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Mathematics
Quarter 1-Module 4:

Lesson 1: Writing the Linear Equation $Ax + By = C$ in the form $y = mx + b$ and Vice versa

Lesson 2 : Graphing Linear Equations

Lesson 3 : Describing the Graph of a Linear Equation

AIRs - LM

MATH 8
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in the form $\boldsymbol{y = mx + b}$ and Vice versa
Lesson 2 : Graphing Linear Equations
Lesson 3 : Describing the Graph of a Linear Equation

Second Edition, 2021

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Printed in the Philippines by: _____

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Lesson 2 : Graphing Linear Equations

Lesson 3 : Describing the Graph of a Linear Equation

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.

Target

In this module, you will learn writing linear equations in two variables in different forms.
The scope of this module enables you to use it in many different learning situations.
The lesson is 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.
This module contains:

Lesson 1: Writing the Linear Equation $Ax + By = C$ in the Form $y = mx + b$ and Vice versa.

After going through this module, you are expected to:

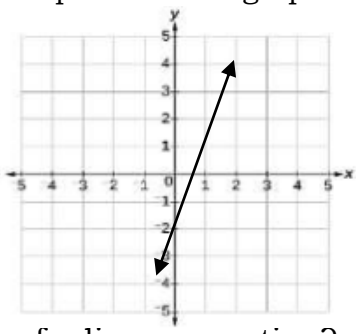
1. state the standard and slope-intercept form of linear equations,
2. translate linear equation in the form $Ax + By = C$ to $y = mx + b$ and vice versa,
3. identify the slope and the y-intercept given linear equation in two variables.

Let us find out how much you already know about this module. Answer the pre-assessment in a separate sheet of paper.

PRE-TEST:

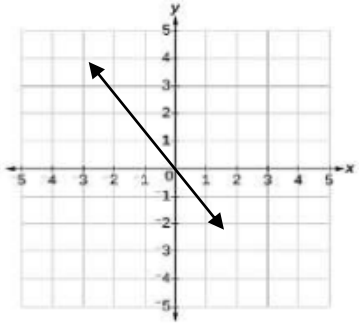
Directions: Choose the letter of the correct answer. Write your answer on a separate sheet of paper. (Take note of the items that you were not able to answer correctly and find the right answer as you go through this module)

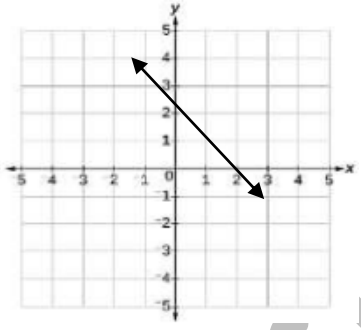
1. The standard form of the equation of a line is $Ax + By = C$. Which of the following equations is written in standard form?
   A. $2y = 2x + 8$ B. $-7y = x + 2$
   C. $x + 3y = 6$ D. $8 + y = 5$
2. Which of the following equations below is written in slope-intercept form?
   A. $4x - 3y = 10$ B. $x + y = 2$
   C. $y = -x+5$ D. $x = 2y - 6$
3. Determine the slope and y-intercept of the line $2x = y + 4$.
   A. $m = 2$; $b = -4$ B. $m = -2$; $b = 4$
   C. $m = 2$; $b = 4$ D. $m = -2$; $b = -4$
4. Which of the following is the standard form of the equation $y = -3x + 4$?
   A. $3x - y = 4$ B. $3x + y = 4$
   C. $3x + y = -4$ D. $3x - y = -4$
5. Rewrite $3x - y = 12$ in slope-intercept form.
   A. $y = 3x + 12$ B. $y = 3x - 12$
   C. $y = 3x + 6$ D. $y = -3x + 6$
6. Rewrite the equation $2x + y = 3$ in slope-intercept form.
   A. $y = 2x + 3$ B. $2x = -y + 3$
   C. $y = -2x + 3$ D. $y = -2x - 3$
7. In her Math class, Joan, was asked by her teacher to rewrite $6x + 2y = 8$ in slope-intercept form. She answered, $2y = -6x + 8$. Is Joan correct?
   A. Yes, because $6x$ and 8 is on the other side of the equation.
   B. Yes, because Joan is the smartest and never got wrong in the class.
   C. No, because the term $-6x$ must be positive.
   D. No, because the simplified answer must be $y = -3x + 4$.
8. Which is TRUE about a linear equation?
   A. It is an equation whose graph is a parabola.
   B. It is an equation which has two solutions.
   C. It is an equation having a polynomial of degree 1.
   D. It is an equation having a polynomial of degree 2.
9. Which of these linear equations represents the graph?
   A. $y = 3x - 2$
   B. $y = -3x - 2$
   C. $y = \frac{2}{3}x + 3$
   D. $y = -\frac{2}{3}x - 3$

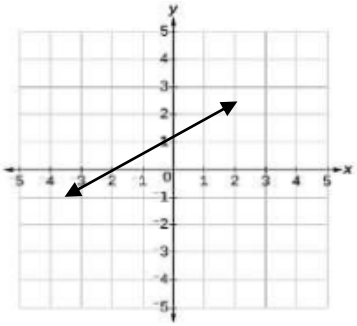


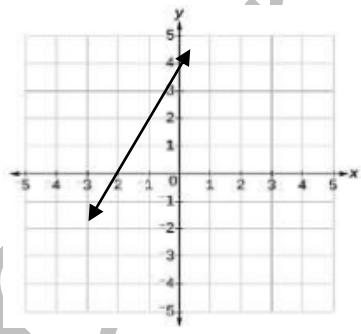
10. What do you call the graph of a linear equation?
    A. ellipse B. hyperbola C. line D. parabola

11. What is the graph of a linear equation whose slope is 2 and passes through
point (−2,0)?

A. 

B. 

