

# Lesson #11: Solving Systems of Equations Story Problems

By the end of this lesson, you will be able to:

- ~ Solve story problems by elimination
- ~ Solve story problems by substitution

## Lesson #11: Systems Story Problems

### Mathematical operations in verbal expressions

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Addition	Subtraction
plus more than the sum of increased by added to	minus less than ✖ the difference of decreased by subtracted from ✖
Multiplication	Division
the product of multiplied by times twice	the quotient of divided by the ratio of half
Exponents	
squared cubed to the _____ power	

## Lesson #11: Systems Story Problems

# Words that mean "Equal"

- ~ is
- ~ was
- ~ is equivalent to
- ~ yields
- ~ gives
- ~ equals
- ~ are
- ~ results in
- ~ is equal to

## Lesson #11: Systems Story Problems

Translate each English Statement into a mathematical statement.

Ex 1: The product of 3 and y is equal to 21.

$$3y = 21$$

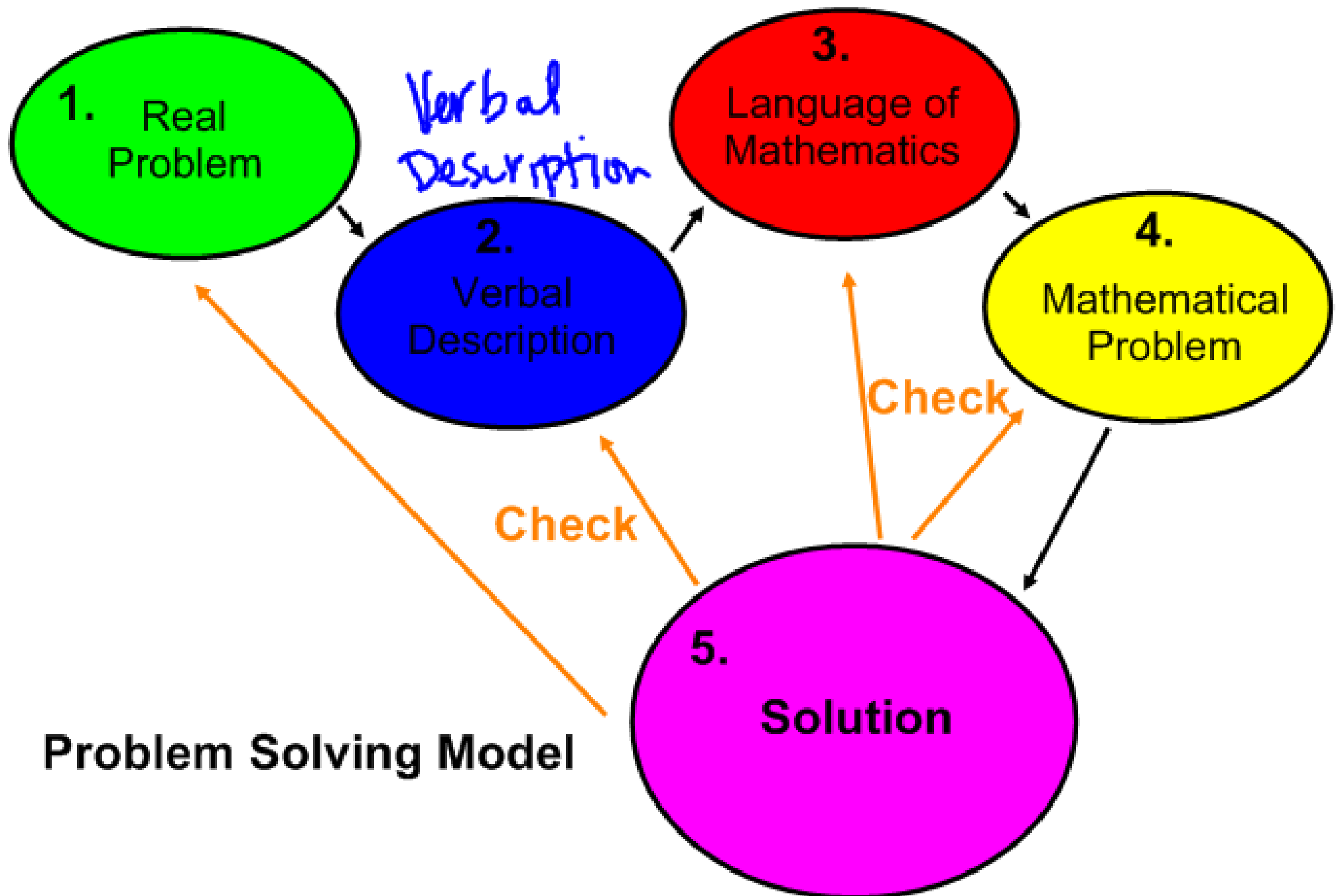
Ex 2: Two times the sum of 3 and X is equivalent to the product of 5 and X.

$$2(3+x) = 5x$$

Ex 3: The difference of x and 10 equals the quotient of x and 2.

$$x - 10 = \frac{x}{2}$$

## Lesson #11: Systems Story Problems



**Problem Solving Model**

## Lesson #11: Systems Story Problems

### Steps for Solving Problems with Mathematical Models

Step 1: Identify what you are looking for.

