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Lesson Exemplar for Mathematics

Quarter 3
Lesson

4

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Lesson Exemplar for Mathematics Grade 8
Quarter 3: Lesson 4 (Week 4)
SY 2025-2026

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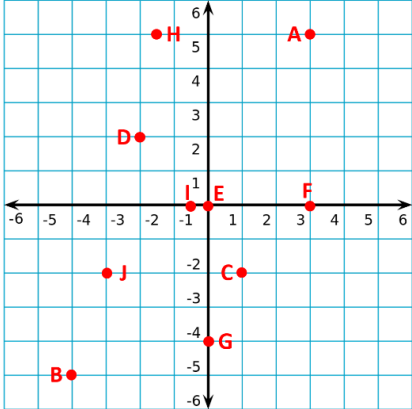
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SiMERR National Research Centre

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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 two variables and their graphs.
B. Performance Standards	By the end of the quarter, the learners are able to graph linear equations in two variables.
C. Learning Competencies and Objectives	<i>Learning Competencies</i> The learners: 1. describe a linear equation in two variables and express its solution using ordered pairs; 2. define and determine the slope and intercepts of a line; and 3. sketch the graph of a linear equation. <i>Learning Objectives</i> By the end of the lesson, the learners are expected to: 1. describe linear equation in two variables; 2. determine the slope and intercepts of a line; and 3. graph linear equations in a cartesian plane.
D. Content	Linear Equation in Two Variables
E. Integration	None

II. LEARNING RESOURCES	
Admin. (2021, September 23). Linear Equations - Standard forms and examples. BYJUS. https://byjus.com/maths/linear-equations/ Jerimi. (2017, September 22). Using the slope formula to find the slope of a line - MathBootCamps. MathBootCamps. https://www.mathbootcamps.com/using-the-slope-formula-to-find-the-slope-of-a-line/ Understanding slope of a line. (n.d.). Grade a Math Help. http://www.gradeamathhelp.com/understanding-slope.html	

III. TEACHING AND LEARNING PROCEDURE	NOTES TO TEACHERS
A. Activating Prior Knowledge DAY 1 1. Short Review Activity 1: Do You Remember? Let the learners identify the location of the given points in the cartesian coordinate plane. 1. A (__, __) 2. B (__, __) 3. C (__, __) 4. D (__, __) 5. E (__, __) 6. F (__, __) 7. G (__, __) 8. H (__, __) 9. I (__, __) 10. J (__, __)  2. Feedback (Optional)	This activity is intended to recall the concept of locating points in a cartesian coordinate plane. Answer: 1. A (3, 5) 2. B (-4, -5) 3. C (1, -2) 4. D (-2, 2) 5. E (0, 0) 6. F (3, 0) 7. G (0, -4) 8. H (-3/2, 5) 9. I (-0.5, 0) 10. J (-3, -2)
B. Establishing Lesson Purpose 1. Lesson Purpose Activity 2: Let's Explore Let the learners analyze the situation below and answer the questions that follow. The base fare for a jeepney ride is ₱13.00 for the first 4km. Then for every additional km, ₱2.00 is added. Guide Questions: 1. What equation represents the total cost (y) of riding a jeepney and distance traveled in kilometers (x)? 2. If you traveled an additional 10km, what would be the total cost of your jeepney ride? 3. What kind of equation was represented in the situation? 2. Unlocking Content Vocabulary • Linear Equation is a first-degree equation whose graph is a line.	Activity 2 is intended to give the learners an idea of modeling linear equations in two variables. You may also add other questions if necessary. Answer: 1. $y = 2x + 13$ 2. $y = ₱33.00$ 3. linear equation in two variables

- **Slope** is the ratio of rise and run. It also determines the steepness of a line. It is denoted by **m**.
- **Intercepts** are points in a cartesian plane where the graph of a linear equation and the axes intersect. The point where it intersects in the x-axis is the x-intercept while the point where it intersects in the y-axis is called y-intercept.
- **Ordered Pair** represents the location of a point in a cartesian plane. The first value is the x-coordinate or abscissa while the second value is the y-coordinate or ordinate.