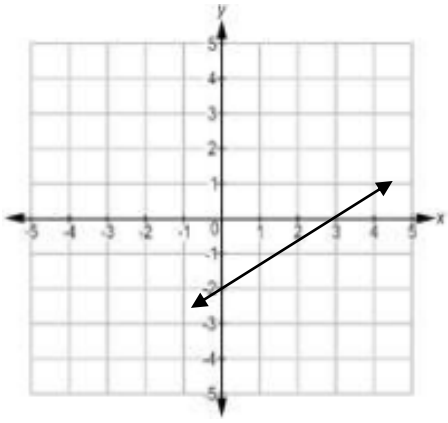
C. 

D. 

12. What is the trend of the graph of a linear equation that has a slope of 3?
A. The graph is a vertical line.
B. The graph is a horizontal line.
C. The graph is increasing from left to right.
D. The graph is decreasing from left to right.

13. A linear equation has a slope of $-\frac{3}{5}$. What is the trend of its graph?
A. The graph is a vertical line.
B. The graph is a horizontal line.
C. The graph is increasing from left to right.
D. The graph is decreasing from left to right.

Use the graph below to answer items 14 and 15.
aaaaa



14. What is the slope of the line?
A. $\frac{3}{2}$ B. $\frac{2}{3}$
C. $-\frac{2}{3}$ D. $-\frac{3}{2}$

15. What is the trend of the graph?
A. The graph is a vertical line.
B. The graph is a horizontal line.
C. The graph is increasing from left to right.
D. The graph is decreasing from left to right.

Lesson 1 Writes the Linear Equations in form and Vice versa

Previously, you studied about the concept linear equations in two variables. Likewise, you have the knowledge and skills of graphing using Cartesian Plane and illustrates and finds the slope of a line given two points, equation , and graph.

Jumpstart

At this point, you are going to take everything you have learned about linear equation and apply it. This activity will enable you to write in form ax + bx = c or y = mx+b and vice versa.

Activity1: Classify My Form

Classify each linear equation as an equation written in standard form or in slope - intercept form. Write your answer in the appropriate box.

3x-y = 7	4x – y = -8
y= 5x -2	y = -x + 9
2x+y = -4	3x+6y = 12
$y= -\frac{3}{4}x + 1$	$y= \frac{2}{3}x + 5$

Standard Form	Slope-Intercept Form

Discover

The equation of the form $Ax + By = C$ can be rewritten in the form $y = mx + b$ and vice versa.

Remember

Standard Form: $Ax + By = C$, where A, B and $C \in \Re, A \neq 0$ and $B \neq 0$; and
Slope-Intercept Form: $y = mx + b$, where m is the slope and b is the y-intercept, m and $b \in \Re$.

Example 1:

Rewrite the following equations in the form $y = mx + b$. Determine the slope and y-intercept.

a. $-3x + y = 7$

b. $20x - 10y = 30$

In writing standard form of a linear equation to slope-intercept form, let us isolate the variable y in the side of the equation,. To do this, observe the steps below.

Solution:

a. $-3x+y = 7$	Given
$-3x + y + 3x = 12 + 3x$	Addition Property of Equality
$y + (-3x + 3x) = 12 + 3x$	Associative Property for Addition
$y + 0 = 12 + 3x$	Additive Inverse
$y = 12 + 3x$	Identity Property for Addition
$y = 3x + 12$	Commutative Property for Addition

The slope is 3 and the y- intercept is 12

b. $20x - 10y = 30$	Given
$20x - 10y - 20x = 30 - 20x$	Addition Property of Equality
$-10y = 30 - 20x$	Additive Inverse
$-\frac{1}{10}(-10y) = -\frac{1}{10}(30-20x)$	Multiplication Property of Equality
$y = -3 + 2x$	Multiplicative Inverse
$y = 2x - 3$	Commutative Property for Addition

The slope is 2 and the y- intercept is -3

Example 2

Rewrite the following equations in the form $Ax + By = C$.

c. $y = -x + 4$

d. $y = \frac{2}{3} + 5$

To write slope intercept form y = mx +b to standard form AX + By + C = 0, let m = $\frac{A}{B}$, collect all terms on the left side of the equation and multiply by the denominator B to get rid of the fraction.

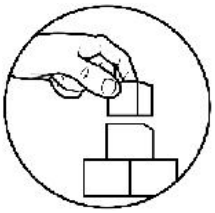
Solution:

a.

y = -x + 4	Given
y + x = - x + x + 9	Addition Property of Equality
y + x = (-x + x) + 9	Associative Property Of Addition
y + x = 0 + 9	Additive Inverse
y + x = 9	Identity Property of Addition
x + y = 9	Commutative Property for Addition
x + y = 9	Standard Form

b.

y = $\frac{2}{3}x$ + 5	Given
(3) (y) = (3) ($\frac{2}{3}$x + 5)	Multiplication Property of Equality
3y = $\frac{6}{3}$ $x + 15$	Distributive Property
3y = 2x + 15	Simplified ($\frac{6}{3} = 2$)
3y + (-2x) = 2x + 15 + (-2x)	Addition Property of Equality
3y + (-2x) = (2x-2x) + 15	Associative Property of Equality
3y + (-2x) = 0 + 15	Additive Inverse
3y – 2x = 0 + 15	Distributive Property
3y – 2x = 15	Identity Property for Addition
-2x +3y = 15	Commutative Property
(-1) (-2x + 3y) = (-1) (15)	Multiplication Property of Equality
2x – 3y = - 15	Standard form



Explore

Activity 2: Set Me to My Standard!

Give the equivalent standard form of each linear equation written in slope-intercept form. Answers can be found inside the box. Use a separate sheet of paper.

1. $y = 3x + 6$
2. $y = -2x + 4$
3. $y = \frac{1}{2}x - 6$
4. $y = \frac{2}{3}x$
5. $y = -4x + \frac{1}{8}$

$3x - y = -6$	$2x + y = 4$
$x - 2y = 12$	$2x - 3y = 0$
$32x + 8y = 1$	$x - 3y = 6$
$2x + y = -12$	$8x + y = 32$

Activity 3: Vice Versa!

