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Lesson Exemplar for Mathematics

Quarter 3
Lesson
1

Lesson Exemplar for Mathematics Grade 8
Quarter 3: Lesson 1 (Week 1)
SY 2025-2026

Development Team

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MATHEMATICS / QUARTER 3 / GRADE 8

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	The learners should have knowledge and understanding of linear equations in one variable
B. Performance Standards	By the end of the quarter, the learners are able to solve linear equations and linear inequalities in one variable. (NA)
C. Learning Competencies and Objectives	*Learning Competency* The learners… • solve linear equations in one variable.
D. Content	Linear Equations in One Variable
E. Integration	

II. LEARNING RESOURCES
Blackman, R. (2020, March 29). *Teaching linear equations in math.* https://www.hmhco.com/blog/teaching-linear-equations-in-math De Sagun, P. (1999). *Dynamic Math I.* Paranaque City, Philippines Khurma, M. (2013) *Algebra: Linear equations.* https://www.cuemath.com/algebra/linear-equations/ Orines, F. (2012). *Next century Mathematics 7.* Quezon City, Philippines Quan, R. A., Madilo, A. & Fulgencio, M. (2013). *conceptual math and beyond 7.* Quezon City, Philippines Splash Learn. (2024). *Expression in math-definition, parts, examples, practice problems.* https://www.splashlearn.com/math-vocabulary/number-sense/expression

III. TEACHING AND LEARNING PROCEDURE		NOTES TO TEACHERS
A. Activating Prior Knowledge	**DAY 1** **1. Short Review** Match column A with column B. Arrange the letter to form the hidden words.	This section of the review focuses on translating mathematical sentences into mathematical equations.

<table>
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Column A

1. Two more than a number
2. The sum of a number and 8
3. Seven subtracted from a number
4. A number decreased by 10
5. The sum of twice a number and two
6. Six times the sum of the number n and 3
7. Nine times the sum of the number and 2
8. Four less than 11 times the number
9. Thirteen more than 15 times the number

Column B

M. 2n + 2
E. 2 + n
L. 6(n+3)
I. n – 7
H. n – 10
O. n + 8
T. 9(n+2)
V. 11n – 4
A. 15n + 13

_____ ____ ____ ____ ____ ____ ____ ____ ____
 3   6   2   8   1   5   9   7   4

2. Feedback (Optional)
What is the impact of the activity on the learners?
Based on the activity, do the learners understand their previous lesson thoroughly?

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Answer:
1. 2+ n
2. n + 8
3. n – 7
4. n – 10
5. 2n + 2
6. 6 (n + 3)
7. 9(n + 2)
8. 11n – 4
9. 15n + 13

1 – E
2 – O
3 – I
4 – H
5 – M
6 – L
7 – T
8 – V
9 - A

I LOVE MATH
3 628 1 5974

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B. Establishing Lesson Purpose

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1. Lesson Purpose

    Studying expressions and equations is very important. The most important one is the problem-solving strategies you learn by working through them. It helps train your brain to think. Solving equations is a way of thinking that you will benefit from unconsciously in other parts of your life. Math expressions are different from a math equation. If we look at the difference between expressions and equations is that an **expression** does not include equal sign and are basically mathematical phrases whereas an **equation** includes an equal (=) operator, and show equivalency between two mathematical expressions.

2. Unlocking Content Vocabulary

- **Numerical expression** - consists of numbers and arithmetic operators. It does not contain any unknown variables, equality or inequality symbols.
- **Algebraic Expression** – is a variable and constant or a combination of constants and variables that are separated by plus or minus sign.
- **Mathematical equation** – is a statement that the two numbers or two expressions are equal.
- **Constant** - it is a fixed numerical value.

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In this part the teacher will introduce the lesson and its application to daily life.

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	Variables - they do not take any fixed values. Values are assigned according to the requirement. **Terms** - can be constants, variables or constants multiplied by variable/(s). Each term in an expression is separated by '+' sign or '−' sign. **Operators** - The four operations of addition (+), subtraction (−), multiplication (×), division (÷) are used to combine the terms of an expression and are called operators. **Linear equation** - an algebraic equation where each term has an exponent of 1 and when this equation is graphed, it always results in a straight line.	

