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DepED
DEPARTMENT OF EDUCATION

Mathematics

Quarter 2 – Module 3:

Translating English Phrases and Sentences to Mathematical Phrases and Sentences

ALTERNATIVE DELIVERY MODE
ADM

Mathematics – Grade 7
Alternative Delivery Mode
Quarter 2 – Module 3: Translating English Phrases and Sentences to Mathematical Phrases and Sentences
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Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

Development Team of the Module

Writers: Hyacinth M. Endab, Gelyn L.Rivera

Editors: Venus Jane E. Rosete, Jacqueline C. Marcos, Ana Cristy P. Mercado,

Reviewer: Reynaldo C. Tagala

Illustrator:

Layout Artist: Maylene F. Grigana, Alfaith G. Poblete

Management Team: Allan G. Farnazo, CESO IV, Regional Director
Gilbert B. Barrera, Chief, CLMD
Arturo D. Tingson Jr., REPS, LRMS
Peter Van C. Ang-ug, REPS, ADM
Donna S. Panes, CID Chief
Elizabeth G. Torres, EPS - LRMS
Judith B. Alba, Division ADM Coordinator

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Office Address: Regional Center, Brgy. Carpenter Hill, City of Koronadal
Telefax: (083) 2288825/ (083)2281893
E-mail Address: region12@deped.gov.ph

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.

What I Need to Know

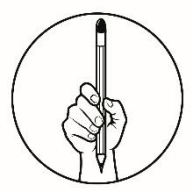
This module was designed and written with you in mind. It is here to help you master Translating English Phrases and Sentences to Mathematical Phrases and Sentences. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary 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 only of one lesson:

- Translating English phrases and sentences to Mathematical phrases and sentences.

After going through this module, you are expected to:

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



What I Know

Let us check your prior knowledge about translating English phrases and sentences to mathematical phrases and sentences. Choose the letter of the correct answer.

1. What is the translation of "a number greater than 12" into an algebraic expression?
   A. n + 12
   B. 12 + n
   C. 12 -n
   D. n – 12

2. Which of the following could be the English translation of x + 3y?
   A. the sum of x and thrice of y
   B. the sum of y and thrice of x
   C. x more than 3y
   D. y more than 3x

3. Which of the following refers to "the area (A) of a rectangle is the product of length (l) and width (w)?"
   A. A = l + w
   B. A = l - w
   C. A = lw
   D. A = $\frac{l}{w}$

4. What is the algebraic expression of " a number less than 23"?
   A. n - 23
   B. 23 - n
   C. n + 23
   D. 23 + n

5. What is the English translation of $\frac{5}{x}$?
   A. the product of 5 and x
   B. the sum of 5 and x
   C. the difference of 5 and x
   D. the quotient of 5 and x

6. Which of the following is the English phrase of x + 4?
   A. x more than 4
   B. 4 more than x
   C. x less than 4
   D. 4 less than x

7. Which of the following represents “10 years ago”?
   A. x - 10
   B. 10 - x
   C. x + 10
   D. 10 + x

8. Which of the following represents “5 years from now”?
   A. n + 5
   B. 5 + n
   C. n - 5
   D. 5 – n

9. In the phrase “the number is increased by nine”, what operation is implied?
   A. Addition
   B. Division
   C. Multiplication
   D. Subtraction

10. In the phrase “thirteen less a certain number g”, what operation is suggested?
   A. Addition
   B. Division
   C. Multiplication
   D. Subtraction

11. What is the mathematical translation of “five multiplied by a number x”?
   A. $5 + x$
   B. $5 - x$
   C. $5x$
   D. $5/x$

12. Which of the following expressions is the correct translation of the verbal phrase "the total of a number y and negative four?"
    A. $y - 4$
    B. $y - (-4)$
    C. $y + 4$
    D. $y + (-4)$

