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DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Mathematics

Quarter 3
Lesson
2

Lesson Exemplar for Mathematics Grade 8
Quarter 3: Lesson 2 (Week 2)
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… 1. solve problems (e.g., number problems, geometry problem, and money problems involving linear equations in one variable.
D. Content	A. Solving Word Problems Involving Linear Equations in One Variable • Number Problems • Age Problem • Geometry Problems • Money Problems • Other types of problems
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** Solve the following equations. 1. 3a – 12 = 21 2. 16a = -8 3. 3x – 4 = 2x + 9 4. 7x – 15 = 3x + 9 5. 12x = 288 **2. Feedback (Optional)** What is the impact of the activity on the learners? How did the learners comprehend the previous lesson?	This section of the review focuses on solving linear equations in one variable. **Short Review Answer:** 1. a = 11 2. a = -1/2 3. x = 13 4. x = 6 5. x = 24
B. Establishing Lesson Purpose	**1. Lesson Purpose** Real-life situations can often be represented using linear equations. Linear equations are widely used for solving word problems. Common applications are geometry problems, tracking population growth over time, calculating mileage rates, predicting profit, determining age, and solving number problem, among others. We often encounter problems that can be solved using equations. To answer these problems, it is helpful to denote the unknown quantity with a variable and create an equation based on the given conditions. Then solve the equations using various methods such as trial and error, systematic approaches, or applying properties of equality. Depending on the nature of the equation, some methods may be more efficient than others. The purpose of studying this lesson is to simplify solving word problems. The equations are typically presented in words, they are known as word problems. Using your knowledge of solving single-variable equations, you have already practiced solving real-life problems. Solving word problems is both a challenging and rewarding experience. **2. Unlocking Content Vocabulary** 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.	In this part the teacher will introduce the lesson and its application to daily life.

C. Developing and Deepening Understanding	**SUB-TOPIC: Solving Word Problems Involving Linear Equations in One Variable** **1. Explicitation** Solving word problems involves writing and solving equations. A word problem generally states some numerical relationships and asks a question. The information given is used to write an equation. Then solve the equation to find the unknown or what is being asked. The equation should always be equal on both sides. The following steps are involved while restating a situation into a mathematical statement: Step 1: Read the problem and identify the unknown quantity. Step 2: Choose a variable to represent this quantity. Step 3: Formulate the equation for the variable to be determined. Step 4: Solve the equation using any of the methods learnt earlier. Step 5: Check the answer to make sure it makes sense **2. Worked Example** Now, we can proceed to solving word problems involving linear equation in one variable. **A. Number Problems** 1. Find two consecutive integers whose sum is 29. Solution: Let: x - be the first number x + 1- the second number Equation: x + x +1 = 29 Solve for the equation applying the properties of equality. x + x + 1 = 29 Addition Property of Equality 2x + 1 = 29 2x + 1 – 1 = 29 -1 2x = 28 Multiplication Property of Equality x = 14 Therefore, the first number is x = 14, and the second number is x + 1 = 14+1 =15 2. The difference between the two numbers is 72. The larger number is 3 less than six times the smaller number. Find the two numbers. Solution: Let: x - be the smaller number 6x – 3 - the larger number Equation: Larger number – smaller number = 72 6x – 3 – (x) = 72	In this part of the lesson, solving word problems on linear equations in one-variable will be discussed following the steps given. Emphasize the different steps and remind them to always check the obtained answer to the problem. Checking: x + x + 1 = 29 14 + 14 + 1 = 29 29 = 29

$$5x - 3 = 72$$
$$5x - 3 + 3 = 72 + 3$$
$$5x = 75$$
$$x = 15$$

Therefore, the first number is 15.

To find the second number, substitute the obtained value of x.

$$6x - 3$$
$$6(15) - 3 = 87$$

The second number is 87.

Checking:

$$6x - 3 - x = 72$$
$$6(15) - 3 - 15 = 72$$
$$90 - 18 = 72$$
$$72 = 72$$

First number = 15
Second number = 87

$$87 - 15 = 72$$

3. Find three consecutive integers whose sum is 87.

Solution: Let: x - first integer
x + 1 - second integer
x + 2 - third integer

Equation: Since the sum of the three integers is 87,
First integer + second integer + third integer = 87

$$x + x + 1 + x + 2 = 87$$
$$3x + 3 = 87$$
$$3x + 3 - 3 = 87 - 3$$
$$3x = 84$$
$$x = 28$$

x = 28, the first integer
x + 1 = 29, the second integer
x + 2 = 30, the third integer
28 + 29 + 30 = 87

Checking:

$$x + x + 1 + x + 2 = 87$$
$$28 + 28 + 1 + 28 + 2 = 87$$
$$87 = 87$$

4. Find three consecutive odd integers such that three times the second minus the third is 21 more than the first.

Solution: Let: x - first odd integer
x + 2 - second odd integer
x + 4 - third odd integer

