

Writing 2-step Equations

Q. How do you write a 2-step equation?

A. Choose a _____ for the _____ value you are trying to find. Use _____ words from the problem to _____ the correct _____ and numbers to use

In other words, you write 2-step equations to represent real-world problems by translating the words of the problem into numbers, variables and operations.

G Modeling Two-Step Equations

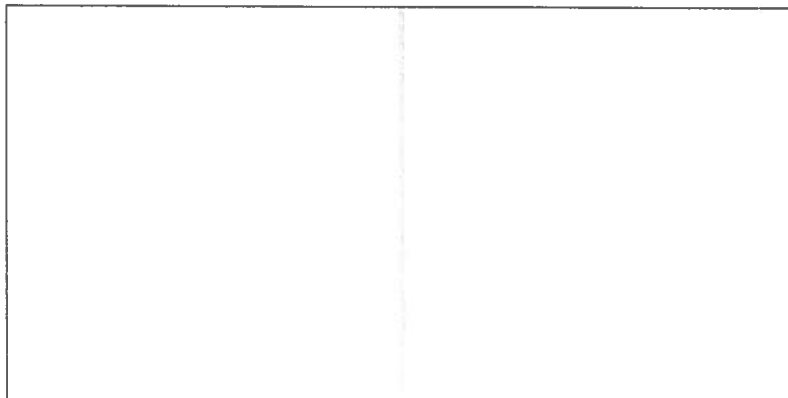
You can use algebra tiles to model two-step equations.

Use algebra tiles to model $3x - 4 = 5$.





A How can you model the left side of the equation?

B How can you model the right side of the equation?

C Use algebra tiles or draw them to model the equation on the mat.



KEY

 = positive variable
 = negative variable
 = 1  = -1

LESSON
8-1

Writing Two-Step Equations

Reading Strategies: Analyze Information

It is important to know whether an equation is a one-step equation or a two-step equation. It is also important to know whether each step is addition, subtraction, multiplication, or division.

Equation	Number of Steps and Description
$2x = 7$	One step: Multiply x by 2.
$y + 5 = 11$	One step: Add 5 to y .
$3z - 1 = 11$	Two steps: Multiply z by 3, then subtract 1.
$\frac{w+3}{2} = 4$	Two steps: Add 3 to w , then divide the result by 2.

Knowing the steps helps you write a two-step equation. Knowing the steps is even more important in the next lesson on *solving* two-step equations.

Write an equation for each problem. State whether the problem should be written as a one-step equation or a two-step equation. Then describe the step or steps.

1. Five times a number subtracted from 50 is 15. What is the number?

Equation: _____

Number of steps and description:

2. Eight more than a number is twenty-seven. What is the number?

Equation: _____

Number of steps and description:

3. At a bookstore, you buy a calendar for \$3 and some books for \$4 each. You spend a total of \$23. How many books do you buy?

Equation: _____

Number of steps and description:

4. You are giving away equal groups of paper clips to some number of friends. Each friend receives 15 paper clips and you started with 90 paper clips. How many friends receive paper clips?

Equation: _____

Number of steps and description:

LESSON
8-1

Writing Two-Step Equations
Success for English Learners

Problem 1

To write an equation from the words, remember clues:

- "Six times a number" $\longrightarrow 6n$
- "Two less than a number" $\longrightarrow n - 2$
- "Eight more than a number" $\longrightarrow n + 8$
- "The opposite of 7" $\longrightarrow -7$

Combine the clues to write an equation with numbers:

"Four less than two times a number is equal to the opposite of nine."

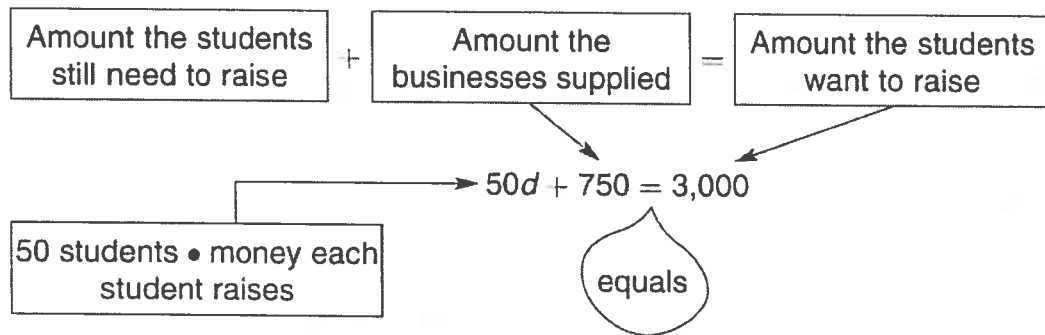
$$2x - 4 = -9$$

Problem 2

Look at the boldfaced numbers and words in the problem.

A group of students want to raise **\$3,000** for hurricane victims. They were **given \$750** by local businesses, but they have to raise the rest. If there are **50 students**, how much does each student need to raise?

Put the information in a chart like this:



- Write the words for the numbers and symbols: $18 - 3x = 3$

- Write the numbers and symbols for this problem: "Five times a number minus seven is equal to the opposite of eleven."

LESSON
8-1

Writing Two-Step Equations

Practice and Problem Solving: D

Model each two-step equation by drawing algebra tiles.
The first one is done for you.

1. $2p + 3 = 7$



2. $3t + 10 = 16$

3. $-q - 3 = 7$

Write an equation for each word problem. The first one is done for you.

4. The sum of three times a number d and 5 is 17. What is the number?

$3d + 5 = 17$

5. As a membership fee, a health club charges a one-time amount of \$40 and charges \$25 for each month. The total fee after m months is \$240. What is the value of m ?