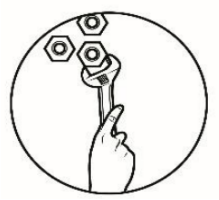
Rewrite the following linear equations in specified form, then answer the questions that follow. Use a separate sheet of paper.

A. Rewrite in the form $y = mx + b$ then identify the slope and the y-intercept.

1. $7x + 4y = 20$
2. $-4x + 2y = -20$

B. Rewrite in the form $Ax + By = C$.

1. $y - 5 = \frac{2}{3}(x - 3)$
2. $y + 8 = \frac{3}{4}(x + 4)$



Deepen

Directions: Read and answer the given problems.

Problem

Each pencil in a store costs Php 7 and each sharpener costs Php 5. If you want to spend exactly Php 43, write an equation in standard form modeling this situation.

Let ***p*** represents the number of pencils you buy and ***s*** represents the number of sharpeners you buy.

Solution:

Lesson 2: Graphing a Linear Equation Given (a)Any Two Points; (b) the x- and y – Intercepts; (c) the Slope and a Point on the Line

Target

In this lesson, you will learn the different methods of graphing a linear equation in two variables. This is done for you to have a better understanding of the equation, to visualize and have a clearer picture in terms of evaluating a linear equation.

Learning Competency: The learner graphs a linear equation given (a) any two points: (b) the x - and y – intercepts; (c) slope and a point on the line.
Learning Code: M8AL-If-2

After going through this module, you are expected to:
1. state the process of plotting the coordinates of points in a coordinate plane.
1. identify the processes of graphing a linear equation.
2. graph a linear equation given any two points, x- and y-intercepts, the slope and a point.

Review

In lesson 1 of this module you have learned that linear equations can be written in two easy ways namely, the standard form; Ax + By = C and the slope - intercept form; y = mx + b.

Your understanding on linear equations widens as you finally unravel the other feature of this equation. In this lesson, you will be given the opportunity to explore deeper on linear equations particularly on its graph given the different conditions. You will soon find out how would any two points, the intercepts or a slope and a point on the line would possibly create a vivid graph of a linear equation.

Activity 1: Seek and check

A. Use a graph paper and plot accurately the given coordinates of points.

1. P (2, 3)
2. Q (-3, 3)
3. T (-4, -5)
4. S (5, - 2)
5. Y (0, 4)

B. Complete the table below by rewriting the given linear equations into standard form and slope - intercept form.

Linear Equation	Standard Form	Slope - intercept form
1. y - 3 = -2x	_____	_____
2. 4x - 2y - 6 = 0	_____	_____
3. 2x = y + 8	_____	_____

Do you still find difficulty in working with activity 1? If not, then you are ready for the succeeding activities ahead. Have fun!

Jumpstart

Activity 2: Plot me like a pro!

Use a graph paper and work on the activity accurately then answer the questions based on your output.

1. Plot the ordered pairs (2, −3) and (3, 5) on the Cartesian Plane. Draw a line that passes through these points and label it $l1$.

Questions:

a. What have you observed after drawing a line through the given points?
b. What have you realized about the number of points needed so that a line can be drawn? Explain briefly.

2. Given the equation $y = x + 4$. If you let $x = 0$, what is the value of y?
On the other hand, if you let $y = 0$, what is the value of x? Plot these pairs of coordinates as two points on a Cartesian Plane. Draw a line that passes through these points and label it $l2$.

Questions:

a. How did you find the value of x and y in the linear equation $y = x + 4$.?
b. Why did you need to find the value of x and y? Expound your answer

3. The line has a slope of -2 and passes through point (-2,4). Show the graph by plotting the points on the Cartesian Plane? Label the graph as $l3$.

Questions:

a. Is it possible to show the graph if you have a slope of 2 and passes through point (2,4)? Why?
b. How will you graph if you are given a slope of 2 and passes through point (2,4) respectively?

Discover

A linear equation in two variables can be written either in the form $Ax + By = C$ or $y = mx + b$ where A, B, and C are real numbers, and A and B are not equal to zero. *Graphing linear equations can be done using any of the three methods.*

1. using any two points on the line
2. using x and y- intercepts
3. using the slope and a point

Using Any Two Points

One method of graphing a linear equation is using any two points. Remember that two points are enough to draw the graph of a linear equation.

Line Postulate: **Two points determine a line**

Example 1:
Graph the linear equation $y = 3x - 2$.

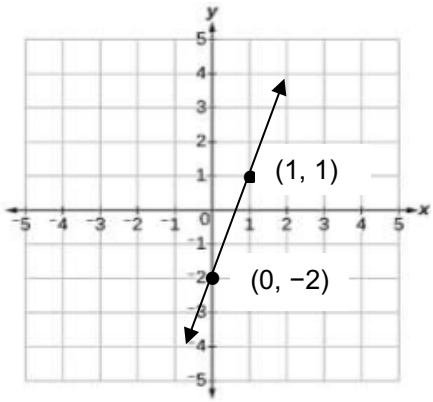
Solution:

You may assign any two arbitrary values of x. In this example we use 0 and 1, and then solve for the corresponding value of y .

By substitution,

When $x = 0$	When $x = 1$
$y = 3x - 2$	$y = 3x - 2$
$y = 3(0) - 2$	$y = 3(1) - 2$
$y = 0 - 2$	$y = 3 - 2$
$\boldsymbol{y = -2}$	$\boldsymbol{y = 1}$

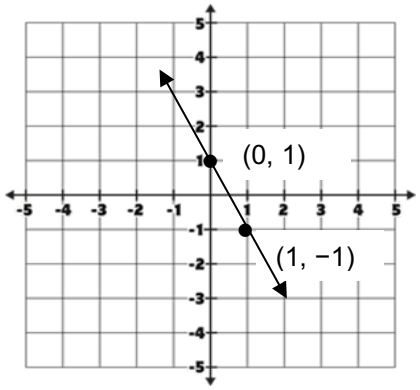
The solution shown above implies that if $x = 0$, then $y = -2$. Also, if $x = 1$, then $y = 1$. Thus, the ordered pairs are (0, −2) and (1, 1), respectively. This means that the line passes through these points.



