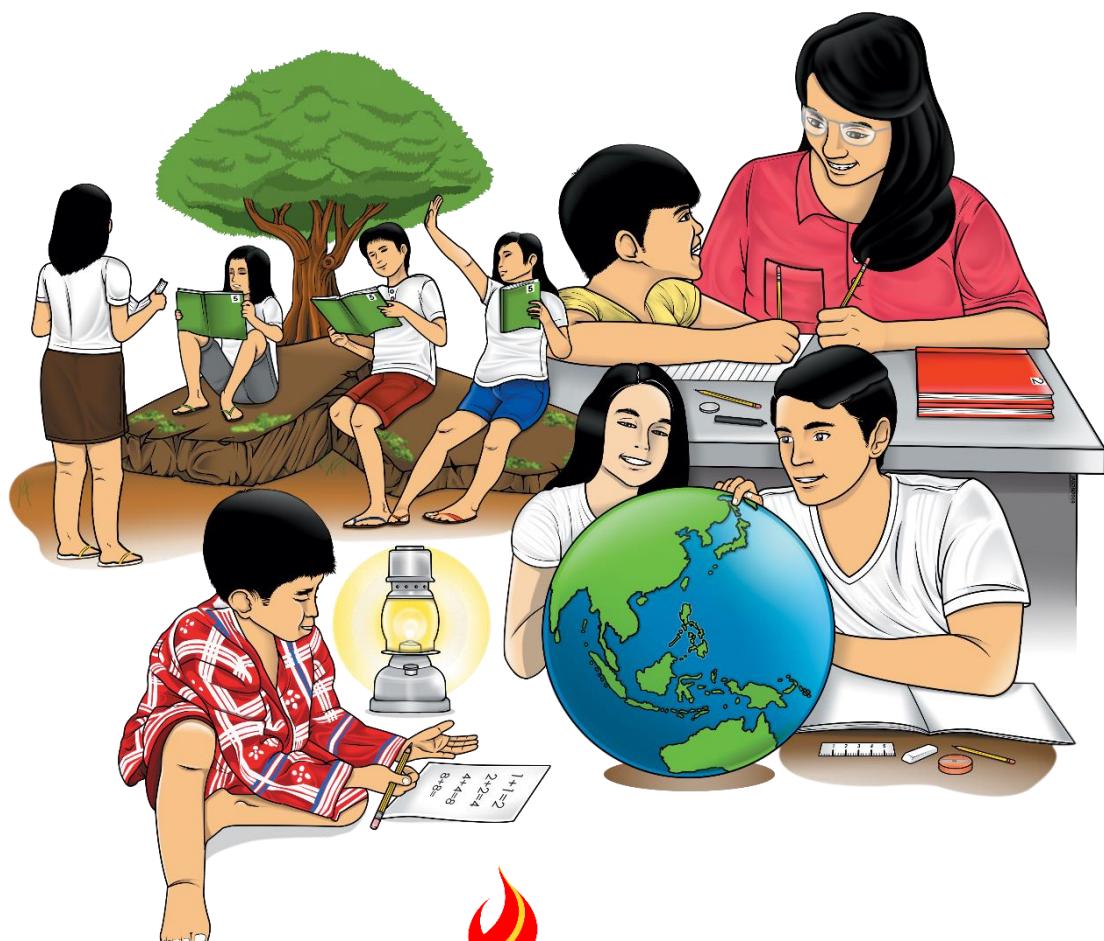


7

Mathematics

Quarter 2 – Module 7: Solving Problems Involving Algebraic Expressions



Mathematics – Grade 7
Alternative Delivery Mode
Quarter 2 – Module 7: Solving Problems Involving Algebraic Expressions
First Edition, 2020

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

**Lesson
1**

Solving Problems Involving Algebraic Expressions

In this lesson, we will use algebraic expression to find the values of the things or unknown in real life situations.



What I Need to Know

This module was designed and written with you in mind. It is here to help you master Solving Problems Involving Algebraic Expressions. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module is comprised of only one lesson:

- Solving Problems Involving Algebraic Expressions

After going through this module, you are expected to:

- solve problems involving algebraic expressions



What I Know

Let us check what you already know about this lesson! Read and understand each item carefully. Write the letter of your answer on a separate sheet of paper.

1. Anthony had forty- four pesos last Friday. He earned some amount of money after washing cars last Sunday. Make an expression that represents his total money.
 - A. $x - 44$
 - B. $x + 44$
 - C. $44 - x$
 - D. $44x$

2. Rose had four rare caladiums (r) in her garden. During weekends she buys additional rare caladiums. Express her total rare caladiums in algebraic expression.