C. Developing and Deepening Understanding	**SUB-TOPIC 1: Differentiating Expression and Equation Describing linear equation**
	1. Explicitation
	    An algebraic expression, or simply an expression, is any combination of numbers, variables, grouping symbols, and operations. For example, x + 12, 3x -8, and x^2+ 4x+4. An equation is a statement that the two numbers or two expressions are equal.
	    The difference between expressions and equations is that an **expression** signifies a combination of numbers, variables, and operation symbols whereas an **equation** will always use an equal (=) operator between two math expressions. Also, both sides of the "equal to" sign have the same value.
		Introduce the lesson by providing a statement that will guide the learners to the new topic.
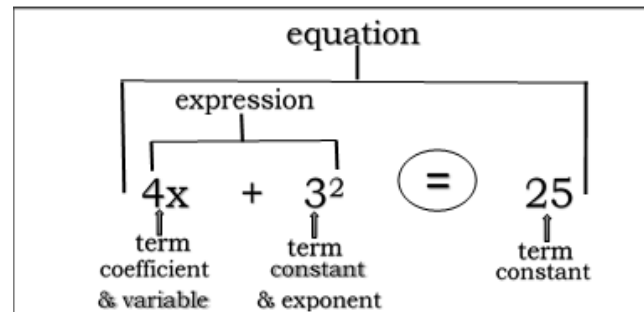
An equation is a statement that two things are equal. An equation has equal sign (=). What is on the left side is equal to what is on the right.

An expression is a group of terms and operators (+, -, x, ÷). A term is a constant, a variable, or coefficients together with variables.

2. Worked Example

Here are some examples of expressions and equations.

Expression	Equation
1. 5x	5x = 10
2. 44 + 23	44 + 23 = 67
3. 6y	6y = 18
4. a + b + c	a + b + c = 10
5. mx + b	mx = b
6. 5x + 2	5x + 2 = 4

Equation shows the representation to a certain problem. They are mathematical sentences that show relationships and connections between quantities or objects.

For example, a balance scale can represent an equation, with each of the pans holding the marbles.

x + 4   =   6

How many more marbles are needed to balance the scale?
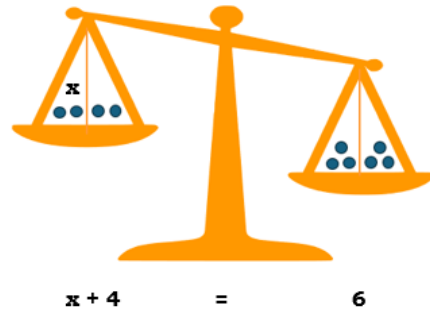
To balance the scale, two more marbles are to be added on one pan. The solution is 2 because if you replace x by 2, the sum will be 6 which makes the equation true.

Two marbles are added to balance the scale.

x + 4	=	6
2 + 4	=	6
6	=	6
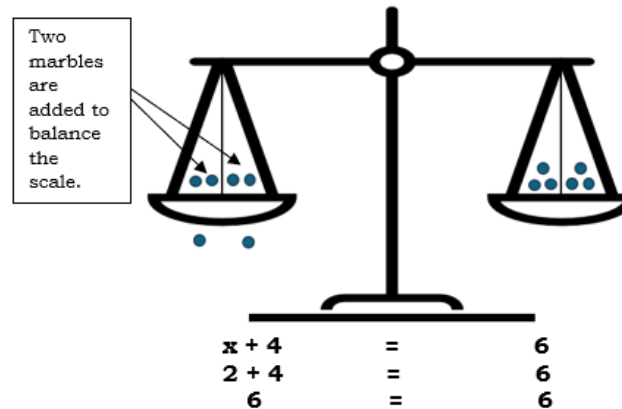
The teacher can add more examples of expressions and equations.

A linear equation in one variable is an equation which has a maximum of one variable of order 1. It is of the form **ax + b = c**, where x is the variable. This equation has only one solution.

> A linear equation in one variable is an equation that can be written in the form
> ax + b = c
> where a, b, and c are real number, a ≠ 0

No variable in a linear equation is raised to a power greater than 1 or used as the denominator of a fraction. When you find pairs of values that make a linear equation true and plot those pairs on a coordinate grid, all the points lie on the same line. The graph of a linear equation is a straight line.

Equations	Linear or Non-Linear
1. 2x + 4 = -16	Linear
2. x^2 = - 9	Non-Linear, the power of the variable x is 2
3. x^3 = 5	Non-Linear, the power of the variable x is 3
4. 3x + 5 = 23	Linear
5. - x = 9	Linear Equation

3. **Lesson Activity**
   Activity 1: Expression or Equation
   Identify whether the given is an expression or Equation. Put a heart to the box corresponds to your answer.