13. What is the mathematical phrase of "the ratio of v to eight"?
    A. $v + 8$
    B. $v - 8$
    C. $8v$
    D. $\frac{v}{8}$

14. The verbal phrase that can be translated as $4 + c$ is _____.
    A. "A number c added to four"
    B. "A number c divided by four"
    C. "A number c multiplied by four"
    D. "A number c subtracted from four"

15. The verbal phrase that can be translated as $4c$ is _____.
    A. "A number c added to four"
    B. "A number c divided by four"
    C. "A number c multiplied by four"
    D. "A number c subtracted from four"

Lesson 1	Translating English Phrases and Sentences into Mathematical Phrases and Sentences

We commonly solve mathematical problems with given numbers by performing various operations. This belongs to the branch of Mathematics that consists of the study of numbers and their properties and the various operations known as Arithmetic. But what if we will go further into studying Math where we will generalize facts in arithmetic? We may use various symbols such as letters, punctuations and operations to find relationships and to represent unknown quantities without fixed values. This branch of Mathematics is known as Algebra.

The knowledge of Algebra will help us apply mathematical concepts to solving a wide variety of problems in real life. To start with this, it is important to be equipped in translating simple English/verbal phrases and sentences into mathematical phrases and sentences, and vice versa. With this, to interpret mathematically the situation and thereby solve the problem will be easy.

Let's begin!

What's In

One of the important aspects in solving problems in algebra is a working knowledge of the ability to translate the statement in algebraic symbols. Thus, one has to develop this ability in order to represent word problems into mathematical statement using algebraic symbols.

Activity 1. *Represent Me!*

Let us check your prior knowledge on number sense by giving the number sentence or phrase in order to represent the following word problems. Write your answer on your answer sheet.

1. Alfred carries a load of 12 kilograms. He finds it heavy, so he removes a weight of 4 kilograms. What is the weight of the remaining load?

   Number Sentence/Phrase:

   _____

2. Ana deposits Php 1,500.00 in her savings account. A week after, she decided to add her extra money amounting to Php 800.00. How much money did she save?

   Number Sentence/Phrase:

   _____

3. A daily newspaper costs Php 15.00 per issue. How much will Mr. Dela Cruz pay for a week's supply?

   Number Sentence/Phrase:

   _____

4. A mother has to divide equally the 16 oranges among her 4 children. How many oranges can each child have?

   Number Sentence/Phrase:

   _____

5. Seven hens lay nine eggs. How many eggs did they lay altogether

   Number Sentence/Phrase:

   _____

What's New

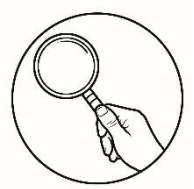
Activity 2. *Classify Me!*

How good is your vocabulary in the language of algebra? Try this!

Classify the following terms according to its corresponding mathematical symbol. List them down under the symbol of your selection on your answer sheet.

plus	more than	times	ratio of
increased by	subtracted by	multiplied by	less
the quotient of	equal to	minus	the product of
not equal to	greater than	diminished by	equivalent
the sum of	the difference of	less than	decreased by
the same as	not the same as	is	

+	−	×	÷
plus			
	subtracted from		
		the product of	
more than			
=	≠	>	<
	Is not equal to		



What is It

A knowledge of symbols representing known and unknown quantities alongside with the symbols of operations and relations will facilitate translation of verbal phrases into mathematical phrases.

Verbal or English phrases refers to mathematical statement that is expressed in words. Once you know what those words mean, you will be able to write different mathematical expressions. Meanwhile, mathematical phrases refer to statements expressed in symbols such as letters, numbers and operations.

The symbol of operations and relations with their corresponding meanings are as follows:

Symbol	***Meaning***
+	Addition, plus, increased by, added to, the sum of, more than
-	Subtraction, minus, decreased by, subtracted from, less than, diminished by
x, ● , ( )	multiplication, times, multiplied by, product of
/, ÷	division, divided by, ratio of, quotient of
=	equals, is equal to
<	is less than
>	is greater than
≤	is less than or equal to, is at most
≥	is greater than or equal to, is at least
≠	is not equal to

The use of the symbols of operation together with symbols such as letters and numbers will enable us to translate verbal phrases into mathematical phrases. It is important for us to be able to associate various key words with their related arithmetic operations. Let us study the following examples below.

