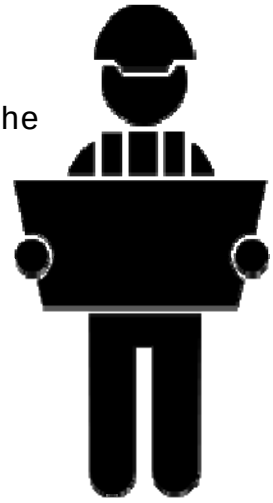
Name _____ Date _____

Solving Systems Word Problems - Step-by-Step Lesson



A carpenter is making furniture. Monday morning, he made 3 small rows and 4 big rows of chairs, for a total of 14 chairs. On Tuesday, he made 3 small rows and 7 big rows of chairs; for a total of 20 chairs.

The small row contains _____ chairs and the big row of chairs contains _____ chairs.

Explanation:

The first day can be described as:

3 small rows and 4 big rows of chairs, total of 14 chairs.

$3x + 4y = 14$

The second day can be described as:

3 small rows and 7 big rows of chairs, total of 20 chairs.

$3x + 7y = 20$

Make sure the equations have opposite x terms or opposite y terms.

Currently, neither the x terms (3x and 3x) nor the y terms (4y and 7y) are opposites. Use multiplication to rewrite the equations with either opposite x terms or opposite y terms. One good approach is to multiply the first equation by -1.

$-1\ (3x + 4y = 14) \quad \rightarrow \quad -3x - 4y = -14$

$3x + 7y = 20 \quad \rightarrow \quad 3x + 7y = 20$

Now the x terms (-3x and 3x) are opposites.

Add to eliminate one variable and solve for the other.

Add to eliminate the x terms, and then solve for y.

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$-3x - 4y = -14$

$3x + 7y = 20$

$0x + 3y = 6$ Add to eliminate the x terms

$y = 6/3$ Divided

$y = 2$

Plug the result of step 2 into one of the original equations and solve.

Take the result of Step 2 ($y = 2$), and plug it into one of the original equations, such as $3x + 4y = 14$. Then find the value of x.

$3x + 4y = 14$

$3x + 4(2) = 14$ Plug in $y = 2$

$3x + 8 = 14$ Multiply

$3x = 14 - 8$ Subtract 8 from both sides

$3x = 6$

$x = 6/3$ Divide by 3

$x = 2$

Since $x = 2$ and $y = 2$, the solution is (2, 2).

The small chairs are 2 and the big chairs are also 2.