Solving Word Problems Involving Systems of Linear Equations in Two Variables

Jonathan R. Bacolod

Sauyo High School

How to Solve Word Problems Involving Systems of Linear Equations?

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3. Write equations that represent relationships stated in the problem.

How to Solve Word Problems Involving Systems of Linear Equations?

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3. Write equations that represent relationships stated in the problem.
4. Solve the system of linear equations formed.

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2. Choose variables and use them with the given facts to represent each unknown described in the problem.
3. Write equations that represent relationships stated in the problem.
4. Solve the system of linear equations formed.
5. Check your results with the words of the problems. Give the answer in correct units of measure.

Example 1

Janna went to Q-Mart to buy fruits. She bought apples at Php 35.00 each and pomelos at Php 120.00 each. She bought nine fruits for a total cost of Php 570.00. How many pomelos did she buy? How many apples did she buy?

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Janna went to Q-Mart to buy fruits. She bought apples at Php 35.00 each and pomelos at Php 120.00 each. She bought nine fruits for a total cost of Php 570.00. How many apples did she buy? How many pomelos did she buy?

Given: $35 = \text{price per apple}$

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Janna went to Q-Mart to buy fruits. She bought apples at Php 35.00 each and pomelos at Php 120.00 each. She bought nine fruits for a total cost of Php 570.00. How many apples did she buy? How many pomelos did she buy?

Given:

$$\begin{aligned} 35 &= \text{price per apple} \\ 120 &= \text{price per pomelo} \end{aligned}$$

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Janna went to Q-Mart to buy fruits. She bought apples at Php 35.00 each and pomelos at Php 120.00 each. She bought nine fruits for a total cost of Php 570.00. How many apples did she buy? How many pomelos did she buy?

Given:

$$\begin{aligned} 35 &= \text{price per apple} \\ 120 &= \text{price per pomelo} \\ 9 &= \text{total number of fruits} \end{aligned}$$

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Given:

$$
\begin{aligned}
35 &= \text{price per apple} \\
120 &= \text{price per pomelo} \\
9 &= \text{total number of fruits} \\
570 &= \text{total cost of fruits}
\end{aligned}
$$

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Janna went to Q-Mart to buy fruits. She bought apples at Php 35.00 each and pomelos at Php 120.00 each. She bought nine fruits for a total cost of Php 570.00. How many apples did she buy? How many pomelos did she buy?

Given:	35	$=$	price per apple
	120	$=$	price per pomelo
	9	$=$	total number of fruits
	570	$=$	total cost of fruits
Find:			number of apples

Example 1

Step 2: Choose variables and use them with the given facts to represent each unknown described in the problem.

Janna went to Q-Mart to buy fruits. She bought apples at Php 35.00 each and pomelos at Php 120.00 each. She bought nine fruits for a total cost of Php 570.00. How many apples did she buy? How many pomelos did she buy?

Given:	35	$=$	price per apple
	120	$=$	price per pomelo
	9	$=$	total number of fruits
	570	$=$	total cost of fruits
Find:			number of apples
			number of pomelos

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Step 2: Choose variables and use them with the given facts to represent each unknown described in the problem.

Janna went to Q-Mart to buy fruits. She bought apples at Php 35.00 each and pomelos at Php 120.00 each. She bought nine fruits for a total cost of Php 570.00. How many apples did she buy? How many pomelos did she buy?

Given:	35	$=$	price per apple
	120	$=$	price per pomelo
	9	$=$	total number of fruits
	570	$=$	total cost of fruits
Find:			number of apples
			number of pomelos
Let:	a	$=$	number of apples

Example 1

Step 3: Write equations that represent relationships stated in the problem.

Janna went to Q-Mart to buy fruits. She bought apples at Php 35.00 each and pomelos at Php 120.00 each. She bought nine fruits for a total cost of Php 570.00. How many apples did she buy? How many pomelos did she buy?