C. Developing and Deepening Understanding

DAY 2-3

1. Explicitation

Given that a, b and c are real numbers and $a \neq 0$ and $b \neq 0$, a linear equation in two variables can be represented in the following forms:

$$ax + by + c = 0$$

General Form

$$ax + by = c$$

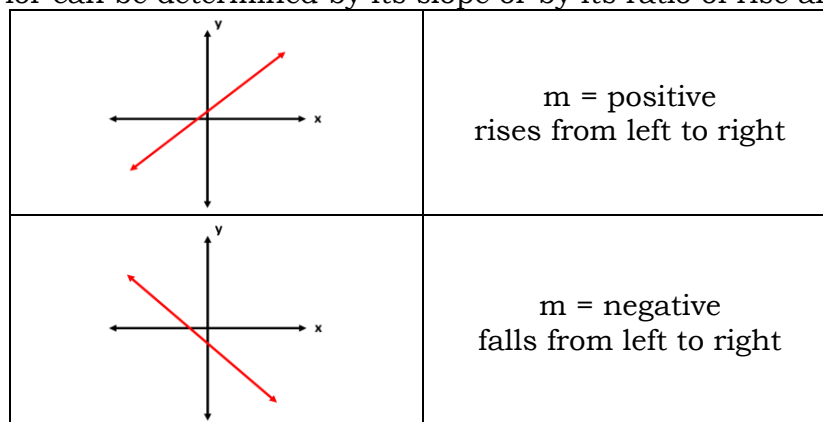
Standard Form

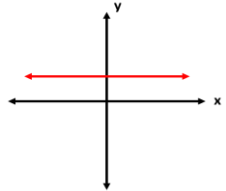
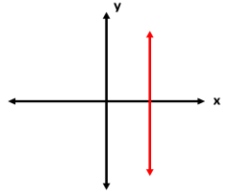
$$y = mx + b$$

Slope-Intercept Form

In the jeepney fare situation in Activity 1, the equation $y = 13 + 2x$ is an example of a linear equation in two variables. It is written in slope-intercept form and its solution can be expressed as an ordered pair. One solution for this is the answer in Guide Question no. 2 where if $x = 10$, then $y = 33$ or simply (10, 33).

As mentioned earlier, the graph of a linear equation in two variables is a line. Its behavior can be determined by its slope or by its ratio of rise and run.



	$m = 0$ horizontal line
	$m = \text{undefined}$ vertical line

The slope of a line can be determined using the following ways:

- if given the equation of the line, transform it into its slope-intercept form;
- if given the graph of a linear equation in two variables, choose two points in the line, then from the first point, count the ratio of rise (positive if upward and negative if downward) and run (positive if going to the right and negative if going to the left) to the second point; and
- if two points of the graph can be determined or was given, you may use the formula for finding the slope $m = \frac{y_2 - y_1}{x_2 - x_1}$.

In graphing linear equations in two variables, we can use the following ways:

- If given the equation of the line, transform it into slope-intercept form and determine the value of the slope and its y-intercept. Plot first the y-intercept then from there, count the number of rise and run based on your slope and plot another point. Finally connect these points and form a line.
- If given the equation of the line, solve for the x-intercept and y-intercept. Then, plot these points, connect them and form a line.

2. Worked Example

Example 1: List two possible solutions for the linear equation $2x - 6y - 12 = 0$.

Solution: From the problem, we are given $2x - 6y - 12 = 0$.

