

# MATHEMATICS

## Quarter 2 - Module 2: Translating Verbal Phrases into Algebraic Expressions and Vice-versa



**AIRs - LM**

## MATHEMATICS 7

Quarter 2 - Module 2: Translating Verbal Phrases into Algebraic Expressions and Vice-versa  
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Region I

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# MATHEMATICS

## **Quarter 2 - Module 2: Translating Verbal Phrases into Algebraic Expressions and Vice-versa**



## **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.



## ***Target***

You have already known what an algebraic expression is. It can be read or written verbally in different ways. Expressing words into Mathematical symbols is very essential in working a word problem. Thus, you must interpret every word in the statement correctly.

This module will provide you with information and activities that will help you translate a long verbal phrase in symbols or vice versa.

After going through this module, you are expected to:

### **Learning Competency:**

Translate English phrases to mathematical phrases and English sentences to mathematical sentences and vice versa.

### **Learning Objectives:**

1. Illustrate mathematical symbols.
2. Identify mathematical terms.
3. Translate English phrases to mathematical phrases and English sentences to mathematical sentences and vice versa.

Before going on, check how much you know about this topic.

## PRE – ASSESSMENT

**Directions:** Read each statement below carefully. Select the letter of the correct answer. Write your answer on a separate sheet of paper.

1. Which of the following operation symbols translates the phrase *added to*?  
A. +                      B. –                      C.  $\times$                       D.  $\div$
2. What operation symbol is used to indicate *decreased by*?  
A. +                      B. –                      C.  $\times$                       D.  $\div$
3. Which of the following illustrates the phrase *ratio of*?  
A. +                      B. –                      C.  $\times$                       D.  $\div$
4. What operation symbol is used to denote *the product of*?  
A. +                      B. –                      C.  $\times$                       D.  $\div$
5. Which of the following expressions represents *the difference of 8 and m*?  
A.  $m - 8$                       B.  $8 - m$                       C.  $8m$                       D.  $8 \div m$
6. What is the mathematical translation of *sum of 4 and twice the number b*?  
A.  $4 + 2b$                       B.  $4 + bb$                       C.  $2(4 + b)$                       D.  $4b + 2$
7. What is meant by *the square of the difference of x and 5*?  
A.  $(x - 5)^2$                       B.  $x^2 - 5^2$                       C.  $x^2 - 5$                       D.  $5 - x^2$
8. How do you translate *the quotient of 9 and the sum of x and 7*?  
A.  $\frac{9}{x+7}$                       B.  $\frac{9}{x} + 7$                       C.  $\frac{7}{x+9}$                       D.  $\frac{x+7}{9}$
9. What is the mathematical translation of *the sum of two consecutive number, when n is the first number*?  
A.  $n + (n + 1)$                       B.  $n + 2n$                       C.  $n - n + 1$                       D.  $n + n$
10. Which of the following expressions represents *9 more than a number m*?  
A.  $9 + m$                       B.  $m + 9$                       C.  $9m$                       D.  $m9$
11. What is the English translation of  $2b - 7$ ?  
A. 7 minus twice the number b  
B. twice the difference of b and 7  
C. two times the difference of b and 7  
D. 7 subtracted from twice the number b
12. How do you translate  $\frac{x}{8}$ ?  
A. the sum of x and 8                      B. the ratio of x and 8  
C. the product of x and 8                      D. the difference of x and 8
13. Which verbal phrase translates  $y^2 + 6$ ?  
A. twice the number y plus 6  
B. the sum of the square of y and 6  
C. the square of the sum of y and 6  
D. the square of the number y and 6
14. What is the mathematical sentence of “Five times the sum of the number and 2 is greater than 31”?  
A.  $5x + 2 < 31$                       B.  $5(x + 2) < 31$                       C.  $5x + 2 > 31$                       D.  $5(x + 2) > 31$
15. The area (A) of a rectangle is equal to the product of the length (l) and the width (w) of the rectangle. Which equation illustrates the given statement?  
A.  $A = l + w$                       B.  $A = lw$                       C.  $A = l - w$                       D.  $A = \frac{l}{w}$



## Jumpstart

Symbols convey meanings. We can see symbols in the streets, malls, or even in gadgets that direct us where to go and what to do.

