

Example Problem #1)

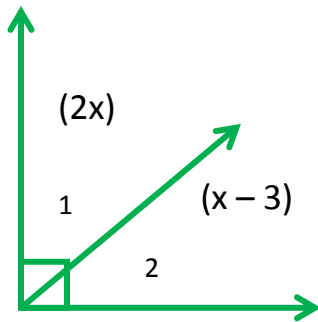
The complement of an angle is 3° less than one-half of the other. Find the measure of both angles.

Step 1: Write an expression for each angle based on the description above.

$$\text{Let } \angle 1 = (2x) \quad \text{then} \quad \angle 2 = (x - 3)$$

Step 2: Remember, complementary angles \Leftrightarrow right angle sum!

Draw a picture of a **right angle** divided into two parts by a ray. Label the partial angles with your expressions.



Step 3: Write an equation that represents the relationship between the two angles with the original right angle. In this case the angles are complementary, so we know that the sum of their expressions equals the measure of a right angle (90).

$$\begin{aligned} \angle 1 + \angle 2 &= 90 \\ (2x) + (x - 3) &= 90 \\ 3x - 3 &= 90 \\ 3x &= 93 \\ x &= 31 \end{aligned}$$

Step 4: Substitute the value for x into both expressions for the angle measures. Or, you can simply subtract the amount you get for one of the angles from 90 to get the other!

Either

$$\begin{aligned} \angle 1 &= 2(31) = \mathbf{62} \\ \angle 2 &= (31 - 3) = \mathbf{28} \end{aligned}$$

Or

$$\begin{aligned} \angle 1 &= 2(31) = 62 \\ \angle 2 &= 90 - 62 = 28 \end{aligned}$$

Step 5: Check your sum to be sure of no silly errors! $62 + 28 = 90 \checkmark$

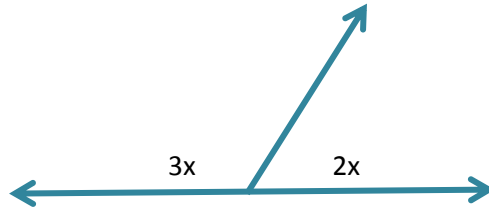
NOTE: If this had been a problem about two **supplementary angles** that compared in the same way, the first change would be that their sum = 180. The diagram would be a straight angle divided by a ray. The value for x = 61. And the measure of the two supplementary angles would be 122 and 58. Try it and see ☺

Example Problem #2)

The comparison of two supplementary angles is 2:3. Find the measure of the larger angle.

Step 1: Expressions: $2x$ and $3x$

Step 2: Labeled diagram:



Step 3: Write and solve an equation based on the angle relationship

(Remember! Supplements $\Leftrightarrow 180$)

$$2x + 3x = 180$$

$$5x = 180$$

$$x = 36$$

Step 4: Substitute the value for x into each expression. Don't forget to answer the question!

Smaller: $2x = 2(36) = 72$ **so the larger must be $180 - 72 = 108!$**

Sure enough! $3(36) = 108$ ☺

Step 5: Check the sum! $108 + 72 = 180$ ✓