Verbal Phrases		**Mathematical Phrases**
1. The sum of a and 3	is written as	a + 3
2. 8 more than p	is written as	p + 8
3. The square of r	is written as	r^2
4. 6 subtracted from b	is written as	b – 6
5. 4 less than y	is written as	y – 4
6. 4 less y	is written as	4 – y
7. The product of 5 and c	is written as	5c
8. The quotient of m and 8	is written as	$\frac{m}{8}$

Study how the following English/verbal phrases are translated into mathematical phrases.

1. thrice x decreased by two

   Thrice means 3 times or simply 3x. Then the word "decreased" suggests subtraction operation, thus we subtract 2 from 3x. Therefore, the translated mathematical phrase is 3x – 2.

2. one-half of the sum of 5 and t

   This means that 5 and t are added first, and their sum is multiplied by $\frac{1}{2}$. Hence, the mathematical phrase is $\frac{1}{2}(5 + t)$.

3. the sum of the squares of a and b

   The squares of a and b are a^2 and b^2, respectively. The word sum indicates addition. Thus, the translated mathematical phrase is $a^2 + b^2$.

4. the square of the sum of a and b

The sum of a and b is written as a + b. The required mathematical phrase, which is the square of a + b, is written as $(a + b)^2$.

Let us study the following verbal phrases and how to translate them into mathematical phrases.

Verbal Phrases	***Mathematical Phrases***	***Verbal Phrases***	***Mathematical Phrases***
the sum of m and 8	m + 8	the difference of m and 8	m - 8
10 added to c	c + 10	10 subtracted from c	c - 10
7 plus a	7 + a	7 minus a	7 - a
5 more than t	t + 5	5 less than t	t - 5
q increased by p	q + p	q decreased by p	q - p
11 greater than n	n + 11	9 take away d	9 - d
exceeds r by twenty	r + 20	18 reduced by n	18 - n
the product of 8 and m	8m	The quotient of 8 and m	$\frac{8}{m}$
10 times c	10c	10 divided by c	$\frac{10}{c}$
twice x	2x	The ratio of 7 to a	$\frac{7}{a}$
$\frac{1}{2}$ of p	$\frac{1}{2}$ p	p split into 4 equal parts	$\frac{p}{4}$
7 multiplied by b	7b	x divided into 10	$\frac{x}{10}$

Now, let us consider that x is a certain number used in the following verbal phrases. Study the following examples of translating into mathematical phrases.

Verbal Phrases	***Mathematical Phrases***
1. three more than the number	x + 3
2. twice the number less two	2x – 2
3. square of thrice the number	$(3x)^2$
4. 15 decreased by a number	15 – x
5. a number less than 23	23 – x
6. a number greater than 12	12 + x
7. five years ago	x – 5
8. ten years from now	n + 10
9. seven more than five times a number or five times a number increased by seven	5x + 7
10. the product of two consecutive number or seven more than five times a number	x(x+1)
11. 10 added to twice a number	2x + 10
12. a number decreased by five	x-5
13. a number multiplied by 7	7x
14. twice a number divided by 3	2a ÷ 3 0r $\frac{2a}{3}$
15. the product of x and the square of y	xy^2

We can translate some verbal phrases by using mathematical symbols and some basically known equivalent relationships like formulas. Formulas are equations that state relationships between two quantities. These formulas can be translated into verbal sentences.

Verbal sentence refers to the mathematical expression which is expressed in words and uses the word equals, greater than, or less than. Meanwhile, mathematical sentence is a mathematical expression which is expressed in numbers, letters and symbols such as =, >, or <.