- A. $4+r$
- B. $4-r$
- C. $r-4$
- D. $4r$

For number 3-5, give the algebraic expression that represents the given situations.

3. In Grade 7- Belardo (b), there are g (girls) and 7 boys. Which of the following expression represents the total number of students in the class?

- A. $g - 7$
- B. $7 - g$
- C. $g + 7$
- D. $7g$

4. I already have 10 chocolates, then Jenny give me 2 packs of chocolates. Each pack contains c chocolate. How many chocolates do I have now?

- A. $2c - 10$
- B. $2c + 10$
- C. $10c - 2$
- D. $10c + 2$

5. There are g goat and d duck in the farm. How many legs are there?

- A. $2g - 4d$
- B. $2g + 4d$
- C. $4g - 2d$
- D. $4g + 2d$

6. Two numbers add up to 8. One of the numbers is -3. What is the other number?

- A. -11
- B. -5
- C. 5
- D. 11

7. Each student in Grade 7- Belardo has crayons (c) and pencils (p). If there are 50 students, how many crayons are there?

- A. $50c$
- B. $50p$
- C. $50 + c$
- D. $50 + p$

8. A chicken is g pounds. It needs to be cooked for 15 minutes per pound plus an extra 5 minutes. What is the total cooking time?

- A. 15 minutes
- B. 20 minutes
- C. $5g + 15$ minutes
- D. $15g + 5$ minutes

9. A car travels x miles in 1 hour (h). Express the distance traveled by the car after 2 hours.

- A. x
- B. $2x$
- C. $x + 2$
- D. $x - 2$

10. Mhackie has 6 fewer hats than Kris and Mark has 5 times as many as hats as Mhackie. If Kris has n hats, which of the following represents the number of hats Mark has?

- A. $6 - 5n$ C. $5n - 6$
B. $n - 6$ D. $5(n - 6)$



What's In

Let's review!

Activity 1. Translate Me!

Translate each mathematical expressions into algebraic expressions.

- _____ 1. Thirteen decreased by a number a
_____ 2. Thrice the sum of x , y and z
_____ 3. 50 decreased by the product of c and d
_____ 4. Six times the number x , increased by 10
_____ 5. The product of 8 and n , increased by the product of q and r
_____ 6. A number x decreased by the product of 2 and p
_____ 7. Five less than twice a number y
_____ 8. The product of m and 10 added to one
_____ 9. Twice a number q more than 5
_____ 10. Four multiplied by the difference of x and y

Great! You were able to translate the mathematical expressions into its algebraic expressions. Your knowledge on this will help you understand better how to solve problems involving algebraic expressions. Keep going!



What's New

Previously, you have just learned about translating mathematical statement into algebraic expressions. This time, let us answer the activity below which will help us solve problems involving algebraic expressions.

Activity 2! Find my message.

Direction: Match each equation with the problem it represents. Write the equation and corresponding letter. Then write the letter of the equation in the table that has the problem number. Discover the message form by the letters.

M $\frac{p}{2} = 150$	T $x+8= 21$	S $a-12=25$	D $m-13=41$
H $c+10=35$	P $4t=360$	A $2s=18$	U $\frac{c}{3} = 55$

- _____ 1. Jeny has 8 more pens than Pete does. If Jeny has 21 pens, how many does Pete has?
- _____ 2. Eliza is 12 years younger than Drexia. If Eliza is 25, how old is Drexia?
- _____ 3. Jane has scored twice as many goals as Jacky has. If Jane's goal total is 18, how many goals has Jacky scored?
- _____ 4. Mark delivered 13 fewer plants this week than last week. If he delivered 41 plants this week, how many did he deliver last week?
- _____ 5. Three friends went out for lunch. They shared the cost of the meal equally. If each person paid Php55, what was the total cost of the meal?
- _____ 6. Theresa and her friends share a cake. The cost of the cake is shared equally between them. If each of them pays Php 150, how much does the cake cost?
- _____ 7. Ana sold 10 more flowers than Cristy did. If Ana sold 35 flowers, how many did Cristy sell?
- _____ 8. Racquel paid 4 times as much for a wallet as Alma did. If Racquel paid Php 360, how much did Alma pay?

6	3	1	7	3	4	4	2	5	8

Very good! You were able to represent the word problems. For you to be able to understand better and master the skill of solving, more examples await you. Good luck!



