Example 1

...continued

Substitute these x- and y-values into each of the original equations to verify the solution.
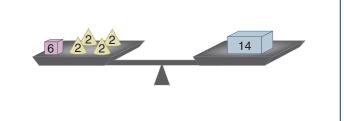
$x = 3y$

Left Side	Right Side
x	$3y$
6	$3(2)$
	6
LS = RS	

$x + 4y = 14$

Left Side	Right Side
$x + 4y$	14
$6 + 4(2)$	
14	
LS = RS	

Check Up

1. Solve the following system of equations by substitution. Verify the solution.

   $11x + 2y = 76$

   $y = 4x$

☑ Compare your answer.

1. Solve the following system of equations by substitution. Verify the solution.

$11x + 2y = 76$

$y = 4x$

Substitute $4x$ for y in the first equation.

$$11x + 2y = 76$$
$$11x + 2(4x) = 76$$
$$19x = 76$$
$$x = 4$$

The x-value of the solution is 4. Substitute this value into one of the original equations to determine the y-value.

$y = 4x$

$y = 4(4)$

$y = 16$

The solution is (4,16).

Verify the solution.

> You can substitute the known value back into any equation that includes both an x- and a y-value. Choose an equation that is easy to work with.
>
> The equation $y = 4x$ was chosen because it is simpler than $11x + 2y = 76$.

$11x + 2y = 76$

Left Side	Right Side
$11x + 2y$	76
$11(4) + 2(16)$	
76	
LS = RS	

$y = 4x$

Left Side	Right Side
y	$4x$
16	$4(4)$
	16
LS = RS	

So far, the systems solved by substitution have included an equation where one of the variables was isolated. This is not always the case and often a variable will need to be isolated before substitution can be used.