Study how to translate the following formula into verbal sentence.

A = lw	The area A of a rectangle is the product of the length l and the width w of the rectangle
P = 2l + 2 w	The perimeter P of a rectangle is the sum of twice its length l and twice its width w
d = rt	The distance d traveled by a moving body is the product of its rate r and the time t elapsed.

Here are other examples of translating mathematical sentences into verbal sentences.

Mathematical Sentences	**Verbal Sentences**
x + 5 = 4	The sum of a number and 5 is 4.
2x – 1 = 1	Twice a number decreased by 1 is equal to 1
7 + x = 2x + 3	Seven added by a number x is equal to twice the number increased by 3.
3x >15	Thrice a number x is greater than 15.
x – 2 < 3	Two less than a number is less than 3.

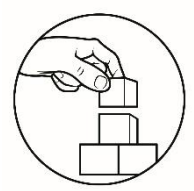
Now, let us consider translating mathematical phrases into verbal phrases. Recall that the various key words are associated with the same arithmetic operation. Thus, a mathematical phrase can be a translation of different verbal phrases. For example, we may write the mathematical phrase x – 1 in several ways, namely:

a. the difference of x and 1
b. 1 subtracted from x
c. x less 1
d. x decreased by 1
e. x minus 1
f. 1 less than x
g. x diminished by 1

Illustrative examples

Translate each mathematical phrase into a verbal phrase.

a. $\frac{1}{2}x + 1$	1 added to $\frac{1}{2}$ of a number x
b. $5x - 4$	4 subtracted from a product of 5 and a number x
c. $3(x + 6)$	Thrice the sum of a number x and 6
d. $x^2 - 1$	1 subtracted from the square of a number x
e. $7 + \frac{x}{2}$	The sum of 7 and the quotient when a number is divided by 2



What's More

Activity 3. ***Match Me!***

Match each verbal phrase under Column A to its mathematical phrase under Column B. Each number corresponds to a letter which will reveal a quotation if answered correctly. A letter may be used more than once.

Column A	Column B
____ 1. The sum of a number and three	A. x + 3
____ 2. Four times a certain number decreased by one	B. 3 + 4x
____ 3. One subtracted from four times a number	E. 4 + x
____ 4. A certain number decreased by two	I. x + 4
____ 5. Four increased by a certain number	L. 4x – 1
____ 6. A certain number decreased by three	M. x – 2
____ 7. Three more than a number	N. x – 3
____ 8. Twice a number decreased by three	P. 3 – x
____ 9. A number added to four	Q. 2 – x
____ 10. The sum of four and a number	R. 2x – 3
____ 11. The difference of two and a number	U. 4x + 3
____ 12. The sum of four times a number and three	
____ 13. A number increased by three	
____ 14. A difference of four times a number and one	

Activity 4: *Find me!*

Match each English/verbal sentence under Column A to its mathematical sentence under Column B. Write your answer on your answer sheet.

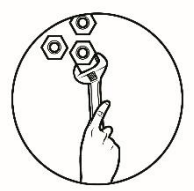
Column A	Column B
_____ 1. d minus six equals four.	a. $ef = 10$
_____ 2. The quotient of d and two is six.	b. $3f > 1$
_____ 3. Seven more than two times h is one.	c. $\frac{x}{y} = 1$
_____ 4. Twice k plus the number g is equal to three.	d. $4 + p < 2$
_____ 5. k diminished by 20 plus 5yields two.	e. $(k - 20) + 5=2$
_____ 6. The ratio of the numbers x and y is equal to one.	f. $2s + 3 = 5$
_____ 7. The product of e and f is equal to ten.	g. $\frac{d}{2} = 6$
_____ 8. The total of four and p is less than two.	h. $d - 6 = 4$
_____ 9. Three times the number f is greater than one.	i. $2k + g = 3$
_____ 10. Two times the number s plus three is five.	j. $3 + f$
	k. $2h + 7 = 1$

What I Have Learned

Activity 5. *Complete Me!*

Let us see how far you have learned! Complete the table below by translating English/verbal phrases and sentences into mathematical phrase and sentences or vice versa.