What is It

Word problems are important in learning mathematics. These help develop one's reasoning and thinking power which are very essential in our daily living. In order for us to solve problems involving algebraic expressions, a thorough knowledge of mathematical symbols as well as translating English phrases to mathematical expressions are necessary. These will help us form equations that will help us solve word problems accurately.

Steps in Solving Problems Involving Algebraic Expressions

1. Read and understand the problem carefully.
2. Identify the unknown quantity and assign the variable to represent it.
3. Solve.
4. Interpret your solution to answer the question in the problem.

Here are examples for you on how to solve word problems involving algebraic expressions:

Example 1.

Durian costs Php x per piece. How many will 3 dozens cost?

Solution:

There are 12 pieces of durian in 1 dozen of durian.

This means that there are 36 pieces of durian in 3 dozens. If x is the cost of each durian then, **Php 36x** is the cost of 3 dozens durian.

Example 2.

Mark saves **p** pesos in his weekly allowance.

- a. How much will he saved in 3 weeks?
- b. How much is his savings in 4 months?

Solution:

- a. He will save **3p**. (3 weeks \times p pesos)
- b. He can save **16p**. (4 months \times 4 weeks \times p pesos)

Example 3.

Ana worked m hours finishing her homework in mathematics. She worked p hours less on her homework in science. Write an expression that represents:

- a. the number of hours she spent finishing her homework in science; and,
- b. the total number of hours she worked for her homework in mathematics and science.

Solution:

- a. Because she worked m hours in finishing her homework in mathematics and p hours less in science, she worked $\mathbf{m - p}$ hours finishing her homework in science.
- b. Because she worked m hours in her homework in math and $m - p$ hours in science, the total time she spent on the two subjects was $\mathbf{m + (m - p)}$.

Example 4.

Rey is 5 years younger than his sister Roan. If Roan's age is R , what expression stands for Rey's age?

Solution:

Rey's age is 5 less than Roan's age.
Five less than R is $R - 5$. The answer is $\mathbf{R - 5}$.

Example 5.

There are b people on a bus. At the next stop, 7 people get off and 10 more get on. How many people are on the bus now?

Solution:

$b - 7$ represents the number of people left on the bus when 7 get off.
If 10 people get on the bus, the expression would be $(\mathbf{b - 7}) + 10$.

Example 6.

A rope f feet long is cut into 3 congruent pieces. Find an expression for the length of each piece.

Solution:

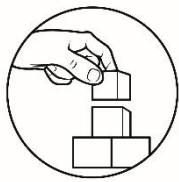
To cut an f feet long rope into 3 congruent pieces means to divide f into 3 equal parts. Thus, it is represented by $\frac{f}{3}$.

Example 7.

A man deposits an amount of Php 5,000 in his savings account. Each week after, he made a deposit of Php 2,000. How much money does he have after t weeks?

Solution:

His deposit every week becomes $2000t$. Since he has already 5000 in his account, so after t weeks, his savings becomes $\mathbf{2000t + 5000}$.



What's More

Activity 3. Determine Me.

Let's apply what you have just learned! Given the situation below, give what is asked in each item.

1. Maria was asked to buy a ribbon in a store. A pack of ribbon consists r pieces. If Maria wishes to buy 3 packs of ribbon, how many ribbons she will have in all?
2. Ana had Php 300 in her wallet. She bought 4 ribbons worth y pesos each. How much money is left in her wallet?
3. Marissa is 3 years younger than her sister Ellice. If Ellice's age is e , what expression stands for Marissa's age?



What I Have Learned

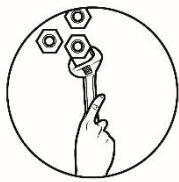
Activity 4. Explain.

Let's recap!

Complete the statement below by expressing your understanding of the process of solving algebraic expression. Write your answer on the space provided for.

Solving an algebraic expression is done by _____

Nice work! Now you're up for the next challenge of this lesson.



What I Can Do

Read and understand each situation below and solve the given problems involving algebraic expressions.

1. Maria had b pesos. She spends 50 pesos for a snack and d pesos for her cellular load. How much money left?

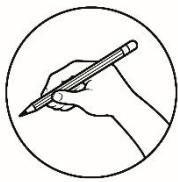
2. Anne purchased a cloth at Php 75 per meter. How much will she pay for x meters?

3. Mang Juan needs to fence a rectangular garden. If the length is 2 meters longer than its width. What is the perimeter of the lot if its width is w meters?

4. A water tank has 155 liters of water. What is the amount of water if c liters have been used?

5. Grade 7 students went to a fieldtrip. What is the number of students in b buses if each buses has 45 students?

Great work! You did a good job in applying what you have learned!