### Activity 1

Explore the road signs in Column A that we often see. Match them in its meaning in Column B.

	Column A	Column B
1.		A. Go sign
2.		B. Crossroad sign
3.		C. No parking sign
4.		D. Men at work sign
5.		E. Pedestrian crossing sign
		F. No overtaking

### Process Questions:

1. Do traffic signs give specific meaning?
2. Are the signs useful to shorten the road traffic rules and safety precautions?
3. Are you going to follow the traffic signs if you see them? Why?

If you answered the questions correctly, then it is easier for you to translate mathematical symbols into verbal phrases and vice versa.



## Discover

The knowledge of constant and variable together with operation symbols will facilitate translation of verbal phrase into algebraic expression.

The symbol of operations, symbol name and its meaning are shown in the table that follows.

Operation	Symbol	Symbol Name	Meaning
<b>Addition</b>	+	Plus sign	<ul style="list-style-type: none"> <li>- plus</li> <li>- the sum of</li> <li>- added to</li> <li>- the total of</li> <li>- increased by</li> <li>- more than</li> </ul>
<b>Subtraction</b>	-	Minus sign	<ul style="list-style-type: none"> <li>- minus</li> <li>- the difference of</li> <li>- subtracted from</li> <li>- decreased by</li> <li>- less than</li> <li>- diminished by</li> </ul>
<b>Multiplication</b>	X	Times sign	<ul style="list-style-type: none"> <li>- times</li> <li>- multiplied by</li> <li>- the product of</li> </ul>
	•	Multiplication dot	
	()	Parenthesis	
<b>Division</b>	÷	Division sign or Obelus	<ul style="list-style-type: none"> <li>- divided by</li> <li>- the quotient of</li> <li>- the ratio of</li> </ul>
	/	Division slash	
	=	Equal sign	<ul style="list-style-type: none"> <li>- is</li> <li>- is equal to</li> <li>- equals</li> </ul>
	<	Strict inequality	<ul style="list-style-type: none"> <li>- is less than</li> </ul>
	>	Strict inequality	<ul style="list-style-type: none"> <li>- is greater than</li> </ul>
	≤	Inequality	<ul style="list-style-type: none"> <li>- is less than or equal to</li> <li>- is not more than</li> <li>- is at most</li> <li>- maximum</li> </ul>
	≥	Inequality	<ul style="list-style-type: none"> <li>- is greater than or equal to</li> <li>- is not less than</li> <li>- is at least</li> <li>- minimum</li> </ul>
	≠	Not equal sign	<ul style="list-style-type: none"> <li>- is not equal to</li> </ul>



Now, let us translate verbal phrase into mathematical phrase.

**Illustrative Example 1:**

Translate the verbal phrases into algebraic expressions.

- |                                |            |
|--------------------------------|------------|
| 1. the sum of $x$ and $y$      | $x + y$    |
| 2. 7 more than $b$             | $b + 7$    |
| 3. twice $m$                   | $2m$       |
| 4. the difference of $f$ and 4 | $f - 4$    |
| 5. a number $n$ divided by 9   | $n \div 9$ |

**Illustrative Example 2:**

Translate the verbal phrases into algebraic expressions.

1. five subtracted from twice a number  $x$

**Solution:**

For “twice a number  $x$ ”, it is  $2x$

“five subtracted from twice a number  $x$ ” is  $2x - 5$

2. the product of three consecutive numbers

**Solution:**

If  $x$  represents the first number, then

$x + 1$  is the second number;

$x + 2$  is the third number;

since the variable is  $x$ , use parenthesis to signify multiplication  
then “ the product of three consecutive numbers” is  $x(x + 1)(x + 2)$

3. 5 less than 8 times a number

**Solution:**

If  $x$  represents a number, then “8 times a number” is  $8x$

5 is the subtrahend, so “5 less than 8 times a number” is  $8x - 5$

**Illustrative Example 3:**

Write the following algebraic expressions into verbal phrase.

