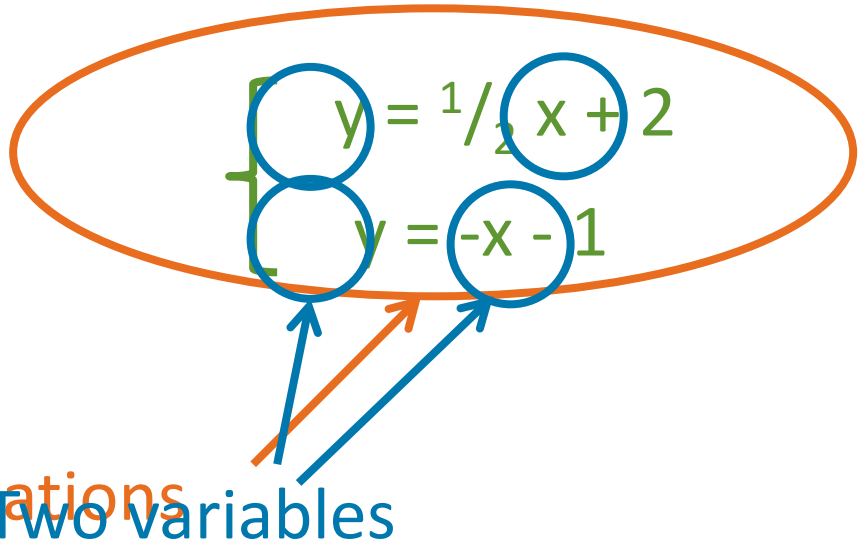
If all the cows and chickens in a pasture have 35 heads and 110 legs, how can you use a system of equations to help you find the number of cows in the pasture?

In this lesson you will learn how a system of linear equations can help you model a real-life situation by analyzing a problem.

Let's Review

system of equations:



A Common Misunderstanding

$$\tfrac{1}{2}x + 2 - x - 1 = y + y$$

$$\begin{cases} y = \tfrac{1}{2}x + 2 \\ y = -x - 1 \end{cases}$$

Let's Review

solution (of a system) : a set of values that makes both equations in the system true at the same time.

$$\begin{cases} y = \frac{1}{2}x + 2 \\ y = -x - 1 \end{cases}$$

SOLUTION: (-2, 1)

Check:

$y = \frac{1}{2}x + 2$

$(1) = \frac{1}{2}(-2) + 2$

$1 = -1 + 2$

$1 = 1$

TRUE!

Check:

$y = -x - 1$

$(1) = -(-2) - 1$

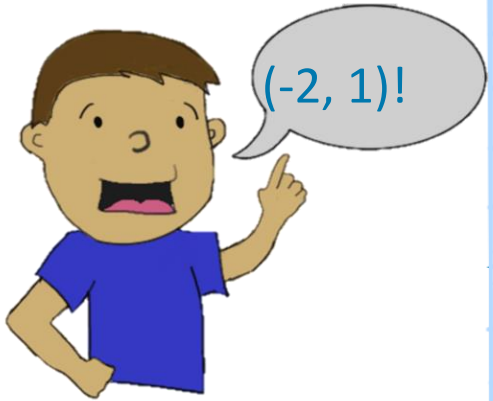
$1 = 2 - 1$

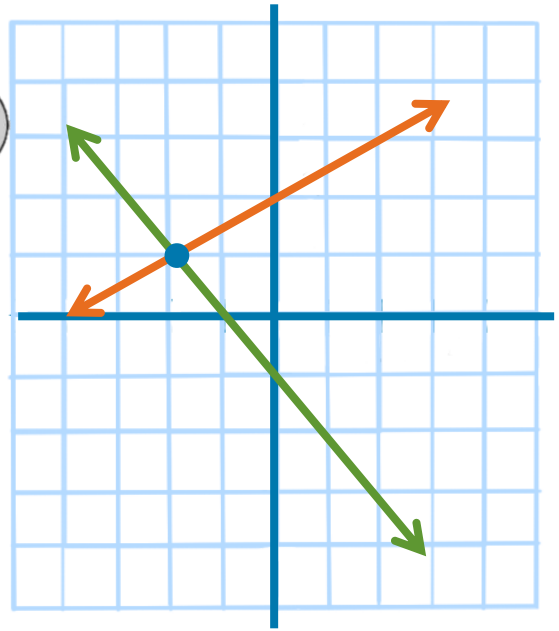
$1 = 1$

TRUE!

