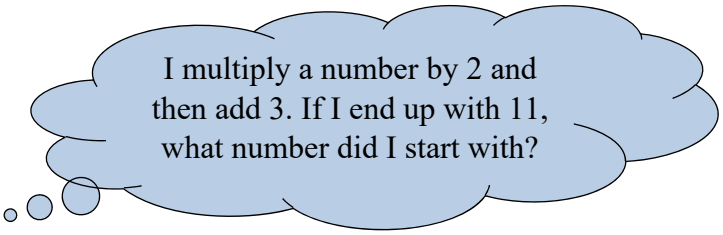


Technology Integrated Mathematics
Class Notes
Algebra: Solving Two-Step Equations (Section 7.4)

Think about the problem in the thought bubble. We can work backwards from 11 to find the unknown number. In the previous section, we saw that…

Addition **undoes** subtraction.

Subtraction **undoes** addition.

Multiplication **undoes** division.

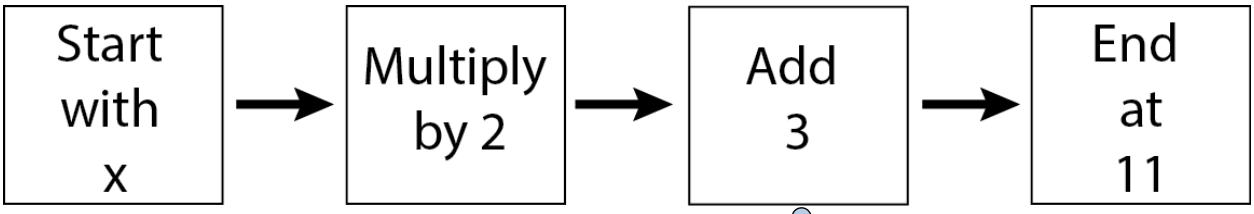
Division **undoes** multiplication.

The algebraic equation we would solve for the thought bubble problem is $2x + 3 = 11$. We need one more concept to solve these equations. You guessed it! It has to do with socks and shoes!

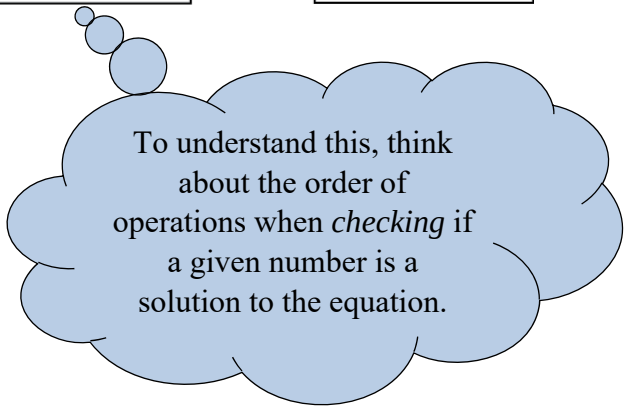
Socks and Shoes Property:
In the morning, you put your socks on and then your shoes. In the evening, you have to take your shoes off *first*, *and then* take your socks off. Right?

The same is true of this equation $2x + 3 = 11$.

We will visualize this equation with what we call a **verbal model**. It's basically the equation in word form.



To solve the equation, we start at the right end and undo the steps, going toward the left, ending with x. Try it here.



Solving Equations Tips:

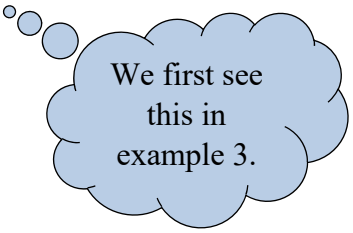
1. We work through equivalent equations, rewriting our equation in simpler and simpler forms, until we get to something like $x = 4$.

2. Remember what operation undoes another.

3. Think through what happened to x to form the equation and undo that, in reverse order.

4. We add, subtract, multiply, and divide the *whole* side of the equation. You have to treat *all* terms the same!

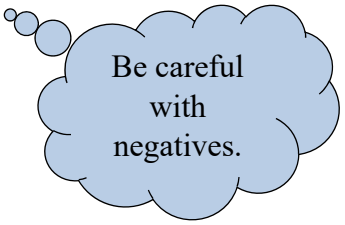
5. When you are given an equation, look for opportunities to *simplify an individual side before* doing stuff to both sides.



expl 1: Solve. Check your solution.

$3x - 5 = 25$

expl 2: Solve. Check your solution.



$$20 - \frac{x}{5} = 13$$

expl 3: Solve. Check your solution.

$4m + 6m - 9 = 14$

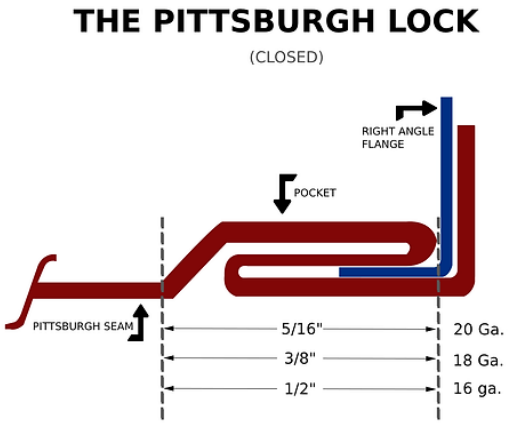
expl 4: Solve. Check your solution.

$$\frac{x+4}{12} = -3$$

Worksheet: Solving Linear Equations:
Here, we will practice the verbal model method of solving equations.

Applications:
Again, of utmost importance is recognizing what the variables represent. Always define your variables!

expl 5: The allowance A for a Pittsburgh lock (in inches) is given by $A = 2w + \frac{3}{16}$ where w is the width of the pocket. If the allowance for a Pittsburgh lock is $\frac{11}{16}$ in., what is the width of the pocket?



(Source: https://www.gmcmachinetools.com)

expl 6: An electrician's total bill A can be calculated as $A = RT + M$. Here, R is her hourly rate (dollars per hour), T is the total labor time in hours, and M is the cost of materials. A bill came to $1825. If materials cost $1200 and her hourly rate is $125/hour, how many hours did she spend on the job?