- |                   |                                                                                                                                                                                                        |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. $y + 2$        | ..... $y$ plus two<br>..... the sum of $y$ and two<br>..... $y$ increased by 2<br>..... 2 more than the number $y$<br>..... 2 added to the number $y$                                                  |
| 2. $\frac{5n}{4}$ | ..... 5 times the number $n$ divided by four<br>..... the product of 5 and $n$ divided by four<br>..... the quotient of 5 times $n$ and four<br>..... the quotient of the product of 5 and $n$ , and 4 |

3.  $\frac{y}{3} - x$  ..... y divided by three minus x  
 ..... the quotient of the number y and 3 diminished by x  
 ..... the number x subtracted from the number y divided by 3  
 ..... x less than the quotient of y and 3
4.  $3(x - 5)$  ..... 3 times the difference of the number x and 5  
 ..... the product of 3 and 5 less than x  
 ..... 3 multiplied by the difference of a number x and 5  
 ..... thrice the difference of x and 5
5.  $x^2 + 4$  ..... the square of number x plus four  
 ..... the sum of the square of x and 4  
 ..... 4 added to x squared  
 ..... x squared increased by four
6.  $(x + 2)^2$  ..... the square of the sum of x and 2  
 ..... the square of 2 more than x

In writing mathematical expressions, there are conventions to follow. The table below shows the proper writing and the common errors.

Expression	Proper Writing	Improper Writing
twice y	$2y$  The constant is written before the variable	$y^2$  it is not correct to write the variable before the number
m more than n	$n + m$  “more” in this phrase refers to addition	$m > n$  This is not an expression. It is a mathematical sentence which read as “m is greater than n”  It is also not correct to write it as “m + n”
x less than 7	$7 - x$  The phrase refers to a quantity that is x units smaller than 7. Example, 2 less than 5 is 3, since $5 - 2 = 3$	$x < 7$  This is also a mathematical sentence and read as “x is less than 7”  $x - 7$ is also a wrong translation

4 times the difference of x and 3	$4(x - 3)$  4 is a multiplier of $x - 3$	$4x - 3$  This is read as “the difference of 4 times the number x and 3”
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Verbal sentence can also be written as a mathematical sentence. Observe how the following sentences are written.

**Illustrative example 4:**

Translate the following verbal sentences into mathematical sentences.

1. The sum of two consecutive numbers is 15.

**Solution:**

Let the variable  $x$  be the first number.

The difference of the two consecutive numbers is 1, so,  $x + 1$  is the second number; therefore, the translation of the verbal sentence into mathematical sentence is  $x + (x + 1) = 15$ .

2. Three times the sum of a number and 5 is greater than 33.

**Solution:**

Let the variable  $x$  represents the number.

The phrase “three times the sum of a number and 5” is written as  $3(x + 5)$ . Therefore, this sentence is translated as  $3(x + 5) > 33$ .

3. Four times a number diminished by 3 is not more than three times the number added to 5.

**Solution:**

Let the variable  $x$  represents the number.

The phrase “four times a number diminished by 3” is written as  $4x - 3$ .

The phrase “three times the number added to 5” is written as  $3(5 + x)$ .

The phrase “is more than” is represented by  $\leq$ .

Therefore, this sentence is translated as  $4x - 3 \leq 3(5 + x)$ .

**Illustrative Example 5:**

Translate the following formulas into mathematical sentences.

$A = lw$       The area (A) of a rectangle is equal to product of the length (l) and the width (w) of the rectangle.

$P = 4s$       The perimeter (P) of a square is 4 times the length of its side.

$V = lwh$       The volume (V) of a rectangular prism is equal to the product its length (l), width (w), and height (h).

Formulas are examples of mathematical sentences that state relationships between quantities. These are equations that can be translated into verbal sentences.



## Explore

### Activity 2:

Translate the verbal phrases into algebraic expressions.

