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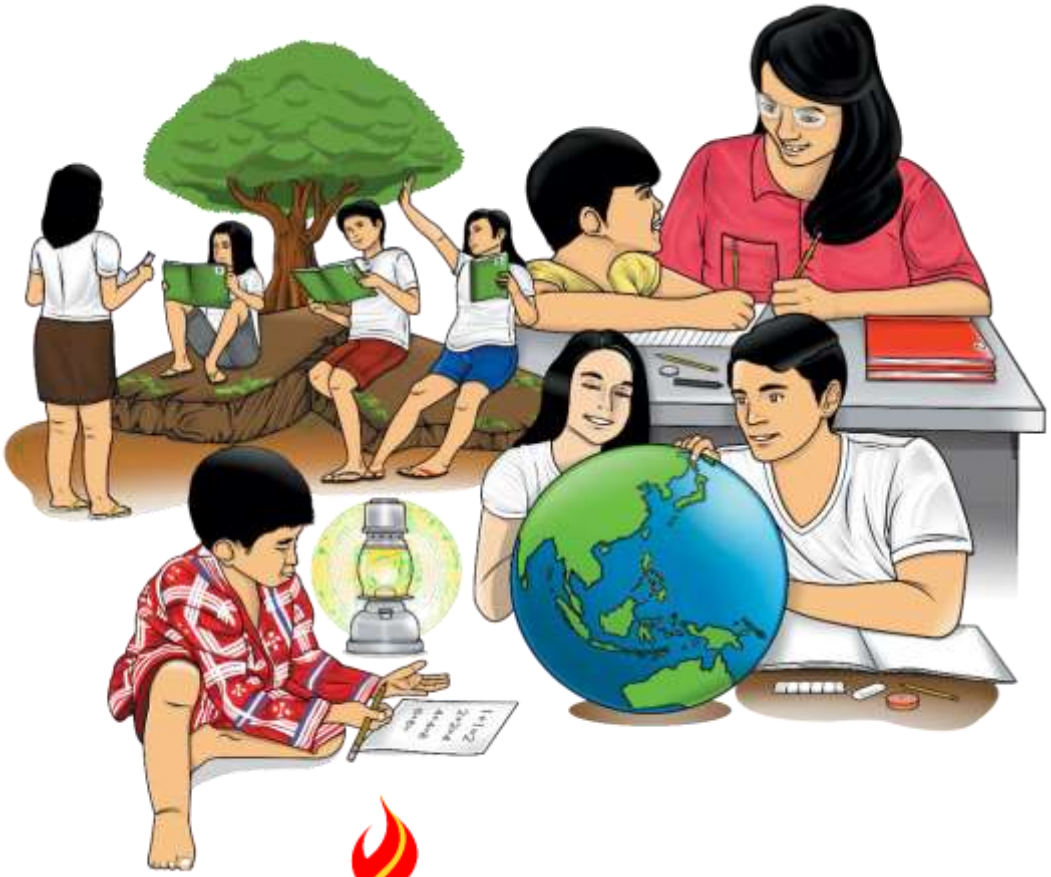
DEPARTMENT OF EDUCATION

Mathematics
Quarter 1 – Module 2
Solving Problems Involving Factors of Polynomials



ALTERNATIVE DELIVERY MODE
ADM

Mathematics – Grade 8
Alternative Delivery Mode
Quarter 1 – Module 2 Solving Problems Involving Factors of Polynomials
First Edition, 2020

Published by the Department of Education
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Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by_____

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8

Mathematics

Quarter 1 – Module 2

"Solving Problems Involving Factors of Polynomials"

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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.

What I Need to Know

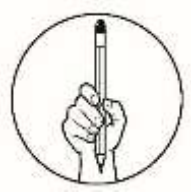
In this module, you will discover that the different methods of factoring can be used and applied in solving word problems. The scope of this material involves real-world encounters that can be defined mathematically using polynomial factoring. You are going to look at factoring at the real world and see how to solve word problems with reasonable solutions involving area, perimeter or finding two numbers that are consecutive values or create an equation that you are going to solve with accuracy and using variety of strategies.

This module contains:

Lesson 1- Solving Problems Involving Factors of Polynomials

After going through this module, you are expected to:

1. recall the different techniques of factoring polynomials;
2. apply the concept of factoring in solving related problems; and
3. describe the importance of understanding factoring and its application to real-life;



What I Know

Read each item very carefully. Choose the letter of the correct answer. Write your answers on a separate sheet of paper.