Let's Review

We know that we can sometimes find the solution to a linear system by graphing.

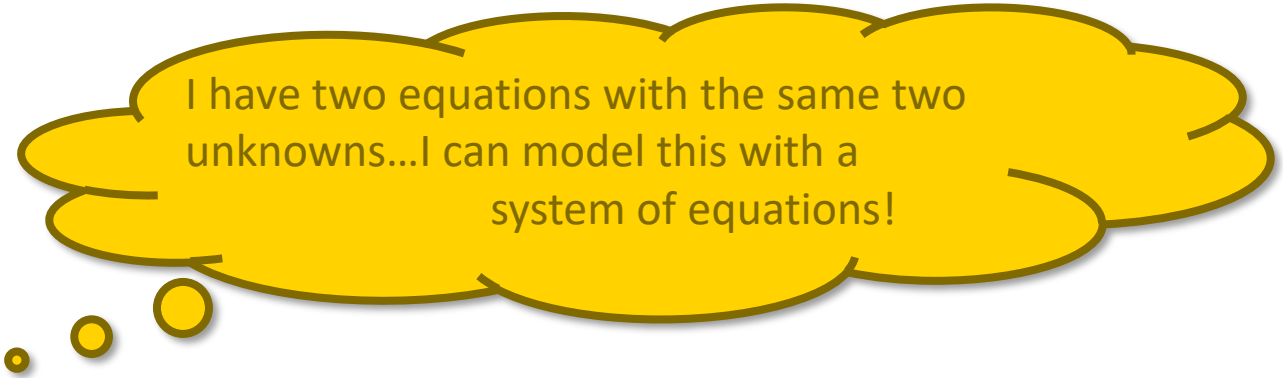




$$\begin{cases} y = \frac{1}{2}x + 2 \\ y = -x - 1 \end{cases}$$

Core Lesson

If all the cows and chickens in a pasture have 35 heads and 110 legs, how many cows are in the pasture?



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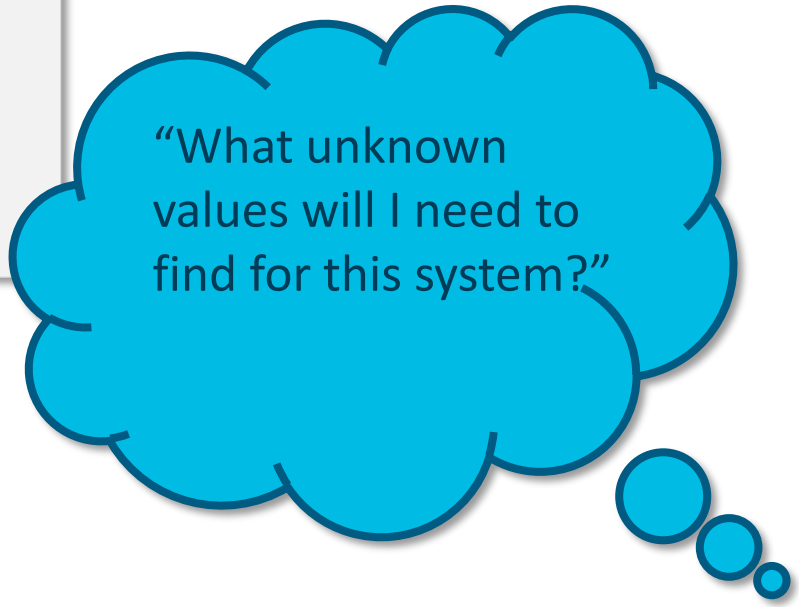

x = the number of cows

y = the number of chickens

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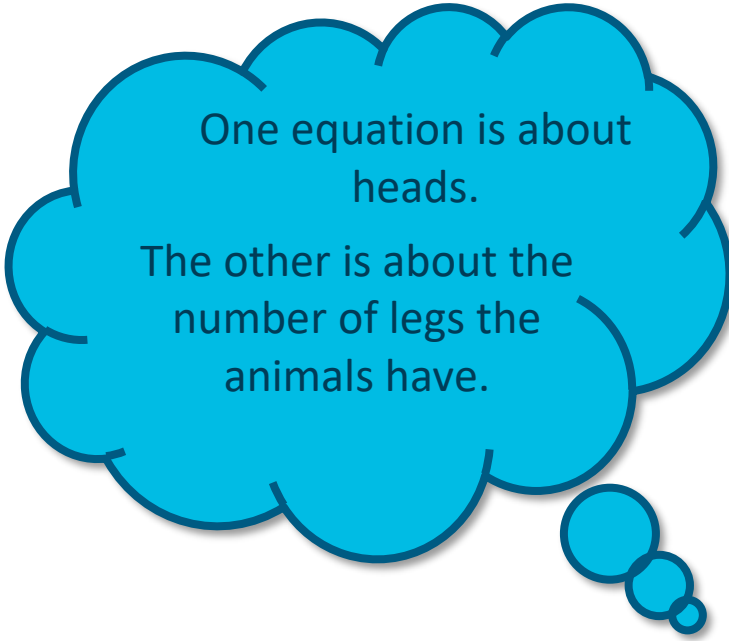