Given:	35	$=$	price per apple
	120	$=$	price per pomelo
	9	$=$	total number of fruits
	570	$=$	total cost of fruits
Find:			number of apples
			number of pomelos
Let:	a	$=$	number of apples
	p	$=$	number of pomelos

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Given:	35	$=$	price per apple
	120	$=$	price per pomelo
	9	$=$	total number of fruits
	570	$=$	total cost of fruits
Find:			number of apples
			number of pomelos
Let:	a	$=$	number of apples
	p	$=$	number of pomelos
Eq. 1:	$a + p$	$=$	9

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Given:	35	$=$	price per apple
	120	$=$	price per pomelo
	9	$=$	total number of fruits
	570	$=$	total cost of fruits
Find:			number of apples
			number of pomelos
Let:	a	$=$	number of apples
	p	$=$	number of pomelos
Eq. 1:	$a + p$	$=$	9
Eq. 2:	$35a + 120p$	$=$	570

Example 1

Step 4: Solve the system of linear equations formed.

Original system

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

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Use MPE

Example 1

Step 4: Solve the system of linear equations formed.

Original system

$$\begin{cases} \boldsymbol{a} + \boldsymbol{p} = \boldsymbol{9} \\ \boldsymbol{35a} + \boldsymbol{120p} = \boldsymbol{570} \end{cases}$$

Use MPE

$$\begin{array}{rcrcr} -35(a & + & p) & = & -35(9) \\ 35a & + & 120p & = & 570 \end{array}$$

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Step 4: Solve the system of linear equations formed.

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$$\begin{cases} \boldsymbol{a} + \boldsymbol{p} = \boldsymbol{9} \\ \boldsymbol{35a} + \boldsymbol{120p} = \boldsymbol{570} \end{cases}$$

Use MPE

$$\begin{array}{rcrcr} -35(a & + & p) & = & -35(9) \\ 35a & + & 120p & = & 570 \end{array}$$

Use Distributive Prop.

Example 1

Step 4: Solve the system of linear equations formed.

Original system

$$\begin{cases} \boldsymbol{a} + \boldsymbol{p} = \boldsymbol{9} \\ \boldsymbol{35a} + \boldsymbol{120p} = \boldsymbol{570} \end{cases}$$

Use MPE

$$\begin{aligned} -35(a + p) &= -35(9) \\ 35a + 120p &= 570 \end{aligned}$$

Use Distributive Prop.

$$\begin{aligned} -35a - 35p &= -315 \\ 35a + 120p &= 570 \end{aligned}$$

Example 1

Step 4: Solve the system of linear equations formed.

Original system

$$\begin{cases} \boldsymbol{a} + \boldsymbol{p} = \boldsymbol{9} \\ \boldsymbol{35a} + \boldsymbol{120p} = \boldsymbol{570} \end{cases}$$

Use MPE

$$\begin{aligned} -35(a &+ p) &&= -35(9) \\ 35a &+ 120p &&= 570 \end{aligned}$$

Use Distributive Prop.

$$\begin{aligned} -35a &- 35p &&= -315 \\ 35a &+ 120p &&= 570 \end{aligned}$$

Add

Example 1

Step 4: Solve the system of linear equations formed.

Original system

$$\begin{cases} \boldsymbol{a} + \boldsymbol{p} = \boldsymbol{9} \\ \boldsymbol{35a} + \boldsymbol{120p} = \boldsymbol{570} \end{cases}$$

Use MPE

$$-35(a + p) = -35(9)$$

$$35a + 120p = 570$$

Use Distributive Prop.

$$-35a - 35p = -315$$

$$35a + 120p = 570$$

Add

$$85p = 255$$

Example 1

Step 4: Solve the system of linear equations formed.

Original system

$$\begin{cases} \boldsymbol{a} + \boldsymbol{p} = \boldsymbol{9} \\ \boldsymbol{35a} + \boldsymbol{120p} = \boldsymbol{570} \end{cases}$$

Use MPE

$$-35(a + p) = -35(9)$$

$$35a + 120p = 570$$

Use Distributive Prop.

$$-35a - 35p = -315$$

$$35a + 120p = 570$$

Add

$$85p = 255$$

Equation 3

Example 1

Step 4: Solve the system of linear equations formed.