1. The square of a number equals nine times that number. Find the number.
   A. 0 or 2
   B. 0 or 3
   C. 0 or 6
   D. 0 or 9

2. The area of a square is $4x^2 + 12x + 9$ square units. Which expression represents the length of the side?
   A. $(3x + 2)$ units
   B. $(2x + 3)$ units
   C. $(4x + 9)$ units
   D. $(4x + 3)$ units

3. Forty-nine less than the square of a number equals zero. Find the number.
   A. -3 or 3
   B. -7 or 7
   C. -13 or 13
   D. 0 or 9

4. The area of triangle is 80 cm^2. If the height of the triangle is 6 cm less than its base, find the base and its height.
   A. $b = 20\ cm, h = 16\ cm$
   B. $b = 10\ cm, h = 6\ cm$
   C. $b = 35\ cm, h = 31\ cm$
   D. $b = 16\ cm, h = 10\ cm$

5. Suppose that four times the square of a number equals 20 times that number. What is the number?
   A. 0 or 1
   B. 0 or 5
   C. 0 or 10
   D. 0 or 20

6. If the area of the square is $(4x^2 - 4x + 1)\ cm^2$, what is the measure of its side?
   A. $(-2x + 1)\ cm$
   B. $(-4x + 1)\ cm$
   C. $(4x - 2)\ cm$
   D. $(2x - 1)\ cm$

7. The product of two consecutive integers is 90. Find the integers.
   A. -5 and -4 or 4 and 5
   B. -10 and -9 or 9 and 10
   C. -13 and -12 or 12 and 13
   D. -18 and -17 or 17 and 18

8. The area of a square is numerically equal to five times its perimeter. Find the length of a side of the square.

A. 4 *units*
C. 10 *units*
B. 5 *units*
D. 20 *units*

9. What is the measure of one side of the square if its area is $(25x^2 - 70x + 49)\ m^2$?

A. $(5x + 7)\ m$
C. $(7x + 5)\ m$
B. $(5x - 7)\ m$
D. $(7x - 5)\ m$

10. A rectangular pond has a length of $4\ m$ more than twice its width. Solve for the length and the width if the area of the said pond is $96 m^2$?

A. $l = 12\ m, w = 4\ m$
C. $l = 16\ m, w = 3m$
B. $l = 24\ m, w = 2\ m$
D. $l = 16\ m, w = 6m$

11. The cube of a number equals nine times the number. Find the number.

A. -1 or 0 or 1
C. -3 or 0 or 3
B. -9 or 0 or 9
D. -27 or 0 or 27

12. The sum of a number and its square is 420. What are the numbers that satisfy this condition?

A. 20 or 25
C. 12 or 13
B. 10 or -11
D. 20 or -21

13. Suppose that five times the cube of a number equals 80 times the number. Find the number.

A. $-4\ or\ 0\ or\ 4$
C. $-10\ or\ 0\ or\ 10$
B. $-5\ or\ 0\ or\ 5$
D. $-16\ or\ 0\ or\ 16$

14. If a square pool is to be made a rectangle such that the length is increased by 6 *units* and the width is decreased by 6 *units*, what will happen to its area?

A. The area will increase by 12.
B. The area will decrease by 12
C. The area will increase by 36
D. The area will decrease by 36

15. A rectangular garden has an area of $(12x^2 - 8x - 15)\ m^2$. Find its dimensions.

A. $(3x - 5)m$ by $(4x + 3)m$
B. $(6x + 5)m$ by $(2x - 3)m$
C. $(6x - 3)m$ by $(2x - 5)m$
D. $(12x - 15)m$ by $(x + 1)$

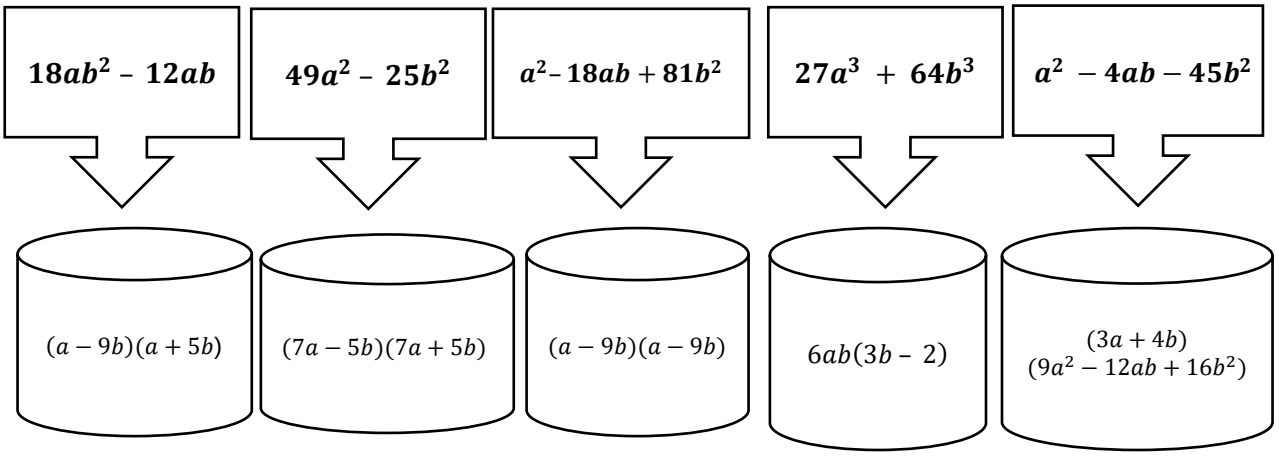
Lesson 1 Solving Problems Involving Factors of Polynomials