	Verbal Phrase/Sentence	**Mathematical Phrase/Sentence**
1	the ratio of w to six	
2	four multiplied by a number x	
3	the total of a number z and negative four	
4		$\frac{17}{r}$
5	One-fourth of m plus seven	
6	m diminished by six	
7		$x + y$
8	Five less the number d is equal to nine.	
9	thirteen diminished by eleven times s	
10		$b - 5$
11	the product of the numbers c and d plus one	
12	the quotient of x and five	
13	Thrice the number b is thirteen	
14		abc
15	twice the sum of x and y	



What I Can Do

Activity 6. *Translate Me.*

A. Translate the following English/verbal phrases into Mathematical phrases:

English/verbal Phrase	**Mathematical Phrase**
1. a certain number *j* added with four	_____
2. the product of a number *c* and sixteen	_____
3. the product of three and *z* more than one	_____
4. eight is increased by the product of *e* and *f*	_____
5. a certain number *v* is divided by seventeen	_____

B. Translate the following mathematical expression in at least two ways.

1. 2(x-3)

   a. _____

   b. _____

2. 3x + 2 = 5

   a. _____

   b. _____

Good job! You did well on this module! Keep going!

Assessment

Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper.

1. What is the algebraic translation of “twice as large as r”?
   A. r + 2
   B. 2 + r
   C. 2r
   D. $\frac{2}{r}$

2. Which of the following can be an English translation of x - 5y?
   A. the sum of x and 5 y
   B. the sum of y and 5x
   C. the difference of x and 5 y
   D. the difference of y and 5x

3. Which of the following refers to “the circumference (C) of a circle is twice the product of π and radius (r)?”
   A. C = 2π + r
   B. C = 2r + π
   C. C = 2πr
   D. C = $\frac{2\pi}{r}$

4. What is the algebraic expression of “a number more than 23”?
   A. n - 23
   B. 23 - n
   C. n + 23
   D. 23 + n

5. Which of the following can be an English translation of 5x?
   A. the product of 5 and x
   B. the sum of 5 and x
   C. the difference of 5 and x
   D. the quotient of 5 and x

6. What is x - 4 in English phrase?
   A. x more than 4
   B. 4 more than x
   C. x less than 4
   D. 4 less than x

7. Which of the following mathematical expression represents “5 years ago”?
   A. x - 5
   B. 5 - x
   C. x + 5
   D. 5 + x

8. Which of the following mathematical expression represents “10 years from now”?
   A. n + 10
   B. 10 + n
   C. n - 10
   D. 10 – n

9. In the phrase “the number is decreased by nine”, what operation is implied?
   A. Addition
   B. Division
   C. Multiplication
   D. Subtraction

10. In the phrase “thirteen plus a certain number g”, what operation is suggested?
   A. Addition
   B. Division
   C. Multiplication
   D. Subtraction

11. What is the mathematical translation of “five divided by a number x”?
   A. 5 + x
   B. 5 - x
   C. 5x
   D. $\frac{5}{x}$

12. Which of the following expressions is the correct translation of the verbal phrase "the total of a number y and negative four"?

A. y - 4
B. y – (-4)
C. y + 4
D. y + (-4)

13. What is the mathematical phrase that is the same as "the product of v and eight?"

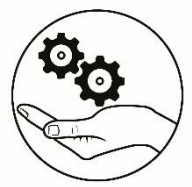
A. v + 8
B. v - 8
C. 8v
D. $\frac{v}{8}$

14. The verbal phrase that can be translated as $c - 4$ is _____.

A. "A number c added to four"
B. "A number c divided by four"
C. "A number c multiplied by four"
D. "A number c subtracted from four"

15. The verbal phrase that can be translated as 8a is _____.

A. "The sum of 8 and a number a"
B. "The difference of 8 and a number a"
C. "The product of 8 and a number a."
D. "The quotient of 8 and a number a"



Additional Activities

Express the following Mathematical phrases and sentence into at least two English phrases/sentences.