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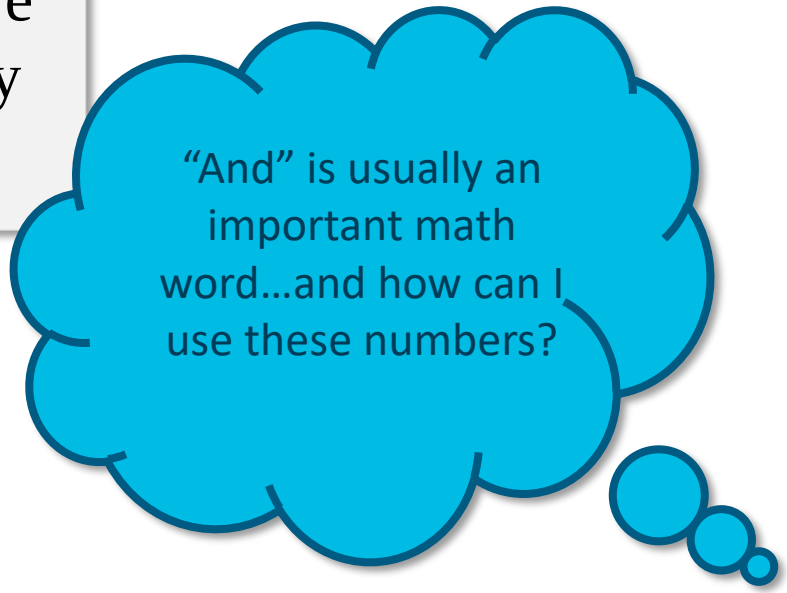

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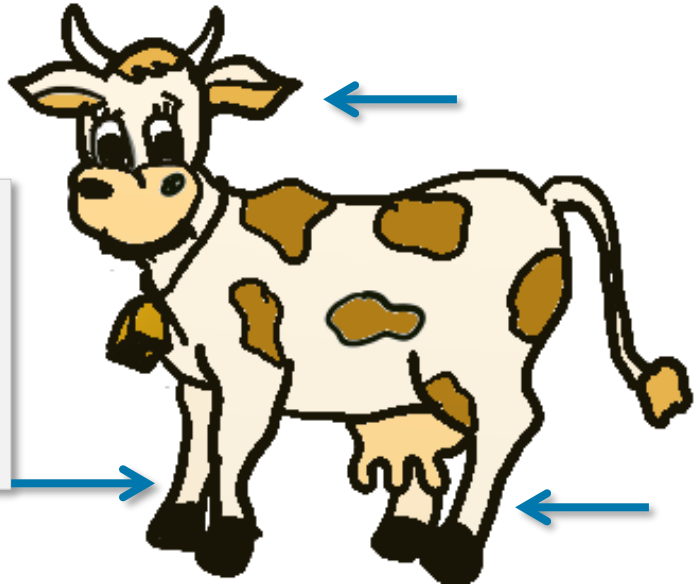

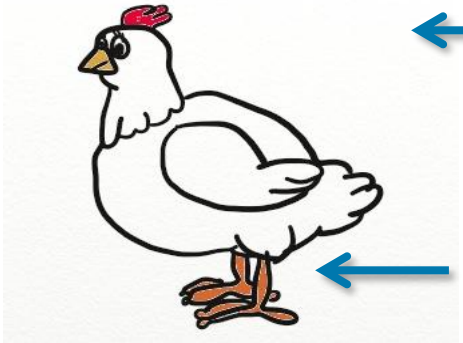

$$\begin{cases} x + y = 35 \\ 4x + 2y = 110 \end{cases}$$

Core Lesson

Three steps…

1. Identify the unknowns and define your variables.
2. Separate types of information to know what the equations will describe.
3. Find the numbers and operations to connect to the unknown values, and write your system of equations.

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