Original system

$$\begin{cases} \boldsymbol{a} + \boldsymbol{p} = \boldsymbol{9} \\ \boldsymbol{35a} + \boldsymbol{120p} = \boldsymbol{570} \end{cases}$$

Use MPE

$$\begin{aligned} -35(a + p) &= -35(9) \\ 35a + 120p &= 570 \end{aligned}$$

Use Distributive Prop.

$$\begin{aligned} -35a - 35p &= -315 \\ 35a + 120p &= 570 \end{aligned}$$

Add

$$85p = 255$$

Equation 3

$$85p = 255$$

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

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$$\begin{cases} a + \quad p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + \quad p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3 $\qquad$ $\mathbf{85}p = \mathbf{255}$

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + \quad p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3 $\mathbf{85p = 255}$

Use Division Property

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + \quad p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3 $\mathbf{85p = 255}$

Use Division Property $\dfrac{85p}{85} = \dfrac{255}{85}$

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + \quad p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3 $\mathbf{85p = 255}$

Use Division Property $\dfrac{85p}{85} = \dfrac{255}{85}$

Simplify

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + \quad p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3 $\quad$ $\mathbf{85p = 255}$

Use Division Property $\quad$ $\dfrac{85p}{85} = \dfrac{255}{85}$

Simplify $\quad$ $p = 3$

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3 $\quad$ $\mathbf{85p = 255}$

Use Division Property $\quad$ $\dfrac{85p}{85} = \dfrac{255}{85}$

Simplify $\quad$ $p = 3$

Equation 1

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3	$\mathbf{85p = 255}$
Use Division Property	$\frac{85p}{85} = \frac{255}{85}$
Simplify	$p = 3$
Equation 1	$\boldsymbol{a + p = 9}$

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3	$\mathbf{85p = 255}$
Use Division Property	$\frac{85p}{85} = \frac{255}{85}$
Simplify	$p = 3$
Equation 1	$\boldsymbol{a + p = 9}$
Substitute $p = 3$	

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3	$\mathbf{85p = 255}$
Use Division Property	$\frac{85p}{85} = \frac{255}{85}$
Simplify	$p = 3$
Equation 1	$\boldsymbol{a + p = 9}$
Substitute $p = 3$	$a + 3 = 9$

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3	$\mathbf{85p = 255}$
Use Division Property	$\frac{85p}{85} = \frac{255}{85}$
Simplify	$p = 3$
Equation 1	$\boldsymbol{a + p = 9}$
Substitute $p = 3$	$a + 3 = 9$
Use Subtraction Property	

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3	$\mathbf{85p = 255}$
Use Division Property	$\frac{85p}{85} = \frac{255}{85}$
Simplify	$p = 3$
Equation 1	$\boldsymbol{a + p = 9}$
Substitute $p = 3$	$a + 3 = 9$
Use Subtraction Property	$a + 3 - 3 = 9 - 3$

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3	$\mathbf{85p = 255}$
Use Division Property	$\frac{85p}{85} = \frac{255}{85}$
Simplify	$p = 3$
Equation 1	$\boldsymbol{a + p = 9}$
Substitute $p = 3$	$a + 3 = 9$
Use Subtraction Property	$a + 3 - 3 = 9 - 3$
Simplify	

Example 1

Step 4: Solve the system of linear equations formed.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Equation 3	$\mathbf{85p = 255}$
Use Division Property	$\frac{85p}{85} = \frac{255}{85}$
Simplify	$p = 3$
Equation 1	$\boldsymbol{a + p = 9}$
Substitute $p = 3$	$a + 3 = 9$
Use Subtraction Property	$a + 3 - 3 = 9 - 3$
Simplify	$a = 6$