Previously, you studied about several ways of factoring polynomials. At this point, let us determine whether you captured the important points of that lesson. Consider the activity below:

What's In

Activity: ***Smart Connect!***

Written on the callouts with down arrows are polynomials. If you are to direct the arrows, to which cylinder should each be paired? Draw a line to connect the arrow to each cylinder which you think correctly represents the factors of the polynomials written on the callouts. Write your answers on a separate sheet of paper.



Now, consider these questions:

1. Were you able to connect the callouts to its right factors?
2. Was it easy for you to find the factors of the given polynomials?
   If *yes*, how did you do it? If *no*, what makes it difficult for you to factor?
3. What techniques did you apply in factoring each polynomial?

If your answer to questions 1 and 2 is YES, then you are ready to proceed to the next activity.

What's New

At this point, you are going to take everything you've learned about polynomials, factoring and polynomial equations and apply it to real-life situations.

Activity: ***Choose What You Sow!***

Directions: Read the given situation and solve. Below the answer box are the steps to be done to arrive at the correct answer. Arrange the steps in logical order by placing the letter of your choice on the shape provided in the Answer Box. The first step is done for you. Write your answers on a separate sheet of paper.

Suppose your mother asks you to make for her a rectangular-shaped garden. The total area of the garden is 84 square feet. She wants that the length of the garden is 8 feet longer than the width. Can you tell what is the length and the width of the garden?

Answer Box

A $84 = x^2 + 8x$

B $x + 14 = 0$ or $x - 6 = 0$

C $A = (length)(width)$
$84 = (x + 8)(x)$

D $0 = x^2 + 8x - 84$

E Let x be the *width*
$x + 8$ be the *length*

F $0 = (x + 14)(x - 6)$

Guide Questions:

1. How did you find the activity?
2. What do you think is the width of the garden? What is its length?
3. How many values of x can be found after solving the equation? Why did you not consider the other value?

What is It

The previous activity illustrates how factoring can be used in solving real-life situations. In doing so, some helpful tips will guide you on how to successfully come up with the correct solution.

1. Write an equation that represents the given information. To help you figure it out, draw a picture or a diagram.

2. Follow the rules of polynomial equation by factoring. This means that you need to place all polynomials on one side of the equation and let it equal to zero, following the Zero Product Property.

   The Zero Product Property simply states that if ab = 0, then either a = 0 or b = 0 (or both).

3. Check the reasonableness of answers. This means that you have to discard solutions that do not make sense; say for example, time and distance cannot be negative.

4. Further, let us add up in our list of things to remember the following properties which will help you justify every step in your solutions.

Additive Inverse Property. The **additive inverse** (or the opposite sign or the negative) of a number $\boldsymbol{a}$ is the number that, when added to $\boldsymbol{a}$, yields zero. In symbol, $\boldsymbol{a + (-a) = 0.}$

Additive Identity Property states that the sum of any number and 0 is the given number. Zero, "0" is the **additive identity**. In symbol, $a + \mathbf{0} = \boldsymbol{a}$

Multiplicative Inverse Property The **multiplicative inverse** (or the reciprocal) of a number $\boldsymbol{a}$ is $\frac{\mathbf{1}}{\boldsymbol{a}}$ that, when multiplied to $\boldsymbol{a}$**,** the product is one. In symbol, $\mathbf{a} \cdot \frac{\mathbf{1}}{\boldsymbol{a}} = \mathbf{1}$.

Multiplicative Identity Property states that the product of any number and 1 is the given number, $a \bullet 1 = a$. One, "1" is the **multiplicative identity**.

Commutative Property of Addition. The order of the addends does not affect the sum. In symbol, $a + b = b + a$.

D**istributive Property of Multiplication** states that when a number is multiplied by the sum of two numbers, the first number can be distributed to both of those numbers and multiplied by each of them separately. In symbol, a(b + c) = ab + ac.

Addition Property of Equality (APE) states that if the same number is added to both sides of an equation, then the equality is still true. In symbol, if $a = b$, then $a + c = b + c$.

Multiplication Property of Equality (MPE) states that when we multiply both sides of an equation by the same number, then the two sides remain equal. That is if a, b, and c are real numbers such that $a = b$, then a x c = b x c.

Consider the following examples:

Problem 1: The area of a square is numerically equal to fifty times its perimeter. Find the length of a side of the square.

Solution:

Step 1: Choose a variable to represent what is unknown.