1. $2 - x$ _____
_____

2. $3x = 1$ _____
_____

3. $\frac{x}{2}$ _____
_____

Answer Key

What's In

Possible Answers:

1. $12 - 4 = n$
2. $1{,}500 + 800 = n$
3. $15 \times 7 = n$
4. $16 \div 4 = n$
5. $7 \times 9 = n$

What I Can Do

A.

1. $j + 4$
2. $16c$
3. $1 + 3z$
4. $8 + ef$
5. $\frac{v}{17}$

B. Some possible answers:

1. $2(x-3)$
   a. The difference of a number x and three is multiplied by two
   b. Twice the difference of a number x and three
2. $3x + 2 = 5$
   a. Thrice a number x increased by two is five.
   b. Two more than thrice a number x is equal to five.

What's More

A.	**B.**
1. A	1. H
2. L	2. G
3. L	3. K
4. M	4. I
5. E	5. E
6. N	6. C
7. A	7. A
8. R	8. D
9. E	9. B
10. E	10. F
11. Q	
12. U	
13. A	
14. L	

What I Know

1. b
2. a
3. c
4. b
5. d
6. b
7. a
8. a
9. a
10. d
11. c
12. d
13. d
14. a
15. c

What's New

+	−	×	÷
plus	Subtracted by	times	The quotient of
Increased by	The difference of	Multiplied by	The ratio of
The sum of	minus	The product of	
More than	Diminished by less		
	Decreased by		

=	≠	>	<
equal to	not equal to	greater than	less than
equivalent	not the same as		
the same as			

What I have learned

	English phrase/sentence	Mathematical phrase/ sentence
1	The ratio of w to six	$\frac{w}{6}$ *or* w: 6
2	Four multiplied by a number x	$4x$
3	The total of a number z and negative four	$z + (-4)$
4	The quotient of seventeen and r, seventeen divided by r, the ratio of seventeen to r	$\frac{17}{r}$
5	One-fourth of m plus seven	$\frac{1}{4}m + 7$ or $(\frac{1}{4})m + 7$
6	m diminished by six	$m - 6$
7	the sum of x and y; x plus y; y is added to x; the total of x and y	$x + y$
8	Five less the number d equals nine.	$5 - d = 9$
9	thirteen diminished by eleven times s	$13 - 11s$
10	the number b decreased by 5; b less 5; b diminished by 5; b minus 5	$b - 5$
11	the product of the numbers c and d plus one	$cd + 1$
12	the quotient of x and five	$\frac{x}{5}$ or $x \div 5$
13	Thrice the number b is thirteen	$3b = 13$
14	the product of a, b, and c; multiply a, b, and c	abc
15	twice the sum of x and y	$2(x + y)$

Additional Activity

Possible answers:

(1) two diminished by x; two decreased by x; two less x; two subtracted by x; x subtracted from two

(2) the product of three and x is equal to one; three multiplied by x equals one; three and x multiplied together is one; three times six equals one

(3) the quotient of x and two; the ratio of x and two; x divided by two

Assessment

1. c
2. c
3. c
4. c
5. a
6. d
7. a
8. a
9. d
10. a
11. d
12. d
13. c
14. d
15. c

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For inquiries or feedback, please write or call:

Department of Education - Bureau of Learning Resources (DepEd-BLR)

Ground Floor, Bonifacio Bldg., DepEd Complex
Meralco Avenue, Pasig City, Philippines 1600

Telefax: (632) 8634-1072; 8634-1054; 8631-4985

Email Address: blr.lrqad@deped.gov.ph * blr.lrpd@deped.gov.ph