

Shelby County Schools
Extended Learning Packet



Grade 6

Solve Equations

Name: _____

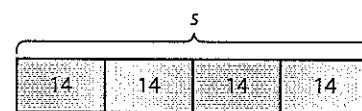
Prerequisite: Write an Equation

Study the example problem showing how to write and solve an equation. Then solve problems 1–8.

Example

Kanika divides a package of sunflower seeds equally among 4 flower beds. She plants 14 seeds in each bed. Write and solve an equation to find how many seeds were in the package.

You can draw a bar model to help you write and solve an equation that represents the problem. The equation $\frac{s}{4} = 14$ represents the problem.



The equation is asking: What number divided by 4 equals 14? You can solve a division equation using multiplication. Since $14 \times 4 = 56$, $56 \div 4 = 14$.

There were 56 seeds in the package.

- 1 What does s represent in the example? What does the expression $\frac{s}{4}$ represent?

- 2 What is the solution to the equation $\frac{s}{4} = 14$?

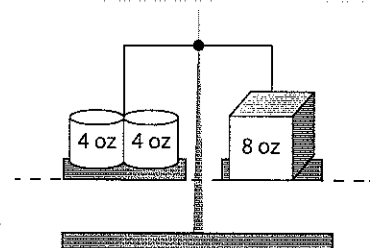
$s =$ _____

- 3 Consider the pan balance. What would happen if you replaced the 8-ounce weight with a 10-ounce weight?

- 4 Suppose you change one of the 4-ounce weights to a 7-ounce weight. How much weight would you have to add on the right side to make the pans balance? Explain.

Vocabulary

equation a statement showing that two expressions are equivalent.



Solve.

- 5 Paulo had a rope that was 15 feet long. He cut off n feet of the rope to hang a bird feeder. Paulo now has $11\frac{1}{2}$ feet of rope left.

a. Write an equation to represent the problem.

b. Draw a number line labeled from $10\frac{1}{2}$ to $15\frac{1}{2}$ and explain how you could use it to solve the problem. How much rope did Paulo use?

- 6 Piper bought 5 movie tickets and 1 bottle of water. She spent \$28. The water cost \$3. How much did each ticket cost? Write an equation to solve the problem and answer the question.
-

- 7 Write a real-world problem that you could represent with the equation $4x + 5 = 37$. Solve the equation to find the answer to your question.
-
-
-

- 8 Without solving, explain how you can tell whether the solution to $0.5x = 10$ is less than 1 or greater than 1.
-
-
-

Solve Addition and Subtraction Equations

Study the example problem showing how to solve an addition equation. Then solve problems 1–10.

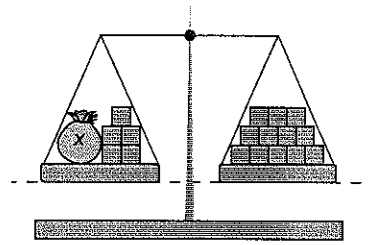
Example

Cora puts 5 blocks and a bag containing an unknown number of blocks on one pan of a balance. She puts 12 blocks on the other pan to make the pans hang evenly. How many blocks are in the bag?

Draw a picture to represent the problem.

Write an expression for the number of blocks in each pan.

- number of blocks on the left side: $x + 5$
- number of blocks on the right side: 12



Write an equation to compare the expressions.

$x + 5 = 12$

1 What operation does the expression $x + 5$ involve?

2 What is the inverse of this operation?

3 How do you isolate the variable in $x + 5 = 12$?

4 What must you do to keep the equation balanced?

5 Solve the equation $x + 5 = 12$. Show and justify each step you take to solve the equation.

$x + 5 = 12$	Write the equation.
$x + 5 \text{ _____} = 12 \text{ _____}$	_____
$x \text{ _____} = \text{ _____}$	_____
$x = \text{ _____}$	_____

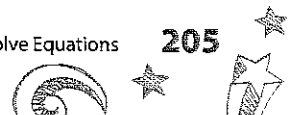
Vocabulary

inverse operations

operations that “undo” each other.

+ and – are inverse operations.

× and ÷ are inverse operations.



Solve.

6 Write the inverse of each operation.

a. addition _____

b. multiplication _____

7 Solve each problem.

Show your work.

a. $x + 12 = 18$

b. $x - 7 = 3$

8 Tim said that to solve the equation $x - 2 = 9$, he would need to subtract 2 from both sides of the equation. Is Tim correct? Explain.

9 Write the equations described below.

a. an addition equation with one variable that has a solution of 3

b. a subtraction equation with one variable that has a solution of $\frac{2}{3}$

10 Marge said that she subtracted 20 from both sides of an equation to solve it. Colin thinks that the equation she was solving could have been $6 + t = 20$. Does Colin's reasoning make sense? Explain.

Solve Multiplication Equations

Study the example problem showing how to solve a multiplication equation. Then solve problems 1–10.

Example

There are 3 bags of marbles in the left-side pan of a balance. Each bag has the same number of marbles. After you put 9 marbles in the right-side pan, the pans hang evenly. How many marbles are in each bag?

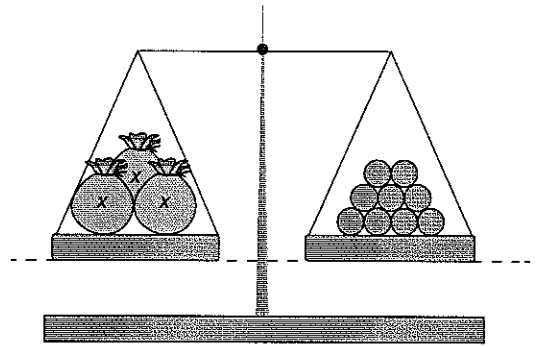
Draw a picture to represent the problem.