Example 1

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} a + \quad p = 9 \\ 35a + 120p = 570 \end{cases}$$

Check: $a = 6, p = 3$

Example 1

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} a + \quad p = 9 \\ 35a + 120p = 570 \end{cases}$$

Check: $a = 6, p = 3$

$a + p = 9$

Example 1

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} a + \quad p = 9 \\ 35a + 120p = 570 \end{cases}$$

Check: $a = 6, p = 3$

$a + p = 9$
$6 + 3 = 9$

Example 1

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Check: $a = 6, p = 3$

$$a + p = 9$$
$$6 + 3 = 9$$
$$9 = 9$$

Example 1

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Check: $a = 6, p = 3$

$a + p = 9$
$6 + 3 = 9$
$9 = 9$ ✓

Example 1

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Check: $a = 6, p = 3$

$a + p = 9$

$6 + 3 = 9$

$9 = 9$ ✓

$35a + 120p = 570$

Example 1

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Check: $a = 6, p = 3$

$a + p = 9$
$6 + 3 = 9$
$9 = 9$ ✓

$35a + 120p = 570$
$35(6) + 120(3) = 570$

Example 1

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Check: $a = 6, p = 3$

$a + p = 9$
$6 + 3 = 9$
$9 = 9$ ✓

$35a + 120p = 570$
$35(6) + 120(3) = 570$
$210 + 360 = 570$

Example 1

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Check: $a = 6, p = 3$

$a + p = 9$
$6 + 3 = 9$
$9 = 9$ ✓

$35a + 120p = 570$
$35(6) + 120(3) = 570$
$210 + 360 = 570$
$570 = 570$

Example 1

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Check: $a = 6, p = 3$

$a + p = 9$
$6 + 3 = 9$
$9 = 9$ ✓

$35a + 120p = 570$
$35(6) + 120(3) = 570$
$210 + 360 = 570$
$570 = 570$ ✓

Example 1

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} a + p = 9 \\ 35a + 120p = 570 \end{cases}$$

Check: $a = 6, p = 3$

$a + p = 9$
$6 + 3 = 9$
$9 = 9$ ✓

$35a + 120p = 570$
$35(6) + 120(3) = 570$
$210 + 360 = 570$
$570 = 570$ ✓

Therefore, Janna bought six apples and three pomelos.

Example 2

The sum of the two numbers is 56 and their difference is 18. Find the numbers.

Example 2

Step 1: Understand the problem. Decide what are asked for and what information is given.

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The sum of the two numbers is 56 and their difference is 18. Find the numbers.

Given: $56 = \text{sum of the two numbers}$

Example 2

Step 1: Understand the problem. Decide what are asked for and what information is given.

The sum of the two numbers is 56 and their difference is 18. Find the numbers.

Given:

$$\begin{aligned} 56 &= \text{sum of the two numbers} \\ 18 &= \text{difference of the 2 numbers} \end{aligned}$$

Example 2

Step 1: Understand the problem. Decide what are asked for and what information is given.

The sum of the two numbers is 56 and their difference is 18. Find the numbers.

Given:	56	$=$	sum of the two numbers
	18	$=$	difference of the 2 numbers
Find:			the first number

Example 2

Step 2: Choose variables and use them with the given facts to represent each unknown described in the problem.

The sum of the two numbers is 56 and their difference is 18. Find the numbers.

Given:	56	$=$	sum of the two numbers
	18	$=$	difference of the 2 numbers
Find:			the first number
			the second number

Example 2

Step 2: Choose variables and use them with the given facts to represent each unknown described in the problem.

The sum of the two numbers is 56 and their difference is 18. Find the numbers.

Given:	56	$=$	sum of the two numbers
	18	$=$	difference of the 2 numbers
Find:			the first number
			the second number
Let:	x	$=$	the first number

Example 2

Step 3: Write equations that represent relationships stated in the problem.

The sum of the two numbers is 56 and their difference is 18. Find the numbers.

