How Do You Pay a Complement to an Angle?

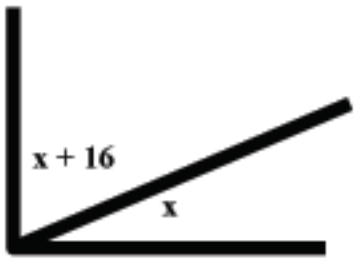
Discussion Question 1 – Can a triangle contain two right angles? Why or why not?

Sample response – No, because if a triangle did contain two right angles, then the sum of their measures would be 180 degrees. Thus, the measure of the third angle would have to be zero degrees, and this is impossible.

Definition Complementary Angles – Two angles are complementary if the sum of their degree measures is 90.

Example 1 – An angle is 16 degrees greater than its complement. Find the measure of each angle.

First, draw a diagram of the angles.
Let x be the measure of the lesser angle.
and (x + 16) be the measure of the greater angle.



Since the angles are complementary, their sum must equal 90.

$x + (x + 16) = 90$
$2x + 16 = 90$
$2x = 74$
$x = 37$ degrees

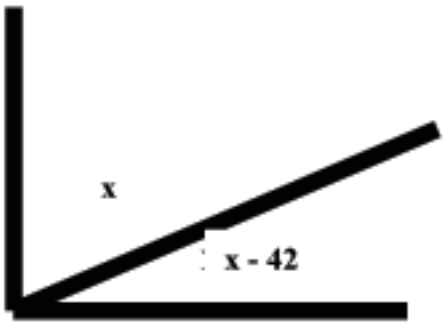
Substitute 37 in for x and you get $(x + 16) = 53$ degrees for the greater angle.

Complementary Angle Theorem – If two angles are complementary, then one angle is the complement of the other and has the measure of $(90 – x)$ degrees.

Example 2 – An angle measures 42 degrees less than its complement. Find the measure of each angle.

$x + (x – 42) = 90$
$2x – 42 = 90$
$2x = 138$
$x = 69$ degrees

$(90 – 69) = 21$ degrees



Example 3 – Find the complement of $(3x + 5)^{o}$.

Since the complement must be 90 – (angle), then we get:

$90^{o} – (3x + 5)^{o}$
$90 – 3x – 5$
$85 – 3x$
$(85 – 3x)^{o}$ Remind students that degree is part of both quantities.

Example 4 – Find the complement of $(2x + 40)^{o}$.

Since the complement must be 90 – (angle), then we get:

$90^{o} – (2x + 40)^{o}$
$90 – 2x – 40$
$50 – 2x$
$(50 – 2x)^{o}$

Example 5 – An angle measures 38^{o} less than its complement. Find the measures of the two angles.

$(x) + (x – 38) = 90$
$2x – 38 = 90$
$2x = 128$
$x = 64^{o}$

$(90 – 64) = 26^{o}$

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Activity Sheet

Find the complement of each angle measure.

1. 85^o
2. 55^o
3. 42^o
4. 24^o
5. 13^o
6. 11^o
7. 45^o
8. 76^o
9. x^o
10. $3x^o$
11. $(2x + 4)^o$
12. $(x + 7)^o$

How Do You Pay a Complement to an Angle
Answer Key

Find the complement of each angle measure.

1. $85^o - 5^o$
2. $55^o - 35^o$
3. $42^o - 48^o$
4. $24^o - 66^o$
5. $13^o - 77^o$
6. $11^o - 79^o$
7. $45^o - 45^o$
8. $76^o - 14^o$
9. $x^o - (90 - x)^o$
10. $3x^o - (90 - 3x)^o$
11. $(2x + 4)^o - (86 - 2x)^o$
12. $(x + 7)^o - (83 - x)^o$