Example 2:

Graph the linear equation 2x + y = 1

By substitution,
When x = 0, the ordered pair would be (0, 1)
Also when x = 1, the ordered pair would be (1, -1).
Its graph is shown in the figure.



With these examples, can you now graph linear equations using any two point

Using x and y - intercept

Another way of graphing a linear equation in two variables is by using the x-intercept $\boldsymbol{a}$ and the y-intercept $\boldsymbol{b}$. The x and y - intercepts of the line could represent two points, which are ($\boldsymbol{a}$, $\boldsymbol{0}$) and ($\boldsymbol{0}$, $\boldsymbol{b}$). So, the intercepts are enough to draw the graph of a linear equation.

Remember

The $\boldsymbol{x}$-intercept is the abscissa of the point where the graph or line crosses the $x-axis$. This implies that the point is on the $x-axis$ then the ordinate is 0, (x, 0). Similarly, since the $\boldsymbol{y}$-intercept is the ordinate of the point where the graph or line crosses the y-axis, this implies that the point is on the y-axis, hence, the abscissa is 0, (0, y).implies that the point is on the y-axis, hence, the abscissa is 0, (0, y).

Example 1:

Graph the linear equation $y = 3x - 2$.

Solution:

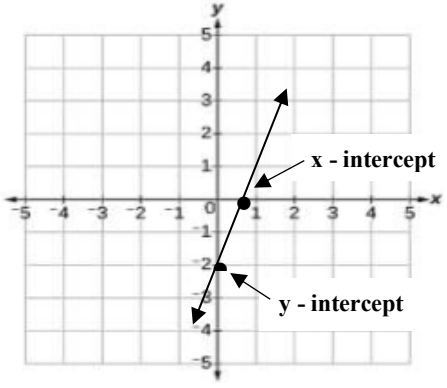
To find the x-intercept of a line given its equation, let $y = 0$, then solve for x. To find the y-intercept, let $x = 0$, then solve for y.
When y = 0, the equation $y = 3x - 2$ becomes,

$0 = 3x - 2$	Substitution
$0 + (-3x) = 3x - 2 + (-3x)$	Inverse Property for Addition
$0 - 3x = 3x - 2 - 3x$	Distributive Property
$0 - 3x = (3x - 3x) - 2$	Associative Property for Addition
$0 - 3x = 0 - 2$	Simplified
$-3x = -2$	Identity Property of addition
$\left(\frac{1}{3}\right)(-3x) = \left(\frac{1}{3}\right)(-2)$	Inverse property of multiplication
$-x = -\frac{2}{3}$	Simplified
$(-1)(-x) = (-1)\left(-\frac{2}{3}\right)$	Multiplication Property
$\boldsymbol{x = \frac{2}{3}}$	

Hence, the x -intercept is $\frac{2}{3}$. In symbol, $a = \frac{2}{3}$ Then the point in the x - axis is $(\frac{2}{3}, 0)$
To find the y-intercept, let $x = 0$, then solve for y.
Letting $x = 0$, $y = 3x - 2$ becomes;

$y = 3(0) - 2$	Substitution
$y = 0 - 2$	Identity Property for Addition
$\boldsymbol{y = -2}$	

Hence, the y-intercept is -2. In symbols, $b = -2$.
The point in the y-axis is $(0, -2)$.
The x-intercept $\boldsymbol{a}$ is $\frac{2}{3}$ while the y-intercept $\boldsymbol{b}$ is -2.
Now, plot the x and y-intercepts, then draw a line that passes through them.



Your turn:

Graph the linear equation 2x + 5y = 10 through its intercepts.

Using Slope and One

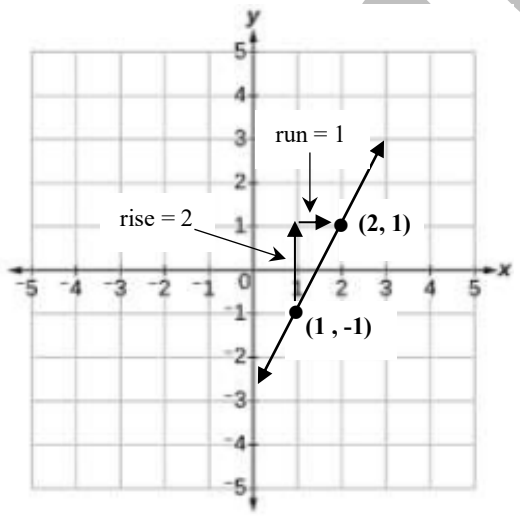
Graphing linear equation can also be done using the slope and one point.

Example 1:

Graph the line whose slope is 2 and contains the point (1, −1).

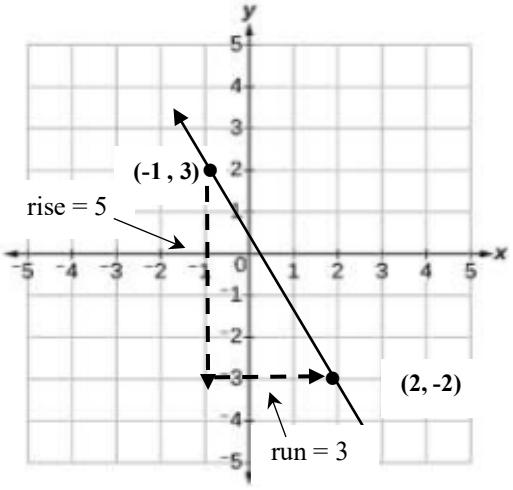
Solution:
The following steps can be followed to graph the given.