Let $\boldsymbol{s}$ be the length of the side of a square

Step 2: Translate what you are representing in words into Mathematical expressions.

Meaning, write the equation based on the given information. Note that area of a square with side s is A = s^2 and its perimeter is $P = 4s$. Hence,

$$\boldsymbol{s^2 = 50(4s)}$$

Step 3: Simplify the expression and solve for the unknown.

s^2	=	$50(4s)$	Equation obtained in Step 2
s^2	=	$200s$	Simplify
$s^2 - 200s$	=	0	Place all polynomials on one side of the equation and set to 0
$s(s-200)$	=	0	Factor the polynomials
$s = 0$	*or*	$s - 200 = 0$	Zero Product Property
$s = 0$	*or*	$s - 200 + 200 = 0 + 200$	Addition Property of Equality
$s = 0$	*or*	$s = 200$	Resulting Equations

Since the length of a square could not be zero hence, the length of the side of the square is 200 units.

Problem 2: Suppose that six times the cube of a number equals 54 times the number. Find the number.

Solution:

Step 1: Choose a variable to represent what is unknown.

Let $\boldsymbol{x}$ be the number

Step 2: Translate what you are representing in words into Mathematical expressions.

Meaning, write the equation based on the given information.

$$\boldsymbol{6x^3 = 54x}$$

Step 3: Simplify the expression and solve for the unknown.

$6x^3 = 54x$		Equation obtained in Step 2
$6x^3 - 54x = 0$		Place all polynomials on one side of the equation and set to 0
$6x(x^2 - 9) = 0$		Factor the polynomials
$6x = 0$	$or \quad x^2 - 9 = 0$	Zero Product Property
$x = 0$		
	$or \quad x^2 - 9 = 0$	Factor the polynomial
	$(x - 3)(x + 3) = 0$	
$x - 3 = 0$	$x + 3 = 0$	Zero Product Property
$x - 3 + 3 = 0 + 3$	$or \quad x + 3 - 3 = 0 - 3$	Addition Property of Equality
$x = 3$	$or \quad x = -3$	Resulting Equations

Therefore, the numbers are -3 or 0 or 3.

Problem 3: The area of a square is $25y^2 - 100y + 100$ square units. What is the length of the side?

Solution:

Step 1: Choose a variable to represent what is unknown.

Let $\boldsymbol{y}$ be the length of side of the square.

Step 2: Translate what you are representing in words into Mathematical expressions.

Meaning, write the equation based on the given information.

$$25y^2 - 100y + 100 = 0$$

Step 3: Simplify the expression and solve for the unknown.

$25y^2 - 100y + 100 = 0$		Equation obtained in Step 2
$(5y - 10)(5y - 10) = 0$		Factor the polynomials
$5y - 10 = 0 \; or \; 5y - 10 = 0$		Zero Product Property
$5y - 10 + 10 = 0 + 10 \; or$	$5y - 10 + 10 = 0 + 10$	Addition Property of Equality

$5y = 10$	$5y = 10$	Resulting Equations
$\frac{5y}{5} = \frac{10}{5}$	$\frac{5y}{5} = \frac{10}{5}$	Multiply both sides of the equation by $\frac{1}{5}$ (Multiplication Property of Equality)
$y = 2$	$y = 2$	Resulting Equations

Observe that the value of the unknown is the same, y = 2. Therefore, the length of the side of the square is 2 units.

Problem 4: The square of a number is 20 more than 8 times the number. Find the number.

Solution:
Step 1: Choose a variable to represent what is unknown.
Let $\boldsymbol{z}$ be the number.

Step 2: Translate what you are representing in words into Mathematical expressions.
Meaning, write the equation based on the given information.
$$\boldsymbol{z^2 = 8z + 20}$$

Step 3: Simplify the expression and solve for the unknown.

$z^2 = 8z + 20$		Equation obtained in Step 2
$z^2 - 8z - 20 = 0$		Place all polynomials on one side of the equation and set to 0
$z^2 - 8z - 20 = 8z - 8z + 20 - 20$		Addition Property of Equality
$(z - 10)(z + 2) = 0$		Factor the polynomials
$z - 10 = 0$	*or* $z + 2 = 0$	Zero Product Property
$z - 10 + 10 = 0$	*or* $z + 2 - 2 = 0 - 2$	Addition Property of Equality
$z = 10$	*or* $z = -2$	Resulting Equations

Since there are two values of the unknown, then the numbers are $\boldsymbol{-2}$ ***or*** $\boldsymbol{10}$.

Problem 5: The length of a rectangular table is 8 more than the width. If the area is 180 m^2, find the length and the width.