Given:	56	$=$	sum of the two numbers
	18	$=$	difference of the 2 numbers
Find:			the first number
			the second number
Let:	x	$=$	the first number
	y	$=$	the second number

Example 2

Step 3: Write equations that represent relationships stated in the problem.

The sum of the two numbers is 56 and their difference is 18. Find the numbers.

Given:	56	$=$	sum of the two numbers
	18	$=$	difference of the 2 numbers
Find:			the first number
			the second number
Let:	x	$=$	the first number
	y	$=$	the second number
Eq. 1:	$x + y$	$=$	56

Example 2

Step 3: Write equations that represent relationships stated in the problem.

The sum of the two numbers is 56 and their difference is 18. Find the numbers.

Given:	56	$=$	sum of the two numbers
	18	$=$	difference of the 2 numbers
Find:			the first number
			the second number
Let:	x	$=$	the first number
	y	$=$	the second number
Eq. 1:	$x + y$	$=$	56
Eq. 2:	$x - y$	$=$	18

Example 2

Step 4: Solve the system of linear equations formed.

Original system

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Example 2

Step 4: Solve the system of linear equations formed.

Original system $\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$

Add

Example 2

Step 4: Solve the system of linear equations formed.

Original system $\begin{cases} \boldsymbol{x + y = 56} \\ \boldsymbol{x - y = 18} \end{cases}$

Add $2x = 74$

Example 2

Step 4: Solve the system of linear equations formed.

Original system $\begin{cases} \boldsymbol{x} + \boldsymbol{y} = \mathbf{56} \\ \boldsymbol{x} - \boldsymbol{y} = \mathbf{18} \end{cases}$

Add

Equation 3

$$2x = 74$$

Example 2

Step 4: Solve the system of linear equations formed.

Original system $\begin{cases} \boldsymbol{x + y = 56} \\ \boldsymbol{x - y = 18} \end{cases}$

Add $2x = 74$

Equation 3 $2x = 74$

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3 $\qquad\qquad$ $\mathbf{2x = 74}$

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3 $\qquad\qquad$ $\mathbf{2x = 74}$

Use Division Property

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3 $\quad \mathbf{2x = 74}$

Use Division Property $\quad \dfrac{2x}{2} = \dfrac{74}{2}$

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3 $\quad$ $\mathbf{2x = 74}$

Use Division Property $\quad$ $\dfrac{2x}{2} = \dfrac{74}{2}$

Simplify

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3	$\mathbf{2x = 74}$
Use Division Property	$\frac{2x}{2} = \frac{74}{2}$
Simplify	$x = 37$

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3	$\mathbf{2x = 74}$
Use Division Property	$\frac{2x}{2} = \frac{74}{2}$
Simplify	$x = 37$

Equation 1

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3	$\mathbf{2x = 74}$
Use Division Property	$\frac{2x}{2} = \frac{74}{2}$
Simplify	$x = 37$
Equation 1	$\boldsymbol{x + y = 56}$

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3	$\mathbf{2x = 74}$
Use Division Property	$\frac{2x}{2} = \frac{74}{2}$
Simplify	$x = 37$
Equation 1	$\boldsymbol{x + y = 56}$
Substitute $x = 37$	

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3	$\mathbf{2x = 74}$
Use Division Property	$\frac{2x}{2} = \frac{74}{2}$
Simplify	$x = 37$
Equation 1	$\boldsymbol{x + y = 56}$
Substitute $x = 37$	$37 + y = 56$

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3	$\mathbf{2x = 74}$
Use Division Property	$\frac{2x}{2} = \frac{74}{2}$
Simplify	$x = 37$
Equation 1	$\boldsymbol{x + y = 56}$
Substitute $x = 37$	$37 + y = 56$
Use Subtraction Property	

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3	$\mathbf{2x = 74}$
Use Division Property	$\frac{2x}{2} = \frac{74}{2}$
Simplify	$x = 37$
Equation 1	$\boldsymbol{x + y = 56}$
Substitute $x = 37$	$37 + y = 56$
Use Subtraction Property	$37 - 37 + y = 56 - 37$