1. Plot the given point. (1, −1)
2. Use the slope formula $m = \frac{rise}{run} = \frac{change\ in\ y}{change\ in\ x}$ to identify the rise and the run. The slope of the line is 2 which is equal to $\frac{2}{1}$.
3. Starting at the given point (1, −1), count out the rise (2 units up) and run (1 unit to the right) to mark the second point. (Note that the slope is positive)
4. Draw a line passing the points.



Example 2:
Graph the line that passes through the point (-1, 3) with a slope of $-\frac{5}{3}$.
Solution:

1. Start plotting the given point (-1, 3)
2. Given the slope of $-\frac{5}{3}$, this could be written as $\frac{-5}{3}$ or $\frac{5}{-3}$ just for us to locate the second point of the line.
3. Using m = $\frac{-5}{3}$, start at the given point (-1, 3) and count out the rise (5 units down since the change in **y** is negative) and run (3 units to the right since the change in **x** is positive) to mark the second point, (2, -2).
4. Connect these two points to graph the line.



Reminder

Alternatively, for a slope m = $\frac{5}{-3}$, start at the given point (-1, 3) and count out the rise (5 units up) and run (3 units to the left since the change in x is negative) to mark the second point. The coordinates of the second point should be (-4, 8).

Explore

Activity 3.A. Using Two Points

Graph accurately each line that passes through the given pair of points. *Use a single coordinate plane to graph the lines and label them as provided.*

1. Line ***m*** (2, 0) and (-4, 4)

2. Line ***p*** (-1, -2) and (5, 4)

3. Line ***t*** (-3, 2) and (4, -5)

Activity 3.B: Using *x*-Intercept and *y*-Intercept

Graph accurately the given. *Use a single coordinate plane to graph the lines and label them as provided.*

1.) Use a graph paper and graph each linear equation whose x-intercept a and y-intercept b are given below.

1. $a = -2$ and $b = -5$

2. $a = 4$ and $b = -3$

2.) Find the x and y - intercepts and graph the linear equation $4x - 5y = 20$.

Activity 3.C: Using Slope and One Point

Illustrate using a graph paper for each linear equation given slope ***m*** and a point. *Use a single coordinate plane for this set.*

1. (3, 1) and $m = 2$

2. (0, 1) and $m = \frac{4}{-3}$

Congratulations for reaching this far. I hope that your enthusiasm keeps on as we continue digging deeper on our next task.

Deepen

Show your expertise in graphing linear equations in the following activities ahead.

A. Given the following conditions, illustrate the graph of the following lines.
Use a single graph sheet for this activity.

1. a line passing through the x- axis at -4 and at the y -axis at -5.

2. a line whose equation is 2x + 4y = 8

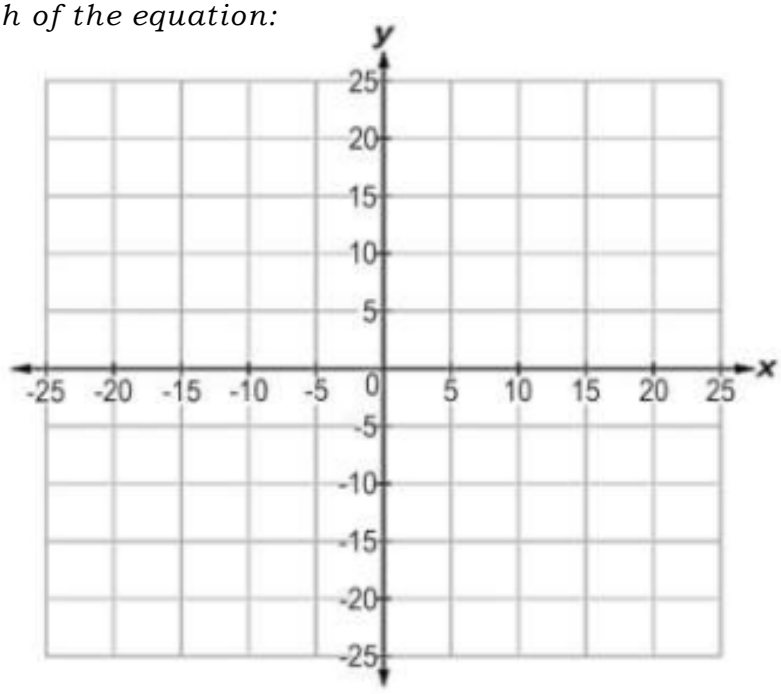
3. a line containing a point at (-4, 1) and a slope $\boldsymbol{m} = \frac{3}{4}$

B. Mr. Santos operates a bike rental service in the park. Initially it costs Php 15 to rent a bike, and an additional Php 5 for every hour of use. Give the equation that models the situation and show the graph representing the cost (y) of using the bike for (x) hours.
A separate graph sheet is needed with a sample below as a guide.

Solution:

Equation :

Graph of the equation:



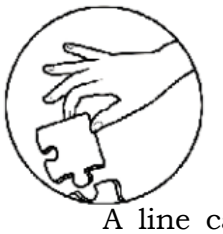
Lesson 3: Describing the Graph of a Linear Equation in Terms of its Intercepts and Slope

Target

In this lesson, you will be exposed with the different trends of the graphs a linear equation in two variables. Having a good foundation on its two forms and the value of the slope will gear you up in understanding fully the graphs of linear equations.

This module contains:
Learning Competency: Describe the Graph of a Linear Equation,
Learning Code: M8AL-If-3

After going through this module, students are expected to:
1. state the process of determining the slope of a line.
2. describe the graph of a linear equation.



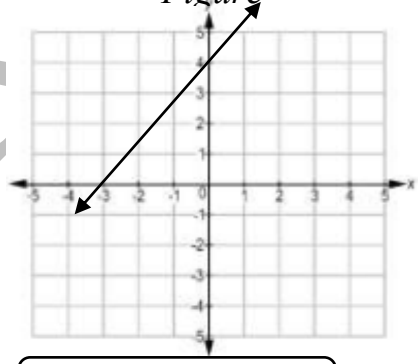
Review:

A line can be described by its slope. The slope of a line is a value that measures its "steepness", usually denoted by the letter m. It is the change in y for a unit change in x along the line. In symbols, $m = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1}$

Directions: Examine closely the figures below. Find the slope of each line in the figures and answer the questions that follow.