	Expression	Equation
1. 40 + 56		
2. (34 + 6) + 1		
3. (2 x 50) – 12 = 88		
4. 120 – 14 = 106		
5. 5x + 6		
6. 3x + 8 = 24		
7. Thrice the sum of 8 and 10		
8. Double of 50 is 100		
9. 10 more than half of 8		
10. c = ax + b		

The teacher will illustrate what is a linear equation in one variable.

Let the students be familiar with how linear equations should be.

Activity 1 Answer Key:
1. expression
2. expression
3. equation
4. equation
5. expression
6. equation
7. expression
8. equation
9. expression
10. equation

Activity 2 Answer Key:

5

Activity 2: Pairing time!
Match each statement to its equation.

1. 3 added to x is 5.	A. 2x = 8
2. One-fourth of x is 21.	B. x + 6 = 21
3. Six times a number is 48.	C. 7x = 42
4. Twice a number is 8.	D. -8 = 2x
5. The sum of 4x and 3 is 11.	E. 4 – x = 32
6. A number increased by 6 is 21.	F. -5 + x = 23
7. The product of a number and 7 is 42.	G. ¼ x = 21
8. The sum of -5 and a number is 23.	H. 4x + 3 = 11
9. A number decreased by 9 is 6.	I. x + 3 = 5
10. A number subtracted from 4 is 32.	J. x – 9 = 6
	K. 6x = 48
	L. x – 9 = -6
	M. 4x – 3 = 11
	N. x + 5 = 23

DAY 2

SUB-TOPIC 2: Solving Linear Equations using the Addition and Multiplication Property of Equality

Short Review. Identify whether the following is an expression or equation.

1. 5x + 3y
2. 45 -20 = 25
3. a + b = 15
4. 5 – x = 8
5. (24 + 15 – 12)

1. **Explicitation**

Solving an equation means one must find all the solutions to the given equation.

To solve an equation is to determine the value of the variable that will *satisfy* or make the conditional equation true. To satisfy or make an equation true means the left side and the right side of an equation will be equal once we substitute the variable with the correct value.

To solve a linear equation in one variable, we use the properties of equality to isolate the variable on one side of the equation.

A. Reflexive Property
–for any real number x, x = x.

Right column:

1. x + 3 = 5
2. ¼ x = 21
3. 6x = 48
4. 2x = 8
5. 4x + 3 = 11
6. x + 6 = 21
7. 7x = 42
8. -5 + x = 23
9. x – 9 = 6
10. 4- x =32

This lesson tells the teacher to apply the property of addition and multiplication in solving linear equation in one-variable.

The reflexive property states that any real number is equal to itself. For example, the equations -8 = -8 and x + 2 = x + 2 are both true according to the reflexive property.

B. Symmetric Property
   –for any real numbers a and b, if x = y, then y = x.
   For example, the equation 3 + x can also be written as x = 3.

C. Transitive Property
   –for any real numbers x, y, and z if x = y and y = z, then x = z.
   For example, suppose you were given x = 2+3. Using the fact that 2 + 5 = 5, you may conclude that x = 5 according to the transitive property.

D. Addition Property of Equality
   –for all real numbers x, y, and z, if x = y, then x + z = y + z
   The property states that adding the same number to both sides of an equation yields an equivalent equation. For example, the equation x - 2 = 7 is equal to x - 2 + 2 = 7 + 2

E. Multiplication Property of Equality
   –for all real numbers x, y, and z, if x = y, then xz = yz and z ≠ 0, then x = y
   Multiplying the same nonzero number to both sides of the yields an equivalent equation. For example, $\frac{x}{6}$ =5 is equal to $\frac{x}{6}$ (6) =5 (6)

2. Worked Example
When we solved an equation, we find the solution set of an equation. The properties of equality are used to solve equations.

1. Solve for x in the equation, x + 5 = 25
   Solution:

x + 5 = 25	Given equation
x + 5 + (-5) = 25 + (-5)	Addition Property of Equality
x = 20	

2. Solve for x in the equation, x - 4 = 9

Remind learners to always check their obtained value of the unknown variables.

