Lesson 5: Number and Money Applications

Friday, August 31, 2018 3:55 AM

Systems Of Linear Equations Lesson #5:
Number and Money Applications

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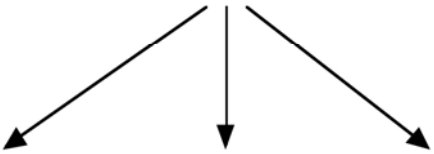
We have discussed three different methods for solving systems of equations.

Methods for Solving Systems of Equations



Graphing — graph 2 lines & find point of intersect

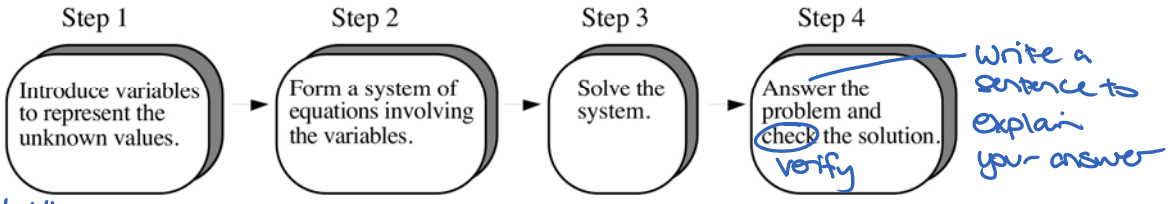
Substitution

Elimination — add/subtract to eliminate 1 variable

In this lesson we apply these methods in problem solving.

Problem Solving

We can solve a variety of types of problems using a system of equations. There are four general steps to problem solving which are shown in the flowchart below.



"let" statement (define your variables)

Number Applications

The difference between two numbers is 9. The larger number, 3 more than twice the smaller number. Find the numbers.

subtract

is

let x = larger number
y = smaller number

verify: $x - y = 9$
$15 - 6 = 9$ ✓

$x = 2y + 3$
$15 = 2(6) + 3$
$15 = 12 + 3$ ✓

$x - y = 9$
$x = 2y + 3$

$x = 2y + 3$
$x = 2(6) + 3$
$x = 12 + 3$
$x = 15$

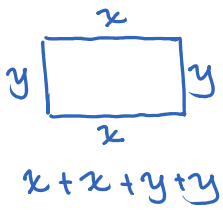
$2y + 3 - y = 9$
$y + 3 = 9$
$y = 6$

The two numbers are 15 and 6.

The perimeter of a rectangle is 40 metres. The width is 4 metres less than the length. Find the dimensions of the rectangle.

l and w

let x = length
y = width



$x + x + y + y$

$2x + 2y = 40$

$y = x - 4$

$2x + 2(x-4) = 40$
$2x + 2x - 8 = 40$
$4x - 8 = 40$
$+8 \quad +8$
$\frac{4x}{4} = \frac{48}{4}$
$x = 12$

$y = x - 4$
$y = 12 - 4$
$y = 8$

The length is 12m and the width is 8m.

Verify: $2(12) + 2(8) = 40$
$24 + 16 = 40$ ✓
$8 = 12 - 4$ ✓

Money Applications

Gary had a total of $260 in five-dollar bills and ten-dollar bills. If he has 33 bills in total, how many of each denomination does he have?

let x = # of $5 bills
y = # of $10 bills

$5(x + y = 33)$
$5x + 10y = 260$ $\Rightarrow$ $5x + 5y = 165$
$-(5x + 10y = 260)$
$-5y = -95$
$\frac{-5y}{-5} = \frac{-95}{-5}$
$y = 19$

Verify:
$x + y = 33$
$14 + 19 = 33$ ✓

$5x + 10y = 260$
$5(14) + 10(19) = 260$
$70 + 190 = 260$ ✓

There are 14 $5 bills and 19 $10 bills

$x + y = 33$
$x + 19 = 33$
$x = 14$

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WS # 2,4,8

Complete Assignment questions #1 - #10