Solution:
Step 1: Recall that the area of a rectangle can be found by multiplying the length ($\boldsymbol{l}$) and the width ($\boldsymbol{w}$). In symbols,

$$Area = (length)(width) \text{ or } Area = l\,x\,w$$

Step 2: Substitute the values given in the problem to the formula in finding the area of the rectangle where

Area = $180\ m^2$

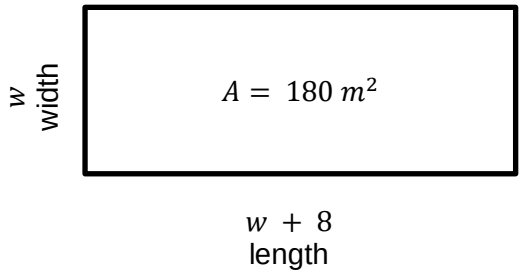
length ($\boldsymbol{l}$) = $w + 8$ (8 more than the width)

width (**w**) = w

Since $Area = l\ x\ w$, by substitution

$180 = (w + 8)(w)$

Consider the illustration:



Step 3: Simplify the expression and solve for what is asked.

$180 = (w + 8)(w)$	$Area = l\ x\ w$
$180 = w^2 + 8w$	Distributive Property of Multiplication
$180 - 180 = w^2 + 8w - 180$	Place all polynomials on one side of the equation and set to 0 by Addition Property of Equality
$0 = w^2 + 8w - 180$	Resulting Equation
$0 = (w + 18)(w - 10)$	Factor the Polynomials
$w + 18 = 0\ or\ w - 10 = 0$	Zero Product Property
$w + 18 - 18 = 0 - 18 \quad or$ $w - 10 + 10 = 0 + 10$	Addition Property of Equality
$w = -18 \quad or \quad w = 10$	Resulting Equations

Now, there are two values of the unknown $\boldsymbol{-18\ or\ 10}$. Since you are looking for the values of the dimensions: length and width, you have to consider the positive value which is 10 and discard -18 since there is no negative dimension. Therefore, the dimensions are:

$$\boldsymbol{Width\ (w) = 10}$$
$$\boldsymbol{Length\ (w + 8) = 10 + 8 = 18}$$

Thus, the width of the table is **10 *meters*** while its length is **18 *meters***.

Problem 6: The product of two consecutive integers is 110. Find the value of the integers.

Solution:

Step 1: Define the integers based on the given problem.

Let $\boldsymbol{x}$ be the first integer

$\boldsymbol{x+1}$ be the second integer since the two numbers are consecutive

Step 2: Analyze what operation to be used. Product means to multiply.

$(First\ integer)\ times\ (Second\ Integer) = 110$, or

$$(x) \quad (x + 1) = 110$$

Step 3: Simplify the expression and equate it to zero.

$x^2 + x - 110 = 110 - 110$	Addition Property of Equality
$x^2 + x - 110 = 0$	Resulting Equation
$(x + 11)(x - 10) = 0$	Factoring
$(x + 11) = 0 \quad or \quad (x - 10) = 0$	Zero Product Property
$x + 11 - 11 = 0 - 11\ or$ $x - 10 + 10 = 0 + 10$	Addition Property of Equality
$x = -11 \quad or \quad x = 10$	Resulting Equation

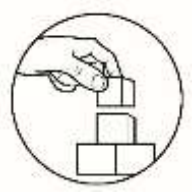
Since there are two values of x, then there could be two pairs of consecutive integers. That is:

If the first integer is $x = -11$, then the second integer $x + 1 = -11 + 1 = -10$. The first pair of consecutive integers are $\mathbf{-11}$ and $\mathbf{-10}$.

If the first integer is $x = 10$, then the second integer $x + 1 = 10 + 1 = 11$. The second pair of consecutive integers are **10** and **11**.

Going Back

Now, if you are going back to answer the problem regarding the rectangular-shaped garden, can you now surely cite the dimensions of the garden? Well, if your answers are **6 feet** and **14 feet**, respectively, for the width and the length, then you got it correct!



What's More

Activity 1: I Can Fill It!

Below is a problem where you can solve by simply following the steps that can be found at the right side. Fill in the blank spaces with the needed solution. In each activity, write your answers on a separate sheet of paper.

Problem: The sum of the square of a number and 15 is the same as eight times the number. What are the numbers?