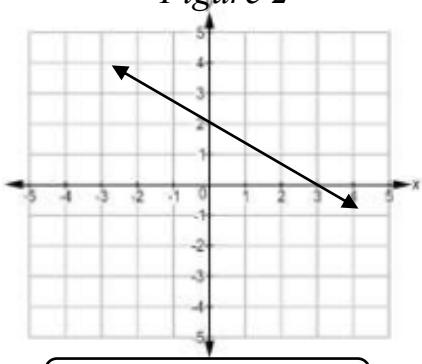
Hint: *You can use the intercepts for the first two figures to determine the slope.*

Figure



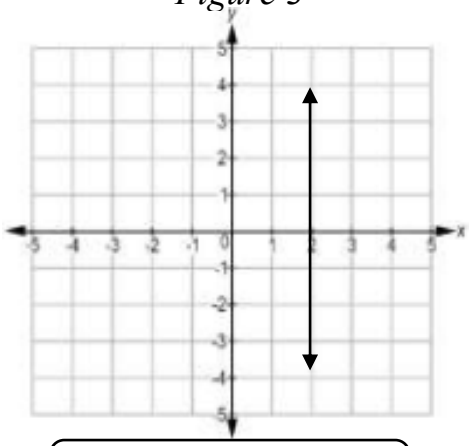
Slope m =

Figure 2



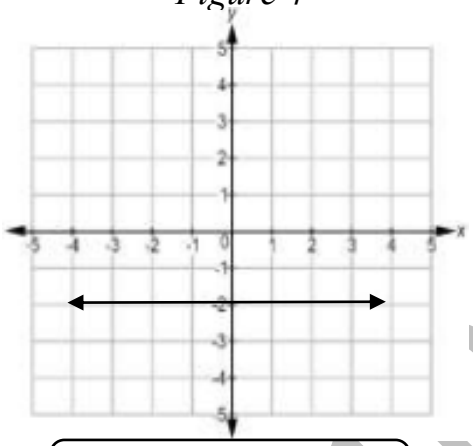
Slope m =

Figure 3



Slope m =

Figure 4



Slope m =

Questions:

1. Which of the figures has a positive slope?
2. Which of the figures has a negative slope?
3. Which of the figures has a slope of zero?
4. Which of the figures has an undefined slope?

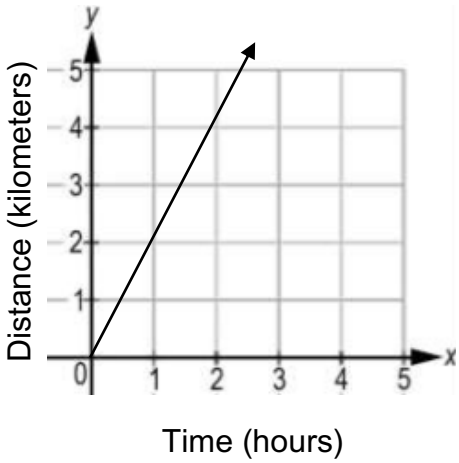
Jumpstart

Activity 1: Let's Have a Walk
Read and analyze the situation, then answer the questions that follow.
Use a separate sheet of paper for your answers.

Situation:

Lenlen goes for a walk every morning. The distance she walks can be modeled by the equation $\boldsymbol{y = 2x}$, where (y) is the distance walked in kilometers and (x) is the number of hours she has walked.

The graph shows the data collected about the daily walk of Lenlen where x is the time (hours) and y is the distance (kilometers) .



Questions:

a. What is the constant speed of Lenlen in walking?

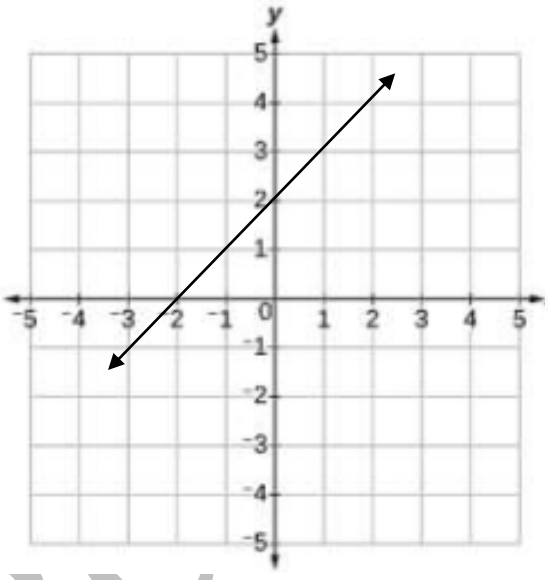
b. What happens to the value of distance for every one hour increase?

c. Slope is defined as "the value of ***y*** for every unit of ***x***", in this line representing the data about the distance walked by Lenlen, what is the slope of the line?