If $x=0$

$$\begin{aligned}
 2x - 6y - 12 &= 0 \\
 2(0) - 6y - 12 &= 0 \\
 -6y - 12 &= 0 \\
 -6y &= 12
 \end{aligned}$$

If $x=1$

$$\begin{aligned}
 2x - 6y - 12 &= 0 \\
 2(1) - 6y - 12 &= 0 \\
 2 - 6y - 12 &= 0 \\
 -6y - 10 &= 0
 \end{aligned}$$

$$\frac{-6y}{-6} = \frac{12}{-6}$$

$$y = -2$$

$$\frac{-6y}{-6} = \frac{10}{-6}$$

$$y = -\frac{5}{3}$$

So, one solution is (0, -2) So, another solution is (0, -5/3)

Hence, two possible solutions are (0, -2) and (0, -5/3).

Note: For linear equations, there are infinitely many possible solutions.

Example 2: Identify whether (7, -6) is a solution of $x + 3y = 14$.

Solution: From the problem, we are given (7, -6) and $x + 3y = 14$.

$$\begin{aligned} x &= 7; y = -6 \\ x + 3y &= 14 \\ (7) + 3(-6) &\stackrel{?}{=} 14 \\ 7 - 18 &\stackrel{?}{=} 14 \\ -11 &\neq 14 \end{aligned}$$

Since (7, -6) does not satisfy the given linear equation, **it is not a solution.**

Example 3: Determine the slope and x-intercept of the line with equation of $2x + 3y = 12$

Solution: From the problem, we are given $2x + 3y = 12$

$$\begin{aligned} 2x + 3y &= 12 \\ 3y &= -2x + 12 \\ \frac{3y}{3} &= \frac{-2x + 12}{3} \\ y &= -\frac{2}{3}x + 4 \end{aligned}$$

From the slope-intercept form $y = -\frac{2}{3}x + 4$, we can now determine that **$m = -\frac{2}{3}$** and **y-intercept = 4.**

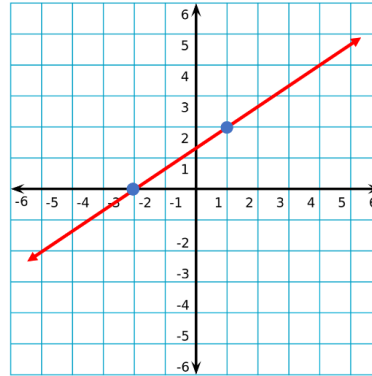
You may click the link or scan the QR Code below to access the images used for the worked examples.



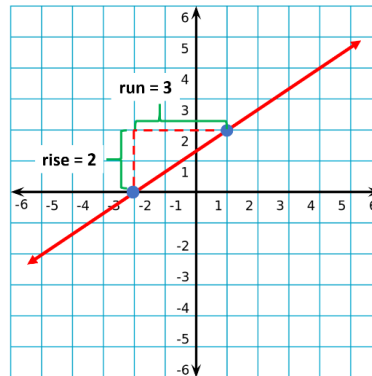
<https://bit.ly/G8-LESSON8>

You may also add more examples if needed.

Example 4: Determine the slope of the line with whose graph is sketch below:



Solution: From the problem, we can start counting the ratio of rise and run from (-2, 0) to (1, 2)



Thus, since the slope is the ratio of rise and run, $m = \frac{2}{3}$

Another solution for this example is by using the formula for finding slope which is $m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$ From the problem, there are two points in the graph which is (-2, 0) and (1, 2), hence $x_1 = -2$, $x_2 = 1$, $y_1 = 0$, and $y_2 = 2$

$$\begin{aligned} m &= \frac{(y_2 - y_1)}{(x_2 - x_1)} \\ &= \frac{(2 - 0)}{(1 - (-2))} \\ m &= \frac{2}{3} \end{aligned}$$

Thus, $m = \frac{2}{3}$

Example 5: Sketch the graph of the linear equation $3x - 5y + 5 = 0$.