1. 5 times  $y$
2. thrice the number  $b$
3. the sum of twice a number and 17
4. the product of  $x$  and seven less than nine
5. 8 more than the quotient of  $m$  and 10

### Activity 3:

Write the following algebraic expressions into verbal phrase.

1.  $a + 3$
2.  $m - 12$
3.  $4x + 5y$
4.  $x + \frac{b}{2}$
5.  $5x^2 - 7$

### Activity 4:

Translate the following verbal sentences into algebraic sentences.

1. The difference of 240 and a smaller number is less than 86.
2. Three times the sum of a number and 5 is 54.
3. A number divided by 2 and added to 5 is greater than or equal to the same number divided by 3 and added to 8.

### Activity 5:

Translate the following formula into verbal sentences.

1.  $C = 2\pi r$  where  $C$  is the circumference of a circle, and  $r$  is the radius of the circle
2.  $A = \frac{1}{2}bh$  where  $A$  is the area of a triangle,  $b$  is the length of the base, and  $h$  is the height
3.  $A = \left(\frac{b_1 + b_2}{2}\right)h$  where  $A$  is the area of a trapezoid,  $b_1$  and  $b_2$  are the bases, and  $h$  is its base length



**Deepen**

**Direction:** Read the selections and answer the questions that follow.

**Selection A:**

**“Open Your Book on Page...”**

by Ar Dizo

In an English class of Mrs. Cruz was a reading session. Mrs. Cruz told her learners to read the short story in the learning module entitled “The Happiest Boy in the World,” written by N. V. M. Gonzales. The class asked what page except for Angel who is very good at Mathematics. Angel raised her hand to catch the attention of her teacher. Her teacher asked her, “Is there any problem, Angel?”. She stood up and replied, “Nothing, ma’am, I just want to say the story is found in the right face when the module was opened and the sum of the pages of the book was 677. Mrs. Cruz amusedly looked at her and let her explained it further. Angel explained that if the page on the left is represented as  $x$ , and the page on the right is one greater than that on the left, the sum is 677. Immediately, Mrs. Cruz wrote the sentence on the board and integrated Mathematics into her subject. Will the class, together with Mrs. Cruz, find the pages of the short story?

**Questions:**

1. When the book is opened to where you can read the short story entitled “The Happiest Boy in the World,” what was the sum of the pages?
2. How will you represent “one greater than the page on the left” if the left page is represented by  $x$ ?
3. Represent “the sum of the page on the left and the page on the right”.
4. What equation is needed to find the pages to open?

**Selection B:****The Problem in Our Birthday**

By Ar Dizo

John and Janry are twin brothers in Grade 7. They are celebrating their 12th birthday and invited their friends and teachers to celebrate with them in their house. Suddenly, they found themselves having fun asking the ages of their teachers. They had known that their English teacher is 34 years old. The TLE and Science teachers are both 29. The MAPEH teacher is 45 while the Filipino teacher is 42. The Araling Panlipunan, who happens to be their EsP teacher as well, is 34 years old. When they asked their Mathematics teacher, he replied, “when you subtract the sum of your ages to my age, the difference is 20”. How old is their Mathematics teacher?

**Questions:**

1. How will the twins represent the age of their Mathematics teacher?  
A. using a variable                      B. using the sum of their ages  
C. using any number                    D. using the ages of any of their teachers
2. What operation does the word “difference” suggest?
3. What must be subtracted from the age of their Mathematics teacher? Why?
4. What is the equation needed to know the age of their Mathematics teacher?



## Gauge

### Assessment

**Directions:** Read each statement below carefully. Select the letter of the correct answer. Write your answer on a separate sheet of paper.