Step 2: Give Names to the Unknowns. (Variables)

Step 3: Translate the Problem into the Language of Mathematics.

Step 4: Solve the Equation(s) Found in Step 3.

Step 5: Check the Reasonableness of your Answer.

Step 6: Answer the Question (in a complete sentence).

## Lesson #11: Systems Story Problems

**Ex 4:** Two numbers total 23 and their difference is 3.  
Find the numbers.

Step 1: Identify what you are looking for.

looking for two numbers

Step 2: Give Names to the Unknowns.

$x$  = First number

$y$  = 2<sup>nd</sup> number

## Lesson #11: Systems Story Problems

**Ex 4:** Two numbers total 23 and their difference is 3. Find the numbers.

**Step 3: Translate the Problem into the Language of Mathematics.**

$$x + y = 23$$

$$x - y = 3$$

**Step 4: Solve the Equation(s) Found in Step 3.**

$$\begin{array}{r} x + y = 23 \\ + x - y = 3 \\ \hline 2x = 26 \\ \frac{2x}{2} = \frac{26}{2} \\ x = 13 \end{array}$$

$$\begin{array}{r} 13 - y = 3 \\ -13 \quad -13 \\ \hline -y = -10 \\ \frac{-y}{-1} = \frac{-10}{-1} \\ y = 10 \end{array}$$



## Lesson #11: Systems Story Problems

**Ex 4:** Two numbers total 23 and their difference is 3. Find the numbers.

**Step 5: Check the Reasonableness of your Answer.**

$$x = 13 \quad y = 10$$

**Step 6: Answer the Question (in a complete sentence).**

The two numbers are  
13 and 10.

## Lesson #11: Systems Story Problems

**Ex 5:** There are 13 animals in the barn. Some are chickens and some are pigs. There are 40 legs in all. How many of each animal are there?

**Step 1: Identify what you are looking for.**

How many chickens and pigs

**Step 2: Give Names to the Unknowns.**

$x = \text{chickens}$

$y = \text{pigs}$

## Lesson #11: Systems Story Problems

**Ex 5:** There are 13 animals in the barn. Some are chickens and some are pigs. There are 40 legs in all. How many of each animal are there?

**Step 3: Translate the Problem into the Language of Mathematics.**

$$x + y = 13 \qquad 2x + 4y = 40$$

**Step 4: Solve the Equation(s) Found in Step 3.**

$$\begin{array}{r} x + y = 13 \\ -x \qquad -x \\ \hline y = 13 - x \end{array}$$

$$\begin{array}{r} 2x + 4(13 - x) = 40 \\ 2x + 52 - 4x = 40 \\ -2x + 52 = 40 \\ \quad -52 \quad -52 \\ \hline -2x = -12 \\ \quad -2 \quad -2 \\ \hline x = 6 \end{array}$$

$$\begin{array}{r} y = 13 - 6 \\ \hline y = 7 \end{array}$$

## Lesson #11: Systems Story Problems

**Ex 5:** There are 13 animals in the barn. Some are chickens and some are pigs. There are 40 legs in all. How many of each animal are there?

**Step 5: Check the Reasonableness of your Answer.**

$$x = 6 \quad y = 7$$

**Step 6: Answer the Question (in a complete sentence).**

There are 6 chickens and 7 pigs in the barn.

## Lesson #11: Systems Story Problems

**Ex 6:** Bobby has been saving quarters and dimes. He opened up his piggy bank and determined that it contained 47 coins worth \$9.50. Determine how many dimes and quarters were in the piggy bank.

**Step 1: Identify what you are looking for.**

How many Quarters + Dimes?

**Step 2: Give Names to the Unknowns.**

$x = \text{Quarters}$

$y = \text{dimes}$



## Lesson #11: Systems Story Problems

**Ex 6:** Bobby has been saving quarters and dimes. He opened up his piggy bank and determined that it contained 47 coins worth \$9.50. Determine how many dimes and quarters were in the piggy bank.

**Step 5: Check the Reasonableness of your Answer.**

$$x = 32 \quad y = 15$$

**Step 6: Answer the Question (in a complete sentence).**

There are 32 Quarters and 15 dimes.

# Journal #11

Numbers 1-4 in packet

We will stamp your Journal for completion of 1-4 next B1 class.

# Assignment #11

Due at the Beginning of B1 in two class periods - Oct 26