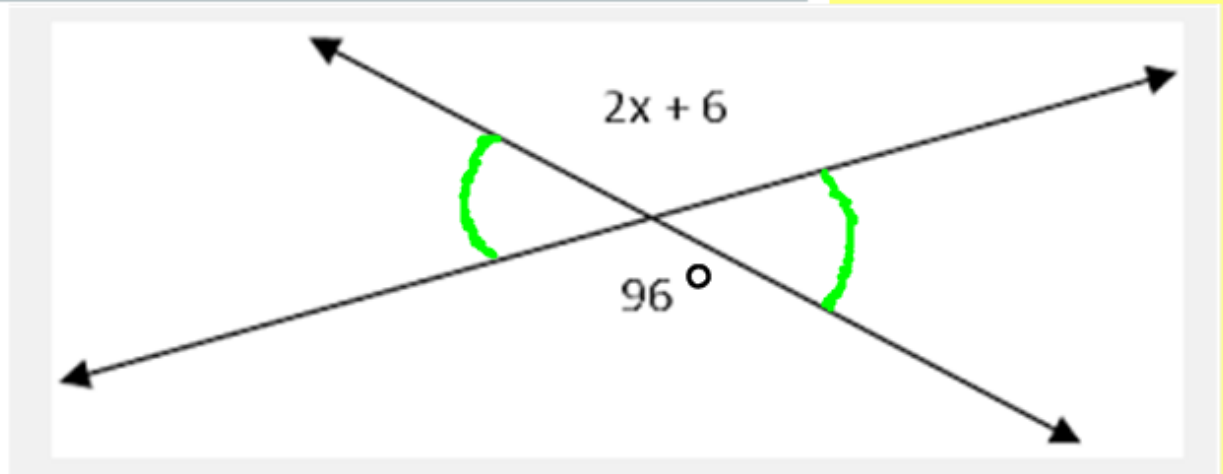
A  $180^\circ$

B  $45^\circ$

C  $42^\circ$

D  $84^\circ$

E  $96^\circ$



$$180 - 96 = 84^\circ$$