Equation: 3 (second) – third integer = first integer + 21

$$3(x + 2) - (x + 4) = x + 21$$
$$3x + 6 - x - 4 = x + 21$$
$$2x + 2 = x + 21$$
$$2x - x = 21 - 2$$
$$x = 19$$

Substitute:

$x = 19$, the first odd integer

$x + 2 = 21$, the second odd integer

$x + 4 = 23$, the third integer

Checking:

$3(19+2) - (19+4) = 19 + 21$

$3(21) - 23 = 40$

$63 - 23 = 40$

$40 = 40$

5. The tens digit of a number is thrice the units digit. If the digits are reversed, the new number is 36 less than the original number. Find the original number.

Solution: Let: x - the units digit

3x - the tens digits

Equation: The original number is $10(3x) + x$

The reversed number is $10(x) + 3x$

The new number is the original number less than 36.

$$10(x) + 3x = 10(3x) + x - 36$$
$$10x + 3x = 30x + x - 36$$
$$13x = 31x - 36$$
$$13x - 31x = -36$$
$$-18x = -36$$
$$x = 2, \text{ the units digit}$$
$$3x = 6, \text{ the tens digit}$$

The new number is $6(10) + 2 = 62$

Checking:

$10(3)(2) + 2 = 62$

$10(2) + 3(2) = 26$

B. Age Problem

In solving the age problem, represent the age of one person as x and the ages of all other people in the problem in terms also of the variable x. Find the relationship between the ages of the people involved in the problem.

1. The age of Bianca is 4 more than 3 times the age of Ryan. The sum of their ages is 32. Find their ages.

Solution: Let: x – be the age of Ryan

3x + 4 – age of Bianca

Equation: Age of Ryan + Age of Bianca = 32

$$x + 3x + 4 = 32$$
$$4x + 4 = 32$$
$$4x = 32 - 4$$
$$4x = 28$$
$$x = 7$$

Therefore, Ryan is 7 years old, and Bianca is $3(7) + 4 = 25$ years old

Checking:

$x + 3x + 4 = 32$

$7 + 3(7) + 4 = 32$

$7 + 21 + 4 = 32$

$32 = 32$

2. Ely's mother is 35 years old. Three years ago, she was 4 times as old as Ely was then. How old is Ely now?

Solution: Let: x = Ely's age

x – 3 = Ely's age three years ago

4(3x – 4) – four times Ely's age three years ago

35 – 3 = 32 – mother's age three years ago

Equation: 4 (x -3) = 32

4x – 12 = 32

4x = 32 + 12

4x = 44

x = 11

Therefore, Ely's age now is 11 years old.

Checking:

4 (x – 3) = 32

4 (11 – 3) = 32

4 (8) = 32

32 = 32

DAY 2

C. Geometry Problems

Some geometric problems such as perimeter, areas, angles can be solved using linear equation in one- variable. Let us try to look at some of the word problems.

1. A 110-meter length fence is used to enclose a rectangular parking lot. The length of the garden is 5 meters more than its width. Find the length and the width of the parking lot enclosed.

Solution: Let: x – be the width of the parking lot

x + 5 – be the length

Equation: Perimeter = length + length + width + width

P = 2 l + 2 w

110 = 2 (x + 5) + 2(x)

110 = 2x + 10 + 2x

110 – 10 = 4x

100 = 4x

x = 25

Therefore, the width is 25 meters and the length 25 + 5 = 30 meters

Checking:

P = 2l + 2 w

110m = 2(30) + 2(25)

110m = 60 + 50

110m = 110m

2. The supplement of an angle measures 25° more than twice its complement. Find the measure of the angle.

Solution: Let: x = measure of the unknown angle

90 – x = measure of its complement

180 – x = measure of its supplement

Equation: supplement = 25 + 2 (complement)

$$180 - x = 25 + 2(90 - x)$$
$$180 - x = 25 + 180 - 2x$$
$$180 - x = 205 - 2x$$
$$-x + 2x = 205 - 180$$
$$x = 25$$

Therefore, the measure of the angles is 25°, its complement is 65° and its supplement is 155°.

Checking:

$180 - x = 25 + 2(90 - x)$

$180 - 25 = 25 + 2(90 - 25)$

$155 = 25 + 130$

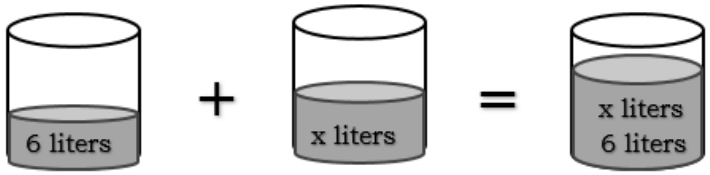
$155 = 155$

D. Mixture Problem

In this type of word problem, illustrations may be used to visualize more the representation of the given information in the problem. This type of word problem involves the percentage of chemical mixtures or ingredients.