Solution:

$$x - 4 = 9$$ Given equation

$$x - 4 + 4 = 9 + 4$$ Addition Property of Equality

x = 13

Check:

$$x + 5 = 25$$
$$20 + 5 = 25$$
$$25 = 25$$

3. Solve for x in the equation, $3x + 17 = 59$

Solution:

$$3x + 17 = 59$$ Given equation

$$3x + 17 + (-17) = 59 + (-17)$$ Addition Property of Equality

$$3x = 42$$

$$\tfrac{1}{3}(3x) = 42 \left(\tfrac{1}{3}\right)$$ Multiplication Property of Equality

x = 14

Check:

$$x - 4 = 9$$
$$13 - 4 = 9$$
$$9 = 9$$

4. Solve for x in the equation, $13x + 5 = 7x - 13$.

Solution:

$$13x + 5 = 7x - 13$$ Given equation

$$13x + 5 + (-5) + (-7x) = 7x - 13 + (-5) + (-7x)$$ Addition Property of Equality

$$13x - 7x = -13 + (-5)$$

$$6x = -18$$

$$\tfrac{1}{6}(6x) = -18\left(\tfrac{1}{6}\right)$$ Multiplication Property of Equality

x = –3

Check:

$$3 (14) + 17 = 59$$
$$42 + 17 = 59$$
$$59 = 59$$

Let us have some other type of equations involving linear equations in one variable.

1. Solve for x: $2(x - 6) = 3(2x + 4)$

Solution:

$$2 (x - 6) = 3 (2x + 4)$$ Given equation

$$2x - 12 = 6x + 12$$ Applying the Distributive Property of Multiplication over Addition (DPMA)

$$2x - 12 + (12-6x) = 6x + 12 + (12-6x)$$ Addition Property of Equality

$$(2x - 6x) + (12-12) = (6x - 6x) + (12+12)$$

$$-4x = 24$$

Check:

$$13x + 5 = 7x - 13$$
$$13(-3) + 5 = 7(-3) - 13$$
$$-39 + 5 = -21-13$$
$$-34 = -34$$

$\frac{1}{4}$ (-4x) = 24 $\left(\frac{1}{4}\right)$ Multiplication Property of Equality

       x = –6

Check:

1. 2 (x – 6) = 3 (2x + 4)

  2 (-6 -6) = 3 (2(-6) + 4)

   2(-12) = 3 (-12 + 4)

     -24 = 3 (-8)

     -24 = -24

2. Find the solution of the given linear equation, 3(x+5) + 4 (x+5) = 21

   Solution:

      3(x+5) + 4 (x+5) = 21   Given equation

      3x + 15 + 4x + 20 = 21   DPMA

          7x + 35 = 21   Combining similar terms

      7x + 35 – 35 = 21 – 35   APE

           7x = -14

      $\frac{1}{7}$ (7x) = -14 $\left(\frac{1}{7}\right)$ MPE

          x = –2

Check:

2. 3(x+5) + 4 (x+5) = 21

  3(-2+5) + 4 (-2+5) = 21

     3(3) + 4 (3) = 21

       9 + 12 = 21

        21 = 21

3. Solve for x in the given linear equation, $\frac{x+2}{3}$ = $\frac{2x-7}{5}$

   Solution:

      $\frac{x+2}{3}$ = $\frac{2x-7}{5}$ Given equation

      $\frac{x+2}{3} \times \frac{2x-7}{5}$ Apply the cross multiplication

     5 (x + 2) = 3 (2x – 7)

      5x + 10 = 6x – 21   DPMA

      5x – 6x = -21 -10   APE

        -x = -31   Multiply both sides by -1

        x = 31

4. Solve: $|x + 4| = 15$

   Solution:

   There are two cases to consider:

    Case 1: $|x + 4| = 15$

          x + 4 = 15

            x = 15 – 4

           x = 11

    Case 2:   x + 4 = -15

            x = -15 – 4

           x = -19

Check:

3. $\frac{x+2}{3}$ = $\frac{2x-7}{5}$

  $\frac{31+2}{3}$ = $\frac{2(31)-7}{5}$

    $\frac{33}{3}$ = $\frac{62-7}{5}$

    11 = $\frac{55}{5}$

    11 = 11

Recall why there's a need to have two cases if absolute value is

Thus, the solution set is {11, -19}

5. Solve: $|2x + 3| = 9$
   Solution:
   Case 1:   2x + 3 = 9
   Case 2:   2x + 3 = -9

   Case 1:   2x + 3 = 9
                        2x + 3 − 3 = 9 − 3
                            2x = 6
                        $\frac{1}{2}$ (2x) = 6 ($\frac{1}{2}$)
                            x = 3
   Case 2:   2x + 3 = -9
                        2x + 3 − 3 = -9 − 3
                            2x = -12
                        $\frac{1}{2}$ (2x) = -12 ($\frac{1}{2}$)
                            x = −6

DAY 3
3. **Lesson Activity**
   Activity 3: Identify Me!
   A. Give the property of Equality that is illustrated by each of the following.
       1. If n + 1 = 4, then n = 3   _____
       2. 10 = 10   _____
       3. If 5 = x , then x = 5   _____
       4. If x = 7 and y + 2 = x
          then 7 = y + 2   _____
       5. If 2x = 12 , then x = 6   _____
       6. If 3x + 7 = 1, then 3x = -6   _____

involved. Solving equations involving absolute value asks for the number x such that if you get its absolute value , $|x|$ = x and $|−x|$ = x

Thus, it has solution set {x, -x}

Activity 3 Answer Keys:
A.