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3	$\mathbf{2x = 74}$
Use Division Property	$\frac{2x}{2} = \frac{74}{2}$
Simplify	$x = 37$
Equation 1	$\boldsymbol{x + y = 56}$
Substitute $x = 37$	$37 + y = 56$
Use Subtraction Property	$37 - 37 + y = 56 - 37$
Simplify	

Example 2

Step 4: Solve the system of linear equations formed.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Equation 3	$\mathbf{2x = 74}$
Use Division Property	$\frac{2x}{2} = \frac{74}{2}$
Simplify	$x = 37$
Equation 1	$\boldsymbol{x + y = 56}$
Substitute $x = 37$	$37 + y = 56$
Use Subtraction Property	$37 - 37 + y = 56 - 37$
Simplify	$y = 19$

Example 2

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Check: $x = 37, y = 19$

Example 2

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Check: $x = 37, y = 19$

$x + y = 56$

Example 2

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Check: $x = 37, y = 19$

$x + y = 56$
$37 + 19 = 56$

Example 2

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Check: $x = 37, y = 19$

$x + y = 56$
$37 + 19 = 56$
$56 = 56$

Example 2

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Check: $x = 37, y = 19$

$x + y = 56$
$37 + 19 = 56$
$56 = 56$ ✓

Example 2

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Check: $x = 37, y = 19$

$x + y = 56$

$37 + 19 = 56$

$56 = 56$ ✓

$x - y = 18$

Example 2

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Check: $x = 37, y = 19$

$x + y = 56$
$37 + 19 = 56$
$56 = 56$ ✓

$x - y = 18$
$37 - 19 = 18$

Example 2

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Check: $x = 37, y = 19$

$x + y = 56$
$37 + 19 = 56$
$56 = 56$ ✓

$x - y = 18$
$37 - 19 = 18$
$18 = 18$

Example 2

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Check: $x = 37, y = 19$

$x + y = 56$
$37 + 19 = 56$
$56 = 56$ ✓

$x - y = 18$
$37 - 19 = 18$
$18 = 18$ ✓

Example 2

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} x + y = 56 \\ x - y = 18 \end{cases}$$

Check: $x = 37, y = 19$

$x + y = 56$
$37 + 19 = 56$
$56 = 56$ ✓

$x - y = 18$
$37 - 19 = 18$
$18 = 18$ ✓

Therefore, the two numbers are 37 and 19.

Example 3

A table maker wants to cut an 18-foot piece of wood for his project by 2 pieces. The longer piece is to be 3 feet longer than twice of the shorter piece. What is the length of each piece of his wood?

Example 3

Step 1: Understand the problem. Decide what are asked for and what information is given.

A table maker wants to cut an 18-foot piece of wood for his project by 2 pieces. The longer piece is to be 3 feet longer than twice of the shorter piece. What is the length of each piece of his wood?

Example 3

Step 1: Understand the problem. Decide what are asked for and what information is given.

A table maker wants to cut an 18-foot piece of wood for his project by 2 pieces. The longer piece is to be 3 feet longer than twice of the shorter piece. What is the length of each piece of his wood?

Given: $18 = \text{total length of wood}$

Example 3

Step 1: Understand the problem. Decide what are asked for and what information is given.

A table maker wants to cut an 18-foot piece of wood for his project by 2 pieces. The longer piece is to be 3 feet longer than twice of the shorter piece. What is the length of each piece of his wood?

Given:	18	$=$	total length of wood
Find:			length of longer piece

Example 3

Step 2: Choose variables and use them with the given facts to represent each unknown described in the problem.

A table maker wants to cut an 18-foot piece of wood for his project by 2 pieces. The longer piece is to be 3 feet longer than twice of the shorter piece. What is the length of each piece of his wood?

Given:	18	$=$	total length of wood
Find:			length of longer piece
			length of shorter piece

Example 3

Step 2: Choose variables and use them with the given facts to represent each unknown described in the problem.