Assessment

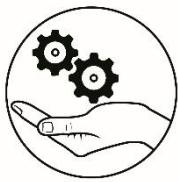
Let us check what you already know about this lesson! Read and understand each item carefully. Write the letter of your answer on a separate sheet of paper.

1. Robert wants to fence his rectangular lot. If the length of the lot is 3 meters longer than its width. What is the perimeter of the rectangular lot if its width is y meters?
 - A. $4y + 6$ meters
 - B. $6y + 4$ meters
 - C. $4y - 6$ meters
 - D. $6y - 4$ meters
2. Rose had ten roses (r) in her garden. During weekends she buys additional roses. Express her total roses in algebraic expression.
 - A. $10r$
 - B. $r - 10$
 - C. $10 - r$
 - D. $10 + r$

For number 3-5, give the algebraic expression that represents the given situations.

3. In Grade 7- Belardo, there are 15 girls and b boys. Which of the following expression represents the total number of students in the class?
 - A. $15 - b$
 - B. $15 + b$
 - C. $b - 15$
 - D. $15b$
4. I already have 5 pens, Mark give me 2 packs of pens. Each pack contains p pens. How many pens do I have now?
 - A. $2p + 5$
 - B. $2p - 5$
 - C. $5p + 2$
 - D. $5p - 2$
5. There are y carabaos and d ducks in the farm. How many legs are there?
 - A. $2y - 4d$
 - B. $2y + 4d$
 - C. $4y - 2d$
 - D. $4y + 2d$
6. Two numbers add up to 10. If one of the numbers is f , what is the other number?
 - A. $10 + f$
 - B. $10 - f$
 - C. $f - 10$
 - D. $10f$

7. Each student has crayons (c) and pencils (p). If there are 26 students, how many crayons are there?
- A. $26c$
 - B. $26p$
 - C. $26 + c$
 - D. $26 + p$
8. Agnes is q years old. How old she will be in 12 years?
- A. $q - 12$
 - B. $12 - q$
 - C. $q + 12$
 - D. $12q$
9. A car travels y kilometers in 1 hour. Express the speed of the car after 4 hours.
- A. y
 - B. $4y$
 - C. $y + 4$
 - D. $y - 2$
10. Mhackie helps his father feed the chickens in their farm. Each day, a chicken z eats 95 grams of growing mash. Mhackie will prepare a food budget for the chicken. Which of the following algebraic expressions represent the daily food budget for the chickens in the farm?
- A. $95z$
 - B. $z + 95$
 - C. $z - 95$
 - D. $95 - z$



Additional Activities

Let us make use of your newly acquired skill!

Solve the following problems involving algebraic expressions.

1. There are 20 red and blue candies in a bag. If there are y red candies, how many are blue candies?

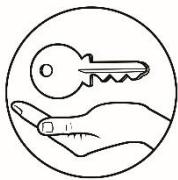
2. Maui is a student assistant at the Mathematics department. Since she is hardworking and very pleasant to all, the department head decides to give her an additional Php 50 every week on top of the x per hour rate.
 - a. If she works for 4 hours a day, how much does she receive in 1 a week with 5 working days?

 - b. Write an expression that gives how much she should receive in two weeks.

3. Printing of greeting cards consists of a fixed charge of Php 150 and a charge of Php 5 for each card printed. What is the cost of printing n cards?

4. Flora bought s shirts for the orphans in the community. How much will she pay if each shirt cost Php 95?

5. Karen plans to fence her rectangular garden. If the length of the garden is 5m longer than its width (a). What is the perimeter of the garden?



Answer Key

Assessment

Activity 2

6	3	1	7	3	4	4	2	5	8
M	A	T	H	A	D	D	S	U	P

Activity 3

Additional Activities

Solving problems on algebraic expression is done by determining the constant and variable. The next step are translating the mathematical expression into algebraic expression and performing the operation needed to find the unknown in the given.

Activity 1
Additional Activities

1. $20-y$ candies
2. a. $\text{Php } 20x+50$
b. $\text{Php } 40x+100$
3. $\text{Php } 150+5n$
4. $\text{Php } 95s$
5. $10 + 4a$ metres

What I Can Do

1. $b - (50 + d)$
2. $75x$
3. $P = 4l + 2w$
4. $155 - c$
5. $45b$

1. $13-a$
2. $3(x+y+z)$
3. $50-cd$
4. $6x+10$
5. $8n+qr$
6. $x-2p$
7. $2y-5$
8. $1+10m$
9. $2q+5$
10. $4(x-y)$

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