Discover

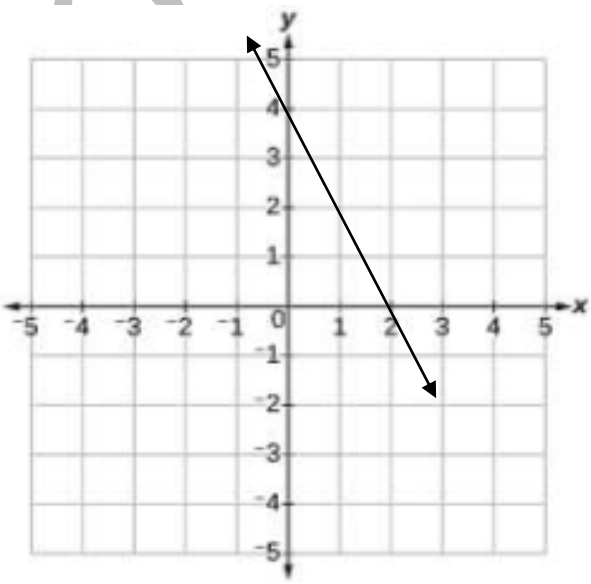
Trend of the graph

*The value of the slope **m** tells the trend of the graph of a linear equation.*



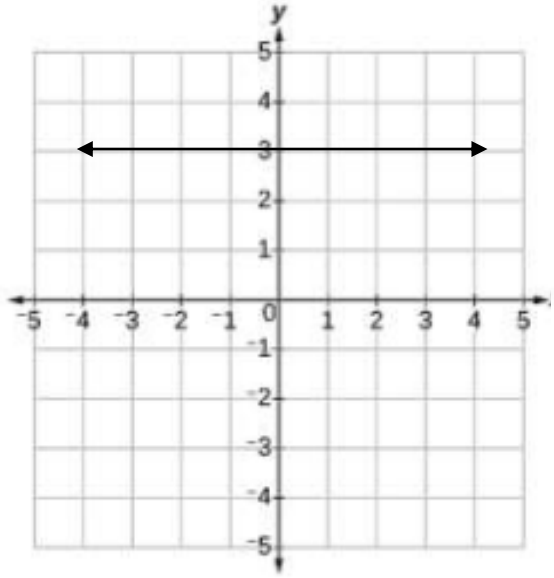
In the figure, the slope is $\frac{2}{2}$ or 1.

If ***m*** is positive, then the graph is increasing (rising) from left to right.



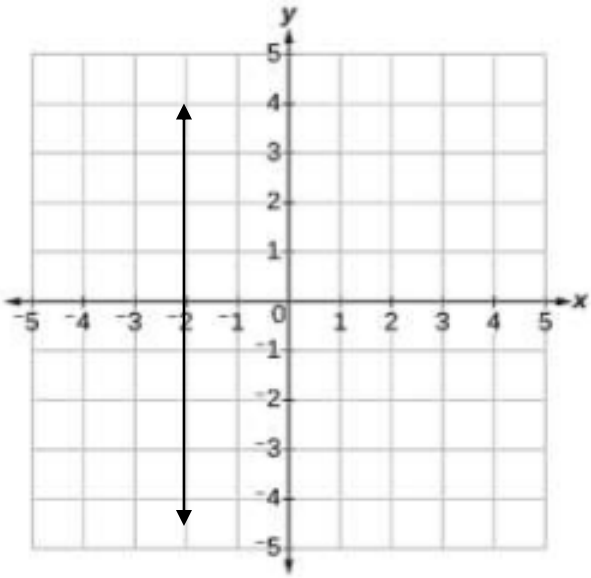
In the figure, the slope is $-\frac{4}{2}$ or -2.

If ***m*** is negative, then the graph is decreasing (falling) from left to right.



In the figure, there is no change in y. Hence, the slope is 0.

If ***m*** is zero, then the graph is a horizontal line.



In the figure, there is no change in x .
Hence, the slope is undefined.
If ***m*** is undefined, then the graph is a vertical line.

Example 1:

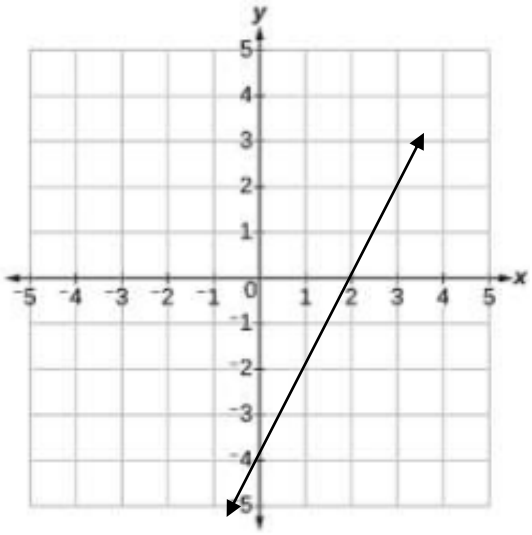
Describe the graph of the linear equation $y = 2x - 4$.

Solution:

In the graph, ***y*** increases as ***x*** increases, so the line inclines upwards to the right.

Also, notice that the equation has a positive slope of 2.

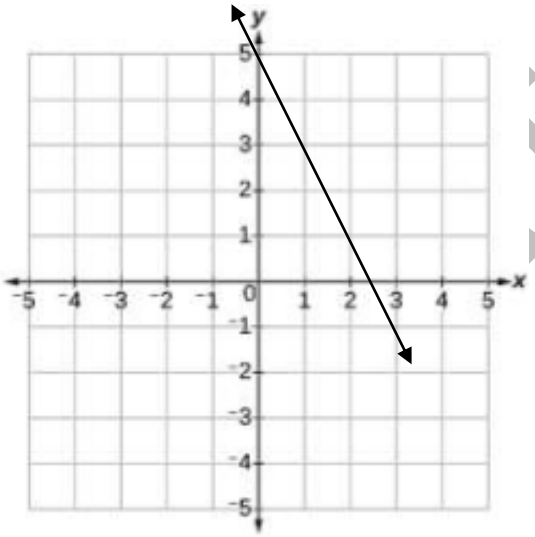
Thus, it can be deduced that the graph of the given equation increases from left to right. It is called a rising line.



Example 2:

Describe the graph of the linear equation $y = -2x + 5$.