A table maker wants to cut an 18-foot piece of wood for his project by 2 pieces. The longer piece is to be 3 feet longer than twice of the shorter piece. What is the length of each piece of his wood?

Given:	18	$=$	total length of wood
Find:			length of longer piece
			length of shorter piece
Let:	l	$=$	length of longer piece

Example 3

Step 3: Write equations that represent relationships stated in the problem.

A table maker wants to cut an 18-foot piece of wood for his project by 2 pieces. The longer piece is to be 3 feet longer than twice of the shorter piece. What is the length of each piece of his wood?

Given:	18	$=$	total length of wood
Find:			length of longer piece
			length of shorter piece
Let:	l	$=$	length of longer piece
	s	$=$	length of shorter piece

Example 3

Step 3: Write equations that represent relationships stated in the problem.

A table maker wants to cut an 18-foot piece of wood for his project by 2 pieces. The longer piece is to be 3 feet longer than twice of the shorter piece. What is the length of each piece of his wood?

Given:	18	$=$	total length of wood
Find:			length of longer piece
			length of shorter piece
Let:	l	$=$	length of longer piece
	s	$=$	length of shorter piece
Eq. 1:	$l + s$	$=$	18

Example 3

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A table maker wants to cut an 18-foot piece of wood for his project by 2 pieces. The longer piece is to be 3 feet longer than twice of the shorter piece. What is the length of each piece of his wood?

Given:	18	$=$	total length of wood
Find:			length of longer piece
			length of shorter piece
Let:	l	$=$	length of longer piece
	s	$=$	length of shorter piece
Eq. 1:	$l+s$	$=$	18
Eq. 2:	l	$=$	$2s+3$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation $\boldsymbol{l + s = 18}$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation $\boldsymbol{l + s = 18}$

Substitute Eq. 2

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation	$\boldsymbol{l + s = 18}$
Substitute Eq. 2	$2s + 3 + s = 18$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation	$\boldsymbol{l + s = 18}$
Substitute Eq. 2	$2s + 3 + s = 18$
Simplify	

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation	$\boldsymbol{l + s = 18}$
Substitute Eq. 2	$2s + 3 + s = 18$
Simplify	$3s + 3 = 18$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation	$\boldsymbol{l + s = 18}$
Substitute Eq. 2	$2s + 3 + s = 18$
Simplify	$3s + 3 = 18$
Use Subtraction Property	

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation	$\boldsymbol{l + s = 18}$
Substitute Eq. 2	$2s + 3 + s = 18$
Simplify	$3s + 3 = 18$
Use Subtraction Property	$3s + 3 - 3 = 18 - 3$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation	$\boldsymbol{l + s = 18}$
Substitute Eq. 2	$2s + 3 + s = 18$
Simplify	$3s + 3 = 18$
Use Subtraction Property	$3s + 3 - 3 = 18 - 3$
Simplify	

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l \quad\;\; = 2s + 3 \end{cases}$$

First equation	$\boldsymbol{l + s = 18}$
Substitute Eq. 2	$2s + 3 + s = 18$
Simplify	$3s + 3 = 18$
Use Subtraction Property	$3s + 3 - 3 = 18 - 3$
Simplify	$3s = 15$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation	$\boldsymbol{l + s = 18}$
Substitute Eq. 2	$2s + 3 + s = 18$
Simplify	$3s + 3 = 18$
Use Subtraction Property	$3s + 3 - 3 = 18 - 3$
Simplify	$3s = 15$
Use Division Property	

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation	$\boldsymbol{l + s = 18}$
Substitute Eq. 2	$2s + 3 + s = 18$
Simplify	$3s + 3 = 18$
Use Subtraction Property	$3s + 3 - 3 = 18 - 3$
Simplify	$3s = 15$
Use Division Property	$\frac{3s}{3} = \frac{15}{3}$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation	$\boldsymbol{l + s = 18}$
Substitute Eq. 2	$2s + 3 + s = 18$
Simplify	$3s + 3 = 18$
Use Subtraction Property	$3s + 3 - 3 = 18 - 3$
Simplify	$3s = 15$
Use Division Property	$\frac{3s}{3} = \frac{15}{3}$
Simplify	