1. What is meant by the expression “a number  $x$  plus 7”?  
A.  $x + 7$                       B.  $7 + x$                       C.  $x > 7$                       D.  $7 > m$
2. How do you express “five less than  $m$ ” in symbols?  
A.  $5 - m$                       B.  $m - 5$                       C.  $5 < m$                       D.  $5 < m$
3. Which of the following represents “thrice  $x$  less than 12”?  
A.  $3x < 12$                       B.  $12 < 3x$                       C.  $3x - 12$                       D.  $12 - 3x$
4. What is “twice the sum of 5 and  $m$ ” in algebraic expression?  
A.  $2m + 5$                       B.  $2(5) + m$                       C.  $2(5 + m)$                       D.  $m(2 + 5)$
5. How do you translate “the sum of three consecutive even number, when  $x$  is the second number” in mathematical expression.  
A.  $x + (x + 1) + (x + 2)$                       B.  $x + (x + 2) + (x + 4)$   
C.  $(x - 1) + x + (x + 1)$                       D.  $(x - 2) + x + (x + 2)$
6. What is meant by the expression “the square of 5 more than  $m$ ”?  
A.  $5^2 + m$                       B.  $5^2 > m$                       C.  $(m + 5)^2$                       D.  $(m > 5)^2$
7. Which expression means “the sum of a number  $y$  and the square of  $m$ ”?  
A.  $y + m^2$                       B.  $y^2 + m$                       C.  $(y + m)^2$                       D.  $2(y + m)$
8. How do you translate “ $\frac{15}{y+4}$ ” in mathematical phrase?  
A. 15 is divided by a number  $y$  and 4  
B. the sum of a number  $y$  and 4 divided by 15  
C. 15 is divided by the sum of a number  $y$  and 4  
D. 15 is divided by the product of a number  $y$  and 4
9. How do you express “ $15 - \frac{5}{m}$ ” in word phrase?  
A. the quotient of 5 and  $m$  minus 15  
B. 15 less than the quotient of 5 and  $m$   
C. the quotient of 5 and  $m$  diminished by 15  
D. the quotient of 5 and  $m$  subtracted from 15



10. Which is **NOT** a correct translation of “9y”?
- A. the number 9 and y
  - B. nine times the number y
  - C. nine multiplied by the number y
  - D. the product of the number y and 9
11. What is the mathematical sentence of “Cora is 4 years older than Rose and the sum of their ages is equal to 40”?
- A.  $x + (x + 4) = 40$
  - B.  $x(x + 4) = 40$
  - C.  $x - (x + 4) = 40$
  - D.  $x(x - 4) = 40$
12. Which of the following is the translation of “The minimum car speed (x) in the expressways is 60 kph”?
- A.  $x - 60$
  - B.  $x \leq 60$
  - C.  $x + 60$
  - D.  $x \geq 60$
13. How do you translate “A 120-m is to cut in two pieces so that one piece is thrice as long as the other.” into mathematical sentence?
- A.  $3x - x = 120$
  - B.  $3x + x = 120$
  - C.  $3x - x > 120$
  - D.  $3x + x > 120$
14. What is the mathematical translation of “If the measure of the side of a square is increased by 2, its perimeter is 84.”?
- A.  $84 = 4(x - 2)$
  - B.  $84 = 4(x + 2)$
  - C.  $84 = (x + 2)^2$
  - D.  $84 = (x - 2)^2$
15. How do you translate “There are 6 more boys than girls in the class of less than 48 students.” into mathematical sentence?
- A.  $x + (x + 6) < 48$
  - B.  $x + (x + 6) \leq 48$
  - C.  $x + (x + 6) > 48$
  - D.  $x + (x + 6) \geq 48$

# ***References***

## **A. Books**

- Nivera, Gladys C.(2013), Grade 7 Mathematics Patterns and Practicalities, Makati City, Don Bosco Press
- Bernabe, Julieta G. (2009), Elementary Algebra Textbook for First Year, Quezon City, SD Publications, Inc.

## **B. Online Resources**

- <https://www.prodigygame.com/main-en/blog/exhaustive-list-of-math-symbols-their-meaning-downloadable-chart-for-classroom>
- [https://www.affordablecebu.com/load/philippine\\_government/list\\_of\\_traffic\\_signs\\_in\\_the\\_philippines/5-1-0-30228](https://www.affordablecebu.com/load/philippine_government/list_of_traffic_signs_in_the_philippines/5-1-0-30228)

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