Solution	**What To Do**
Let $\boldsymbol{x}$ be the number	Use a variable to represent the unknown
$\_\_\_ + \mathbf{15} \quad = \_\_\_$	Translate into mathematical expression
$\boldsymbol{x^2} + \mathbf{15} - \_\_\_\_ = \mathbf{8}\boldsymbol{x} - \_\_\_$	Place polynomial on one side and set equation to zero by Addition Property of Equality
$\boldsymbol{x^2} + \mathbf{15} - \mathbf{8}\boldsymbol{x} \quad = \_\_\_$	Write the resulting equation
$\mathbf{x^2} - \mathbf{8}\boldsymbol{x} + \_\_\_ = \_\_\_$	Arrange the terms in descending order of its exponents
$(\_\_\_)(\_\_\_) \quad = \mathbf{0}$	Factor the polynomial
$(\boldsymbol{x} - \_\_\_) = \mathbf{0} \quad \boldsymbol{or} \quad (\boldsymbol{x} - \_\_\_) = \mathbf{0}$	Apply the Zero Product Property
$\boldsymbol{x} - \mathbf{5} + \_\_ = \mathbf{0} + \_\_ \quad \boldsymbol{or}$ $\boldsymbol{x} \_\_ + \mathbf{3} = \mathbf{0} + \_\_$	Solve for the unknown by using Addition Property of Equality
$\boldsymbol{x} = \_\_\_ \quad \boldsymbol{or} \quad \boldsymbol{x} = \_\_\_$	Write the resulting equation.

Final Statement: The numbers are _____.

Activity 2: Get the Order!

To solve the next problem, solutions are already presented but they are in disarray. So, what you are going to do now is to re-arrange the solution by placing each beside the appropriate hints/guides cited in the box below. Write your answers on a separate sheet of paper.

Problem: A rectangle has a width that is ten meters longer than its length. The area of the rectangle is 24 square meters. What are the dimensions of the rectangle?

To represent the unknown, you use the variable $\boldsymbol{l}$.

Hints / Guides	**Place Your Order Here**
Choose a variable to represent the unknown.	
Translate into mathematical expressions using the formula $\boldsymbol{A = l \times w}$	
Apply the Distributive Property of Multiplication.	
Place polynomials in one side and set the equation to zero by using Addition Property of Equality	
Factor the polynomial.	
Set to zero each of the factor by Zero Product Property.	
Simplify equations by using Addition Property of Equality	

$A = width\ times\ length\ or$
$24 = (l + 10)(l)$

Let l be the length
$l + 10$ be the width

$24 - 24 = l^2 + 10l - 24$
$0 = l^2 + 10l - 24$

$24 = l^2 + 10l$

$0 = (l + 12)(l - 2)$

$l + 12 = 0\ or\ l - 2 = 0$

$l + 12 - 12 = 0 - 12$ *or* $l - 2 + 2 = 0 + 2$
$l = -12$ *or* $l = 2$

Questions:

1. What value of $\boldsymbol{l}$ will you take as the length of the rectangle?
2. Why do you say so?
3. What is the width of the rectangle?
4. How did you get the measurement of the width?

Activity 3: Give it to Me!

For sure by now, you are already familiar of how real-life applications on factoring can be solved. You can take the challenge of finding the right answers to the problems found below. Be reminded to write your answers on a separate sheet of paper.

You can do it!

Problem: Originally a rectangle was twice as long as its width. When 5 meters was subtracted from its length and 3 meters was subtracted from its width, the new rectangle had an area of 55 meters. Find the dimensions of the original rectangle.

To start, assign a variable for the unknown. Say,

Let	$\boldsymbol{w}$	be the width of the original rectangle
	$\boldsymbol{2w}$	be the length of the original rectangle

Consider the questions that follow. You are given two choices to each of the question. Place a Check mark (√) on the empty box of your choice. Then, you have to support your answer why you have chosen such. Are you ready? Begin!

Questions:

1. What will be the mathematical equation that you will obtain based on the information given?

	$\boldsymbol{(2w-5)(w-3)=55}$
	$\boldsymbol{(2w-3)(w-5)=55}$

Support your choice:

_____

2. What is the resulting equation when the polynomials are multiplied?

	$\boldsymbol{2w^2-11w+15=55}$
	$\boldsymbol{2w^2-11w-15=55}$

You can show your solution to show your Answer:

3. When the polynomials are placed on one side and the equation is set to zero, what will be the resulting equation?

	$\mathbf{2w^2 - 11w + 40 = 0}$
	$\mathbf{2w^2 - 11w - 40 = 0}$

Support your choice: _____

4. What are the factors of the polynomials based on the equation you have in item #3?

	$\mathbf{(2w + 5)(w - 8) = 0}$
	$\mathbf{(2w - 5)(w + 8) = 0}$

Support your choice: _____

5. What are the possible values of the unknown?

	$w = 8 \; or \; w = \frac{-5}{2}$
	$w = -8 \; or \; w = \frac{5}{2}$

Support your choice: _____

6. What are the measures of the length and the width of the original rectangle?

	$\boldsymbol{Width = 8\,meters}$ $\boldsymbol{Length = 16\,meters}$
	$\boldsymbol{Width = 2.5\,meters}$ $\boldsymbol{Length = 5\,meters}$

Support your choice: _____

That was easy wasn't it? You'll just have to remember that when it comes to solving word problems using factoring, there are a couple things to remember before you begin.