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

First equation	$\boldsymbol{l + s = 18}$
Substitute Eq. 2	$2s + 3 + s = 18$
Simplify	$3s + 3 = 18$
Use Subtraction Property	$3s + 3 - 3 = 18 - 3$
Simplify	$3s = 15$
Use Division Property	$\frac{3s}{3} = \frac{15}{3}$
Simplify	$s = 5$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Equation 2

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Equation 2 $\boldsymbol{l = 2s + 3}$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Equation 2 $\qquad\qquad$ $\boldsymbol{l = 2s + 3}$

Substitute $s = 5$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Equation 2	$\boldsymbol{l = 2s + 3}$
Substitute $s = 5$	$l = 2(5) + 3$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Equation 2	$\boldsymbol{l = 2s + 3}$
Substitute $s = 5$	$l = 2(5) + 3$
Simplify	

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Equation 2	$\boldsymbol{l = 2s + 3}$
Substitute $s = 5$	$l = 2(5) + 3$
Simplify	$l = 10 + 3$

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Equation 2	$\boldsymbol{l = 2s + 3}$
Substitute $s = 5$	$l = 2(5) + 3$
Simplify	$l = 10 + 3$
Simplify	

Example 3

Step 4: Solve the system of linear equations formed.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Equation 2	$\boldsymbol{l = 2s + 3}$
Substitute $s = 5$	$l = 2(5) + 3$
Simplify	$l = 10 + 3$
Simplify	$l = 13$

Example 3

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Check: $l = 13, s = 5$

Example 3

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} l + s = 18 \\ l \quad\quad = 2s + 3 \end{cases}$$

Check: $l = 13, s = 5$

$l + s = 18$

Example 3

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Check: $l = 13, s = 5$

$l + s = 18$
$13 + 5 = 18$

Example 3

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Check: $l = 13, s = 5$

$l + s = 18$
$13 + 5 = 18$
$18 = 18$

Example 3

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Check: $l = 13, s = 5$

$l + s = 18$
$13 + 5 = 18$
$18 = 18$ ✓

Example 3

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Check: $l = 13, s = 5$

$l + s = 18$

$13 + 5 = 18$

$18 = 18$ ✓

$l = 2s + 3$

Example 3

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Check: $l = 13, s = 5$

$l + s = 18$

$13 + 5 = 18$

$18 = 18$ ✓

$l = 2s + 3$

$13 = 2(5) + 3$

Example 3

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Check: $l = 13, s = 5$

$l + s = 18$
$13 + 5 = 18$
$18 = 18$ ✓

$l = 2s + 3$
$13 = 2(5) + 3$
$13 = 10 + 3$

Example 3

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Check: $l = 13, s = 5$

$l + s = 18$
$13 + 5 = 18$
$18 = 18$ ✓

$l = 2s + 3$
$13 = 2(5) + 3$
$13 = 10 + 3$
$13 = 13$

Example 3

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Check: $l = 13, s = 5$

$l + s = 18$
$13 + 5 = 18$
$18 = 18$ ✓

$l = 2s + 3$
$13 = 2(5) + 3$
$13 = 10 + 3$
$13 = 13$ ✓

Example 3

Step 5: Check your results with the words of the problems. Give the answer in correct units of measure.

$$\begin{cases} l + s = 18 \\ l = 2s + 3 \end{cases}$$

Check: $l = 13, s = 5$

$l + s = 18$
$13 + 5 = 18$
$18 = 18$ ✓

$l = 2s + 3$
$13 = 2(5) + 3$
$13 = 10 + 3$
$13 = 13$ ✓

Therefore, the longer piece measures 13 feet and the shorter piece measures 5 feet.

Thank you for watching.