The teacher can add more word problems to fully understand solving linear equations in one variable.

1. A group of STEM students are conducting experiments in their Science Investigatory class. They need 6 liters of 12% alcohol solution to be mixed with a 20 % solution to get a 14% solution. How many liters of the 20% solution are needed?



Summarize in a table:

	Percent concentration	**Number of liters**	**Amount of alcohol**
Solution 1	12%	6 liters	(0.12)(6) = 0.72
Solution 2	20%	x liters	0.20 x
Resulting mixture	14%	x + 6 liters	0.14 (x + 6)

Equation: $0.72 + 0.20x = 0.14(x+6)$

$$0.72 + 0.20x = 0.14x + 0.84$$
$$0.20x - 0.14x = 0.84 - 0.72$$
$$0.06x = 0.12$$
$$x = 2$$

The class needs to mix 2 liters of the 20% alcohol solution.

2. In a TVL Baking class, the students studied a certain grade of milk which contains 10% butterfat and a certain grade of cream 60% butterfat. How many liters of each must be taken to obtain a mixture of 100 liters that will be 45% butterfat?
Solution:

	Value	**Amount**	**Mixture**
Milk	0.10	100 - x	(0.10)(100-x)
Cream	0.60	x liters	0.60 x
Resulting mixture	0.45	100 liters	0.45 (100)

Equation: $(0.10)(100-x) + 0.60x = 0.45(100)$

$10 - 0.10x + 0.60x = 45$

$0.50x = 45 - 10$

$0.50x = 35$

$x = 70$

Thus, 70 liters of milk with 10% butterfat and 30 liters of cream with 60% butterfat is needed.

E. Money Problem

1. Shane saves money in her piggy bank. A total of Php 4,800.00 consisting of Php 50- and Php 100 bills. The number Php 50-bills is 16 less than twice the number of 100-bills. How many bills of each kind does Shane have in her piggy bank?
Solution: Let: x = be the number of 100-peso bill
$2x - 16$ = be the number of 50-peso bill

Denomination	**Number of Pieces**	**Total Amount**
50	$2x - 16$	$50(2x - 16)$
100	x	100 x

The total amount of Shane's money, which is 4800, is equal to the amount of the 50-peso bills and the total amount of 100-peso bills that she has.

Equation: $50(2x-16) + 100x = 4800$

$100x - 800 + 100x = 4800$

$200x = 4800 + 800$

$200x = 5600$

$x = 28$

Therefore, there 28 pieces of 100-peso bill and 2(28)-16 = 40 pieces of 50 peso bill.

F. Other word problems

1. In a park, two kids are on a seesaw. One kid weighs 40 kilograms and sits 2.5 from the fulcrum of the seesaw. How far must the second kid sit to balance the seesaw if he weighs 64 kilograms?

Search image of child on the seesaw. Sample figure:
https://www.quora.com/How-can-a-small-child-play-with-a-much-heavier-child-on-the-seesaw

Solution: weight 1 (distance 1) = weight 2 (distance 2)

$$40\,(2.5) = 64\,(x)$$
$$100 = 64x$$
$$x = 1.5625 \text{ m}$$

Therefore, the other kid must sit at least 1.57m from the center.

2. A jeepney leaves Tere's house at 40km per hour(kph). Two hours later, her mother rides a grab taxi and leaves the same place at 60 kph. How long will it take for her mother's grab taxi to overtake Tere's jeepney.
Solution: Let: t = the number of hours for the taxi to overtake the grab car.

	Rate	Time	Distance
Jeepney	40 kph	t + 2	40 (t + 2)
Grab taxi	60 kph	t	60 t

In overtaking situations, distance traveled is equal. Hence, in this case,

Distance the grab car travels = distance the taxi travels

$$40\,(t + 2) = 60t$$
$$40t + 80 = 60t$$
$$80 = 60t - 40t$$
$$80 = 20t$$
$$t = 4$$

Thus, the grab taxi will take 4 hours to overtake the jeepney.

3. Mr. Chua leaves home for work at 6:20 am driving at 60 km. per hour. If his school is 80 km. away, at what time will he reach the school?

Solution: d = rt

$80 = 60t$

$t = \frac{80}{60}$

$t = \frac{4}{3}$

Thus, $t = \frac{4}{3} = 1\ \frac{1}{3}$ hours or 1 hour and 20 minutes. Mr. Chua will reach his school at 7:40 am.

4. Alexa sold 32 photocards on Friday, some for 7 pesos and the rest for 2 pesos each. If her receipts from the sale of 32 photo cards is 129 pesos, how many of each kind did he sell?