Solution: From the problem, we are given $3x - 5y - 5 = 0$

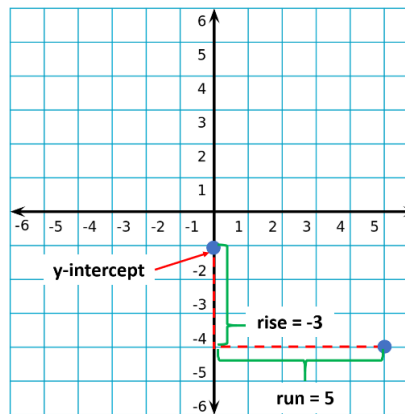
$$3x + 5y + 5 = 0$$

$$5y = -3x - 5$$

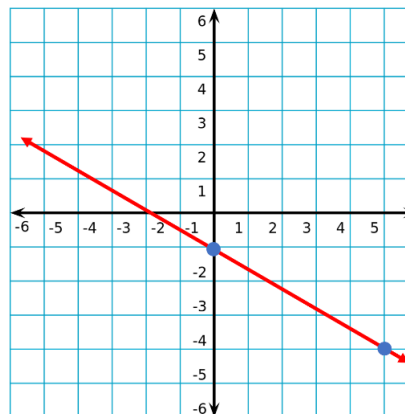
$$\frac{5y}{5} = \frac{-3x - 5}{5}$$

$$y = -\frac{3}{5}x - 1$$

Now we have $m = -\frac{3}{5}$ and y-intercept = -1. From this, we can now plot the y-intercept and then count the number of rise and run



Since we already have two points, we can now connect them and form a line. Thus, the graph is as shown below.



Example 6: Sketch the graph of $3x - 5y + 5 = 0$ using its intercepts.

Solution: We can solve for the x-intercept and y-intercept of the equation by letting $x=0$ and $y=0$

If $x=0$

$$\begin{aligned} 3x + 5y + 5 &= 0 \\ 3(0) + 5y + 5 &= 0 \\ 5y + 5 &= 0 \\ 5y &= -5 \\ \frac{5y}{5} &= \frac{-5}{5} \\ y &= -1 \end{aligned}$$

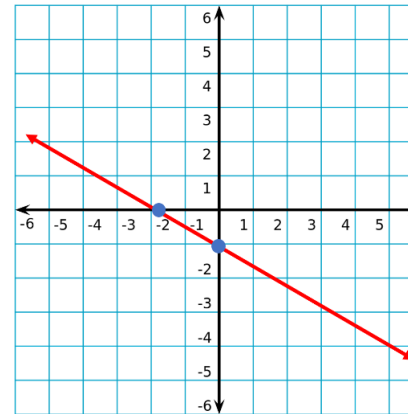
So, we have (0, -1) as the y-intercept

If $y=0$

$$\begin{aligned} 3x + 5y + 5 &= 0 \\ 3x + 5(0) + 5 &= 0 \\ 3x + 5 &= 0 \\ 3x &= -5 \\ \frac{3x}{3} &= \frac{-5}{3} \\ x &= -\frac{5}{3} \text{ or } -1\frac{2}{3} \end{aligned}$$

So, we have $(-5/3, 0)$ as the x-intercept

Since we already have two points, we can plot it, then connect and form a line. Thus, the graph is as shown below.



3. Lesson Activity

Activity 3: Try This!

A. Let the learners identify if the ordered pair is a solution of the linear equation.

1. $y = 4x + 2$; (2, 10)
2. $y = -2x + 5$; (7, 5)
3. $9x + 3y = 18$; (-1, 9)
4. $-2y = 10x$; (0, 0)
5. $3x - 2y + 6 = 0$; (-3, -3)

Provide enough time for the learners to accomplish this activity.

You may adjust the indicated time in the worksheet for this activity if necessary.