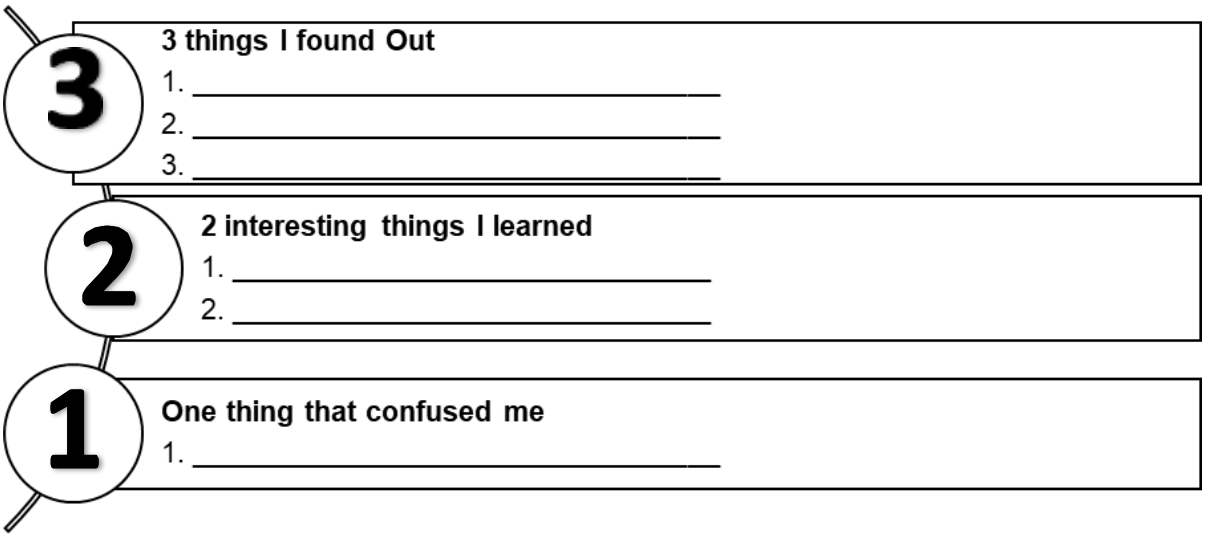
In many cases, word problems are based on "real life" situations so you need to make sure that your answers make sense in the context of the problem. You need to make sure that the answers make sense.

Congratulations for having reached this far!

What I Have Learned

Activity: ***My Learning in 3... 2...1!***

Complete the 3-2-1 Chart about your discoveries in solving word problems involving factoring of polynomials. Write your answers on a separate sheet of paper.



What I Can Do

With the many examples you've encountered in this module that depict real-life applications of factoring, let's turn the table around this time.

Activity: ***Let's Get Real!***

Do the following. Use a separate sheet of paper for your output.

1. Formulate two real-life problems involving factors of polynomials. Choose two (2) of the following situations:

- ✓ Area Problem
- ✓ Perimeter Problem
- ✓ Consecutive Integers Problem
- ✓ Number Problem

2. Solve the problems you formulated accurately using a variety of strategies. Show complete solution.

3. Place the two problems you have formulated including its solution at the allotted space in "My Design Box".

   Be guided with the following rubric:

Points	Indicators
3	The problem is clear, detailed & organized; No grammatical issues; Choose an efficient strategy that made sense; All of the steps in the solution are correct.
2	The problem is clear and detailed; A few grammatical issues; Choose a strategy that made sense; A few of the steps in the solution are correct.
1	The problem is not clear, not detailed and not organized; Lots of grammatical issues; The strategy doesn't make sense; All of the solutions are incorrect.

My Design Box

Assessment

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

1. The square of a number equals five times that number. Find the number.
   A. 0 or 1
   B. 0 or 3
   C. 0 or 5
   D. 0 or 7
2. Find the number if one hundred less than the square of a number equals zero.
   A. -10 *or* 10
   B. -20 *or* 20
   C. -30 *or* 30
   D. -40 *or* 40

3. Which expression represents the length of the side of the square with an area of $4b^2 + 16b + 16$ square units?

A. $(2b + 4)$ units
B. $(4b + 2)$ units
C. $(8b + 4)$ units
D. $(4b + 8)$ units

4. The difference of the square of a number and 36 is the same as -5 times the number. Find the numbers that satisfy the given condition.