6. A runner warms up for ten minutes and then takes seven minutes to run each mile. The total time after r miles is 45 minutes. How many miles are run?

LESSON
8-1

Writing Two-Step Equations

Practice and Problem Solving: A/B

Model each two-step operation by drawing algebra tiles.

1. $3m + 5 = 8$

2. $-2x - 3 = 5$

Write an equation to represent each problem.

3. The sum of fifteen and six times a number t is eighty-one. What is the number?
- _____

4. An electrician charges \$40 to come to your house. She also charges \$55 for each hour that she works. The electrician charges you a total of \$190. How many hours does the electrician work at your house? Use h for the number of hours.
- _____

5. A taxi charges \$1.75 plus a fee of \$0.75 for each mile traveled. The total cost of a ride, without a tip, is \$4.75. How many miles is the trip? Use m for the number of miles traveled.
- _____

Writing 2-step Equations

Q. How do you write a 2-step equation?

A. Choose a variable for the unknown value you are trying to find. Use important words from the problem to identify the correct operations and numbers to use.

In other words, you write 2-step equations to represent real-world problems by translating the words of the problem into numbers, variables and operations.

G Modeling Two-Step Equations

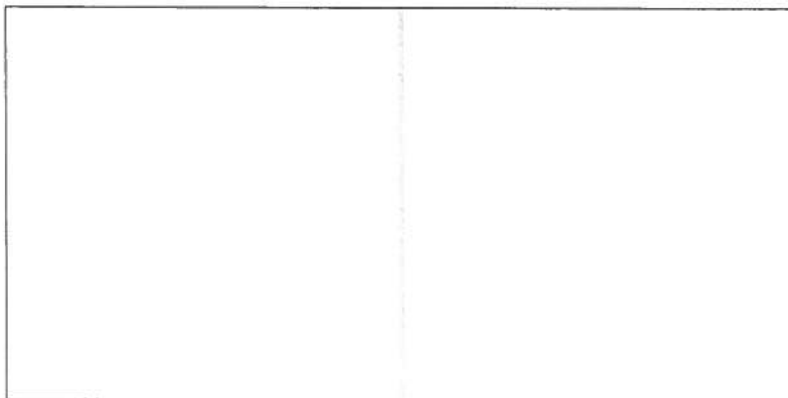
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Write an equation for each problem. State whether the problem should be written as a one-step equation or a two-step equation. Then describe the step or steps.

1. Five times a number subtracted from 50 is 15. What is the number?

Equation: $5x - 50 = 15$

Number of steps and description:

2 steps multiply by 5; subtract 50

2. Eight more than a number is twenty-seven. What is the number?

Equation: $x + 8 = 27$

Number of steps and description:

1 step add 8

3. At a bookstore, you buy a calendar for \$3 and some books for \$4 each. You spend a total of \$23. How many books do you buy?

Equation: $4x + 3 = 23$

Number of steps and description:

2 steps multiply by 4; add 3

4. You are giving away equal groups of paper clips to some number of friends. Each friend receives 15 paper clips and you started with 90 paper clips. How many friends receive paper clips?

Equation: $15x = 90$

Number of steps and description:

1 step multiply by 15

LESSON
8-1

Writing Two-Step Equations
Success for English Learners

Problem 1

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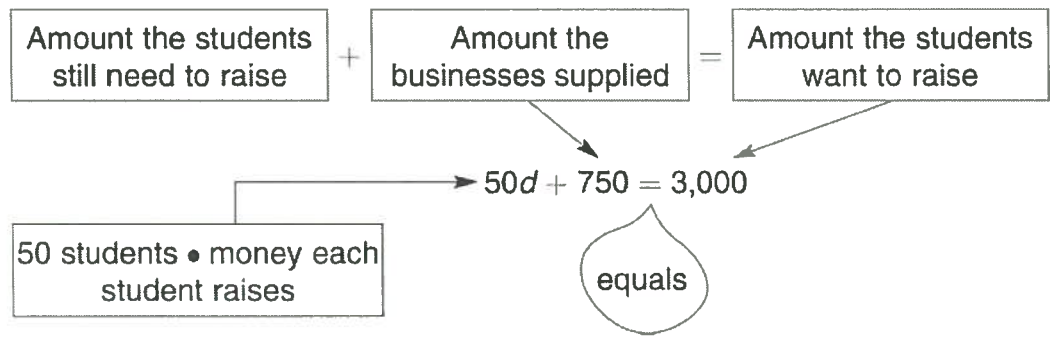
$$2x - 4 = -9$$

Problem 2

Look at the boldfaced numbers and words in the problem.

A group of students want to raise **\$3,000** for hurricane victims. They were given **\$750** by local businesses, but they have to raise the rest. If there are **50 students**, how much does each student need to raise?

Put the information in a chart like this:



1. Write the words for the numbers and symbols: $18 - 3x = 3$

Eighteen less than three times ~~a~~ the number is three

2. Write the numbers and symbols for this problem: "Five times a number minus seven is equal to the opposite of eleven."

$5x - 7 = -11$

LESSON
8-1

Writing Two-Step Equations
Practice and Problem Solving: D

Model each two-step equation by drawing algebra tiles. The first one is done for you.

1. $2p + 3 = 7$



2. $3t + 10 = 16$



3. $-q - 3 = 7$



Write an equation for each word problem. The first one is done for you.

4. The sum of three times a number d and 5 is 17. What is the number?

$3d + 5 = 17$

5. As a membership fee, a health club charges a one-time amount of \$40 and charges \$25 for each month. The total fee after m months is \$240. What is the value of m ?

$25m + 40 = 240$

6. A runner warms up for ten minutes and then takes seven minutes to run each mile. The total time after r miles is 45 minutes. How many miles are run?

$7x + 10 = 45$