Write an expression for the number of marbles in each pan.

number of marbles in left-side pan: $3x$

number of marbles in right-side pan: 9

Write an equation to show that the expressions are equivalent: $3x = 9$.



- 1 What operation does the expression $3x$ involve?

- 2 What is the inverse of this operation?

- 3 How do you isolate the variable in $3x = 9$?

- 4 When you isolate the variable, how do you keep the equation balanced?

- 5 Solve the equation $3x = 9$. Show and justify each step you take to solve the equation.

$$3x = 9$$

$$\frac{3x}{\square} = \frac{9}{\square}$$

$$x = \square$$

Write the equation.

Divide each side by 3.



Solve.

- 6 Draw a picture that you could use to help you solve this problem.

$$2x = 8$$

- 7 Solve each problem.

Show your work.

a. $4x = 20$

b. $9x = 72$

- 8 Elena wrote the equation $5x = 25$. She wants to multiply 25 by 5 to solve it. Does this make sense? Explain why or why not, and then give the solution.

- 9 Find the solution for $8x = 48$. Then explain how you could check your solution.

Show your work.

- 10 Write a multiplication equation with one variable and one fraction that has the solution 8.

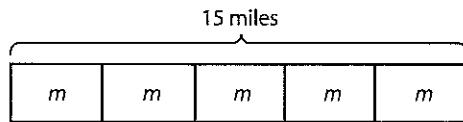
Solve Equations for Real-World Situations

Study the example problem showing how to write and solve an equation based on a real-world situation. Then solve problems 1–7.

Example

In 5 days, Lan jogged a total of 15 miles. She jogged the same number of miles each day. How many miles did Lan jog each day?

Create a bar model to represent the 5 days that Lan jogged and the total number of miles that she jogged. Let m = the number of miles she jogged each day.



- 1 What does each part of the bar model represent?

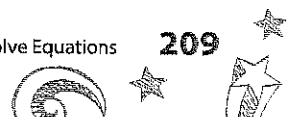
- 2 What expression can you write for the bottom bar?

- 3 Explain how the model shows that $5m = 15$.

- 4 Solve the equation $5m = 15$ to find the number of miles that Lan jogged each day. Justify each step you take to solve the equation.

Show your work.

Solution: _____



Solve.

- 5 It costs Luis \$5 to park his car at a parking meter for 2 hours. What is the price to park for 1 hour? Draw a bar model or write a word sentence to help you solve the problem. Then write and solve a multiplication equation.

Show your work.

Solution: _____

- 6 Juliana buys 7.5 meters of ribbon to make bows. She wants to use the same amount of ribbon for each bow. If she makes 5 bows, how many meters of ribbon should she use for each bow? Write and solve an equation.

Show your work.

Solution: _____

- 7 Henry knows that the area of a rectangle is 30 square inches. The perimeter is 22 inches. If the length is 1 inch longer than the width, what are the length and width of Henry's rectangle? Explain how you know.

Solve Equations

Solve the problems.

1 Which equation has a solution of 4? Select all that apply.

A $12x = 3$

C $10 + x = 14$

B $6x = 24$

D $x - 4 = 8$

How are inverse operations used to solve equations?



2 Elisa is saving an equal amount each week for 8 weeks to buy a video game that costs \$40. How much is she saving each week?

A \$4

C \$32

B \$5

D \$48

Jesse chose **C** as the correct answer. How did he get that answer?

What operation will the equation you use to solve this problem involve?



3 Hector buys a shirt and a tie. The shirt costs \$34, which is \$18 more than the cost of the tie. Olivia and Max each write an equation to find the cost of the tie t . Is one equation, both equations, or neither equation correct? Explain how you know. Solve each correct equation.

Olivia: $t + 18 = 34$ Max: $34 - t = 18$

How do the two equations differ?



Solve.

4 Haley's exercise routine takes 12 minutes. Let r represent the number of times that Haley exercised, and let T represent the total number of minutes she exercised. Tell whether each statement is *True* or *False*.

- a. The equation $r + 12 = T$ can be used to find the total number of minutes that Haley exercised. True False
- b. It takes Haley 36 minutes to do her exercise routine 3 times. True False
- c. If Haley spent a total of 1 hour doing her exercise routine, then she did the routine 6 times. True False
- d. $12r$ represents the total number of minutes that Haley exercised. True False

A model might help you understand this problem.



5 Todd has 17 inches of rope. This is $\frac{1}{3}$ of the length of rope that he needs to tie his boat to a dock. How many inches of rope does he need to tie his boat to the dock.

Show your work.

How can you keep an equation balanced?



Solution: _____

6 Write a scenario that could be represented by this equation. $\frac{3}{4}x = 12$

What real-world scenario might use the operation used in the equation?



Grade 6 Educational Websites and Web Resources

Title of Resource	Web Address	Description	Student Access
Khan Academy	https://www.khanacademy.org	Students will be able to get additional practice with skills in various subjects and test prep.	Students will need to sign up for a free account if they do not already have an account.
Math is Fun	https://www.mathsisfun.com/algebra/index-pre-algebra.html	This website provides content and practices for various math topics.	Students do not need to sign up for an account. They can navigate from the provided web address.
Virtual Nerd	https://www.virtualnerd.com/middle-math/all/	Virtual Nerd is a supplemental learning resource with a focus on middle school and high school math.	Students do not need to sign up for an account. They can navigate from the provided web address.
Math Playground	https://www.mathplayground.com/grade_6_games.html	Math Playground is a site that provides a fun way to practice math facts in a game format.	Students do not need to sign up for an account. Scroll to Ratios and Proportional Reasoning and select a game.