A. $4 \; and \; -9$
B. $6 \; and \; -3$
C. $8 \; and \; 7$
D. $12 \; and \; -3$

5. Six times the square of a number equals eighteen times that number. What is the number?

A. $0 \; or \; -3$
B. $0 \; or \; -6$
C. $0 \; or \; 3$
D. $0 \; or \; 6$

6. The square of a number decreased by 625 is zero. What is the number?

A. $15 \; or \; -15$
B. $25 \; or \; -25$
C. $35 \; or \; -35$
D. $45 \; or \; -45$

7. If the area of the square is $(4x^2 - 8x + 4) \; cm^2$, what is the length of the side?

A. $(-2x + 2) \; cm$
B. $(-x + 2) cm$
C. $(2x - 2) \; cm$
D. $(x + 2) \; cm$

8. The product of two consecutive integers is 306. Find the integers.

A. $-4 \; and \; -5$ or $4 \; and \; 5$
B. $-9 \; and \; -10$ or $9 \; and \; 10$
C. $-12 \; and \; -13$ or $12 \; and \; 13$
D. $-17 \; and \; -18$ or $17 \; and \; 18$

9. Find the length of a side of the square if its area is numerically equal to ten times its perimeter.

A. 4 units
B. 10 units
C. 20 units
D. 40 units

10. The area of a square lot is 256 square meters, find the length of one side.

A. 14 meters
B. 16 meters
C. 24 meters
D. 26 meters

11. What is the measure of one side of the square if its area is $x^2 - 22x + 121$?

A. $11 \; units$
B. $22 \; units$
C. $30 \; units$
D. $50 \; units$

12. The area of a rug is 108 square centimeters. The length of the rug is 6 cm less than twice its width. What is the width of the rug?
    A. 6 cm
    B. 9 cm
    C. 12 cm
    D. 15 cm

13. Suppose that two times the cube of a number equals 8 times the number. Find the number.
    A. -1 or 0 or 1
    B. -2 or 0 or 2
    C. -3 or 0 or 3
    D. -4 or 0 or 4

14. A rectangular pond has a length of 8 m more than twice its width. Solve for the length and the width if the area of the said pond is 120 m^2?
    A. $l = 10\,m, w = 1m$
    B. $l = 12\,m, w = 2\,m$
    C. $l = 14\,m, w = 3\,m$
    D. $l = 20\,m, w = 6\,m$

15. The area of the floor of a rectangular room is 84 square feet. The length of the room is 5 feet more than its width. Find the width and length of the room.
    A. 7 feet and 11 feet
    B. 7 feet and 12 feet
    C. 8 feet and 11 feet
    D. 8 feet and 12 feet

Additional Activities

If you want to practice more with real-life applications of Factoring, here's some situations for you to work on.

Real Quick!

1. Four times the square of a number is 45 more than eight times the number. What is the number?

2. The base of a triangle is 4 meters longer than the height. Find the height if the area of the triangle is 16 square meters.?

Finally, you've answered all of the problems. Congratulations for doing so! There's more fun in Math! Until next time…

Answer Key

What I Know 1. D 9. B 2. B 10. D 3. B 11. C 4. D 12. D 5. B 13. A 6. D 14. D 7. B 15. B 8. D	***What's In*** ***Smart Connect*** 1.$18ab^2$-12ab= 6ab(3b – 2) 2.$49a^2$ -$25b^2$ = (7a – 5b)(7a + 5b) 3.a^2 – 18ab+$81b^2$ =(a-9b)(a-9b) 4.$27a^3$+$64b^3$ = (3a+4b) ($9a^2$-12ab+$16b^2$) 5. a^2 – 4ab – $45b^2$ = (a-9b)(a+5b)	***What's New*** ***Choose What You Sow!*** E, C, A, D, F, B
What's More ***Activity 1: I Can Fill It!*** Let x be the number X^2 + 15 =8x X^2 + 15- 8x = 8x – 8x X^2 + 15-8x = 0 X^2 – 8x + 15 = 0 (x-3)(x-5)=0 X – 5 = 0 or x – 3 = 0 x-5+5 = 0+5 or x-3+3 = 0+3 x = 5 or x = 3	***What's More*** ***Activity 2: Get the Order*** 1. Let h be the height h + 10 be the base 2. A = base times height or 24 = (h + 10) (h) 3. 24 = h^2 + 10h 4. 24-24 = h^2 + 10h – 24 0 = h^2 + 10h – 24 5. 0 = (h+12)(h-2) 6. h + 12 = 0 or h – 2 = 0 7. h + 12 – 12 = 0 -12 or h – 2 + 2 = 0 + 2 h = -12 or h=2 Height = 2 meters Base = h + 10 = 12 meters	***What's More*** ***Activity 3: Give It to Me*** 1.(2w-5)(w-3) 2.$2w^2$ – 11w+15=55 3.$2w^2$ – 11w-40=0 4.(2w+5)(w-8)=0 5.w=8 or w=5/2 6.width is 8 meters Length is 16 meters
What I Have Learned Answers may Vary	**What I Can Do** Answers may Vary	
Post Assessment 1. C 2. A 3. A 4. A 5. C 6. B 7. C 8. D 9. D 10. B 11. A 12. B 13. B 14. D 15. B	**Additional Activities** ***Real Quick*** 1.The number is either -5/2 or 9/2 2. The height of the triangle is 4 meters.	

References

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