Solution: Let: x - denote the number of 2 pesos photocards

$32 - x$ - denotes the number of 7 pesos photocards

$2x$ - denotes the receipts in pesos from 2 pesos

$7(32 - x)$ - denotes the receipts in pesos from 7 pesos

Total receipts = Receipts from 2 pesos + receipts from 7 pesos photocards

$129 = 2x + 7\ (32 - x)$

$129 = 2x + 224 - 7x$

$129 - 224 = -5x$

$-95 = -5x$

$19 = x$

$13 = 32-x$

Thus, 19 of the 2 pesos photocards and 13 of the 7 pesos photocards were sold.

DAY 3

3. Lesson Activity

Activity 1: Let's Solve This!

Solve the following word problems.

1. The larger of two numbers is 5 less than twice the smaller, and their sum is 28.
2. Shane is twice as old as Annie. Ten years ago, her age was thrice of Annie. Find their present age.
3. The length of the legs of an isosceles triangle is 4 meters more than its base. If the perimeter of the triangle is 44 meters, find the lengths of the sides of the triangle.

On this part of the lesson, the students will try to solve problems involving linear equations in one variable.

Activity 1 Answers:

1. smaller number = 11
   bigger number = 17

2. Annie's age = 20 years old
   Shane's age = 40 years old

3. The length of the base is 12 and the two legs are 16.

4. smaller group = 18
   bigger group = 27

	4. Class Matatag has 45 students which is to be divided into two groups. If one group has 9 students less than the other, how many students are in each group? 5. Andy and Eldan are two siblings of the Chua Family. Their combined age is 15. Eldan is twice the age of Andy. Find the age of each sibling. 6. Pepe and Pilar have two grades of milk in their small dairy farm: one that is 22% butterfat, and another is that 16% butterfat. How much of each should they used to end up with 42 liters of 20% butterfat? 7. The tens digit of a number is 5 less than the units digit. The sum of the digits is13. What is the number? 8. Mang Cardo were asked to construct a cabinet with three shelves. The height of the case is to be 60 cm. more than the width and only 6 meters of wood is available. What should be the dimension of the cabinet?	5. Andy = 5 years old Eldan = 10 years old 6. 28 liters are needed to end up with 42 liters of 20% butterfat. 7. x= 9 x-5 = 4 49 is the number 8. w = 80 cm l = 140 cm
D. Making Generalizations	**DAY 4** **1. Learners' Takeaways** Why is it important to represent the unknown value using variables when solving word problems? **2. Reflection on Learning** How can you use the skills of solving linear equations in one variable in your everyday life?	Answer the question in your reflection journal.

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		**NOTES TO TEACHERS**
A. Evaluating Learning	**1. Formative Assessment** Solve the following problems on linear equations in one variable. 1. The second angle of a triangle is double the first. The third angle is 40 less than the first. Find the measure of the three angles. 2. Alexa thought of a number then tripled it. After subtracting 7 from the result, she multiplied it by 2. If the product is 52, what was the number Alexa thought of? 3. The sum of two digits of a 2-digit number is 9. If the number obtained by interchanging the digits exceeds the original number by 27, find the number. 4. Solve 5 (2x+1) = 4 (3x -7) 5. Krisna is 12 years older than Cathy. Five years ago, the sum of their ages was 28. How old are they now?	Answer: 1. The angles are 55°, 110° and 15° 2. the number is 11 3. x = 6 Original number = 36 4. x = 23/2 5. Krisna is 25 years old Cathy is 13 years old

<table>
<tr><td></td><td colspan="3">2. Homework (Optional)
One painter can paint the entire house in twelve hours, and the second painter takes eight hours to paint a similarly sized house. How long would it take the two painters together to paint the house?</td><td></td></tr>
<tr><td rowspan="5">B. Teacher's Remarks</td><td>Note observations on any of the following areas:</td><td>Effective Practices</td><td>Problems Encountered</td><td rowspan="5">The teacher may take note of some observations related to the effective practices and problems encountered after utilizing the different strategies, materials used, learner engagement, and other related stuff.

Teachers may also suggest ways to improve the different activities explored/lesson exemplar.</td></tr>
<tr><td>strategies explored</td><td></td><td></td></tr>
<tr><td>materials used</td><td></td><td></td></tr>
<tr><td>learner engagement/ interaction</td><td></td><td></td></tr>
<tr><td>others</td><td></td><td></td></tr>
<tr><td>C. Teacher's Reflection</td><td colspan="3">Reflection guide or prompt can be on:
• <u>principles behind the teaching</u>
What principles and beliefs informed my lesson?
Why did I teach the lesson the way I did?

• <u>students</u>
What roles did my students play in my lesson?
What did my students learn? How did they learn?

• <u>ways forward</u>
What could I have done differently?
What can I explore in the next lesson?</td><td>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.</td></tr>
</table>