Answer Key:

- A.
 1. solution
 2. not solution
 3. solution
 4. solution
 5. not solution
- B.
 6. $2x + y + 7 = 0$
 7. $2x + y = -7$
 8. -2
 9. $y = \frac{5}{2}x - 5$
 10. $5/2$
 11. -5
 12. $5x + y - 4 = 0$
 13. $5x + y = 4$
 14. $y = -5x + 4$

B. Complete the table below.

General	Standard	Slope-Intercept	m	b
(6)	(7)	$y = -2x - 7$	(8)	-7
$5x - 2y - 10 = 0$	$5x - 2y = 10$	(9)	(10)	(11)
(12)	(13)	(14)	-5	4

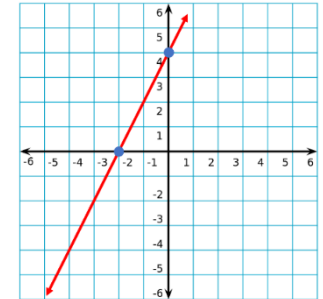
C. Sketch the graph of a linear equation given the following;

- $-4x + 2y = 8$
- $y = -2x - 4$

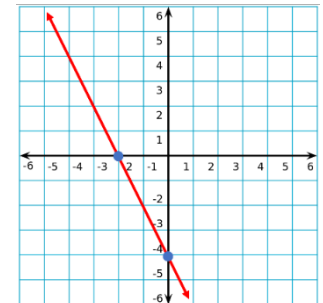
Rubrics for Part C (Max of 3 points for each item)

Score	Indicator/s
3	Provided a complete solution and graphed the linear equation correctly.
2	Provided a complete solution with minor error in the graph of the linear equation.
1	Provided an incomplete with major error in the graph of the linear equation.
0	Did not attempt to solve and graph the linear equation.

C. a.



b.



D. Making Generalizations

DAY 4

Learners' Takeaways and Reflection on Learning

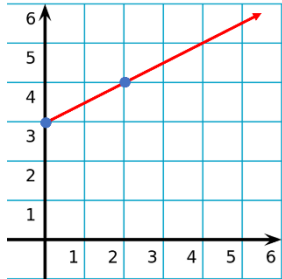
Activity 4: Closing the Loop!

Instruction: Let the learners answer the following questions.

- What are the key concepts of our lesson?
- Which part of the lesson is the easiest for you? Why?
- Which part of the lesson is the hardest for you? Why?
- How are we as a class today?

The activity is intended to determine what the learners have learned as well as to give feedback to their experiences during the lesson. Allot enough time to listen and process the responses of your learners.

You may also add questions if needed.

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION				NOTES TO TEACHERS	
A. Evaluating Learning	1. Formative Assessment Activity 5: Let's Solve It! Instruction: Let the learners analyze the situation below and answer the questions that follows. 1. You are saving money for your mother's birthday. You have already saved ₱100.00 and planning to add ₱25.00 per month. a. What linear equation represents the total amount of money (y) and the number of months (x)? b. If you want to buy a gift worth ₱500.00, will you be able to afford it after a year? Explain your answer. 2. Maria's hair is 3 inches long. Her hair grows 1/2 inch per month. a. What linear equation represents Maria's length of hair (y) and the number of months (x) it grows? b. How many months will it take before Maria's hair grows into 6 inches? c. Draw the graph of the linear equation that represents Maria's length of hair using the first quadrant of the cartesian plane only.			Answer Key: 1. a. $y = 25x + 100$ b. No. Because your total savings after a year is only ₱400.00. 2. a. $y = \frac{1}{2}x + 3$ b. 6 months c. 	
	2. Homework (Optional)				
B. Teacher's Remarks	Note observations on any of the following areas:	Effective Practices	Problems Encountered	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.	
	strategies explored				
	materials used				
	learner engagement/interaction				
	others				

C. Teacher's Reflection	<i>Reflection guide or prompt can be on:</i> • <u>principles behind the teaching</u> <i>What principles and beliefs informed my lesson?</i> <i>Why did I teach the lesson the way I did?</i> • <u>students</u> <i>What roles did my students play in my lesson?</i> <i>What did my students learn? How did they learn?</i> • <u>ways forward</u> <i>What could I have done differently?</i> <i>What can I explore in the next lesson?</i>	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.
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