	7. If 16x = -8 , then x = 1/2 _____
	8. If x = 2, then 3x = 6 _____
	9. If x = 5, then 5 + x = 2x _____
	10. If 3x – 12 = 21, then 3x = 33 _____
	
	B. Solve for the unknown value of the linear equation in one-variable by applying the property of equality. Show your solution.
	  1. $2x - 18 = 44$
	  2. $4x + 11 = 23$
	  3. $7x + 4 = 5x - 18$
	  4. $3x - 6 = 12x + 9$
	  5. If $3x + 6 = 12$, then $2x + 4 =$ _____
	  6. $\frac{3x}{5} = \frac{2x-9}{5}$
	  7. $\frac{2x+1}{2} = \frac{1}{6} + 2x$
	  8. $3(x + 5) + 4(x + 5) = 21$
		1. Addition Property
		2. Reflexive Property
		3. Symmetric Property
		4. Transitive Property
		5. Multiplication Property
		6. Addition Property
		7. Multiplication Property
		8. Multiplication Property
		9. Addition Property
		10. Addition Property
		
		B.
		
		1. x = 31
		2. x = 3
		3. x = - 11
		4. x = -5/3
		5. x = 2; 2x + 4 = 8
		6. x = -9
		7. x = $\frac{1}{3}$
		8. x = -2

D. Making Generalizations	**DAY 4** **1. Learners' Takeaways** Answer the question in your reflection journal. Why is it important to understand expressions and equations? How do they differ? **2. Reflection on Learning** Does understanding the different properties will be of great help in solving linear equations? Explain your answer.	

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION	**NOTES TO TEACHERS**

A. **Evaluating Learning**	**1. Formative Assessment** Complete the crossword puzzle by solving the linear equation in one-variable.	**Answer:**

1. Formative Assessment

Complete the crossword puzzle by solving the linear equation in one-variable.

Across
1. x + 16 = 51
2. 3x – 300 = 63
4. 7x = 168
5. 3x – 3 = 114
7. 2x + 22 = 90
8. 6x – 8 = 376
9. $\frac{x}{4}$ = 103
11. 6x – 11 = 12

Down
1. $\frac{x}{6}$ + 8 = 13
3. 6x + 50 = 650
6. $\frac{x}{8}$ + 12 = 80
10. 2x – 100 = 26

Answer:

¹3	5	■	²1	2	³1
0	■	⁴2	4	■	0
■	⁵3	9	■	■	0
⁶5	■	■	⁷3	4	■
4	■	⁸6	4	■	¹⁰6
⁹4	1	2	■	¹¹2	3

Across
1. x = 35
2. x =121
4. x = 24
5. x = 39
7. x = 34
8. x = 64
9. x = 412
11. x = 23

Down
1. x = 30
3. x = 100
6. x = 544
10. x = 63

2. Homework (Optional)

Decide whether the given number is a solution of the equation.
1. -3 + 4x -11, x = -2
2) 2 – 5 (x -3) = 3, x = 2

B. **Teacher's Remarks**	*Note observations on any of the following areas:*	**Effective Practices**	**Problems Encountered**	The teacher may take note of

	strategies explored			some observations related to the effective practices and problems encountered after utilizing the different strategies, materials used, learner engagement, and other related stuff.
	materials used			
	learner engagement/ interaction			Teachers may also suggest ways to improve the different activities explored/lesson exemplar.
	others			
C. Teacher's Reflection	*Reflection guide or prompt can be on:* • *principles behind the teaching* *What principles and beliefs informed my lesson?* *Why did I teach the lesson the way I did?* • *students* *What roles did my students play in my lesson?* *What did my students learn? How did they learn?* • *ways forward* *What could I have done differently?* *What can I explore in the next lesson?*			Teacher's reflection in every lesson conducted/facilitated is essential and necessary to improve practice. You may also consider this as an input for the LAC/Collab sessions.