Solution:



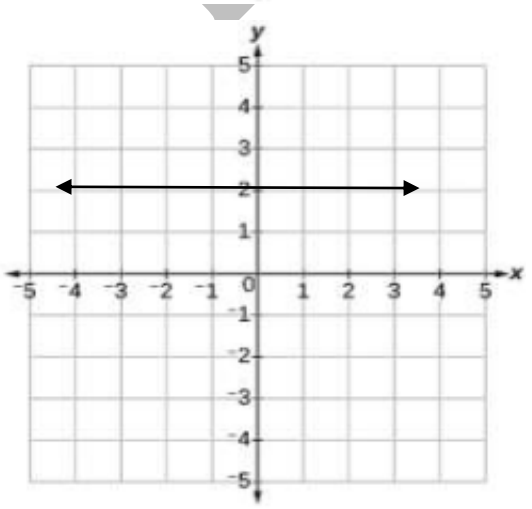
In the graph, ***y*** decreases as ***x*** increases, so the line slopes downwards to the right.
Also, notice that the equation has a negative slope, $\boldsymbol{m} = -2$. Thus, it can be deduced that the graph of the given equation decreases from left to right.

It is called a falling line.

Example 3

Describe the graph of the linear equation $y = 2$.

Solution:

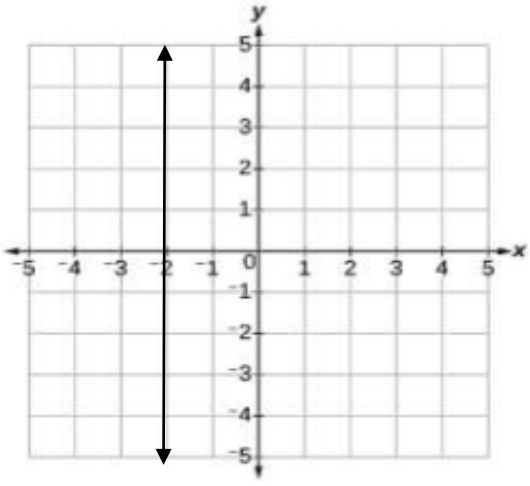


In the graph, y does not change as x increases, so the line is exactly horizontal.
The slope of any horizontal line is always zero. The line on the right goes neither up nor down as x increases, so its slope is zero.
A horizontal line has an equation of the form $y = 2$, where 2 is the y-intercept.

Example 4

Describe the graph of the linear equation $x = -2$.

Solution:



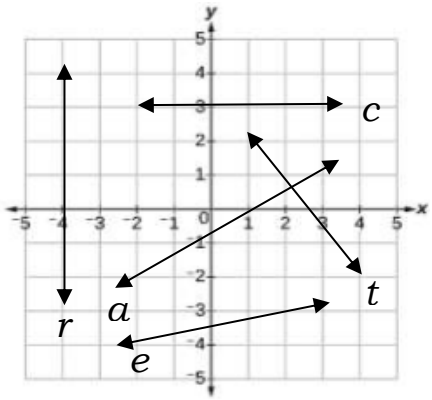
When the line is exactly vertical, it does not have a defined slope.
A vertical line has an equation of the form $x = -2$, where -2 is the x-intercept.

Explore

A. Describe the trend of the graph given the following equations.
Use a separate sheet of paper for your answer.

1. $y = -\frac{3}{5}x + 3$ Trend of the Graph: _____
2. $y = 5$ Trend of the Graph: _____
3. $y = 2x - 7$ Trend of the Graph: _____
4. $x = -3$ Trend of the Graph: _____
5. $4x + 2y = 8$ Trend of the Graph: _____

B. Describe the trend of the graph.



1. Line t _____
2. Line r _____
3. Line a _____
4. Line c _____
5. Line e _____

Deepen

Apply your learnings in this lesson and evaluate the activities below.

A. Supply the missing information to complete the given table.

Linear equation in standard form	Slope- intercept form	Slope (m)	Trend of the line graph
1. x + y - 5 = 0			
2. y -5 = 3x			
3. 2x + 3y = 6			

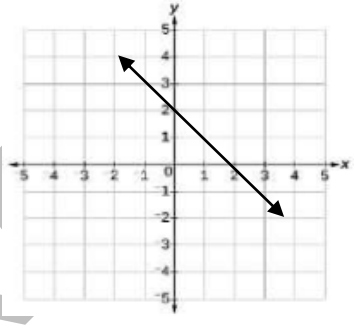
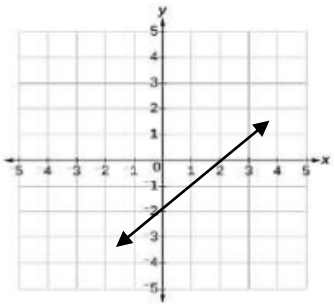
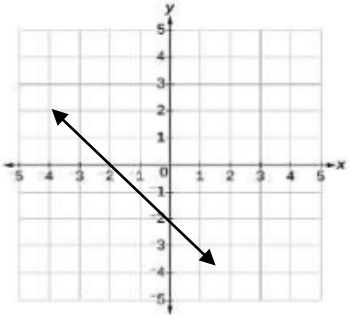
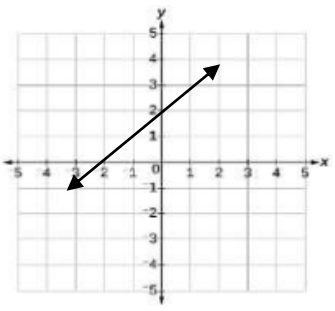
B. Without graphing, determine the trend of the line.

1. with points at (0, 6) and (2, -2) Trend of the Graph: _____
2. with points at (-3, 2) and (2, 2) Trend of the Graph: _____
3. with points at (2, 3) and (2, -5) Trend of the Graph: _____
4. with x-intercept = -2, y - intercept = 6 Trend of the Graph: _____
5. with x-intercept= -1, y - intercept = -5 Trend of the Graph: _____

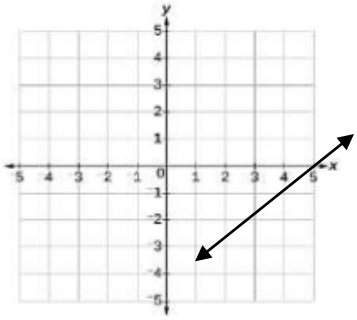
Gauge

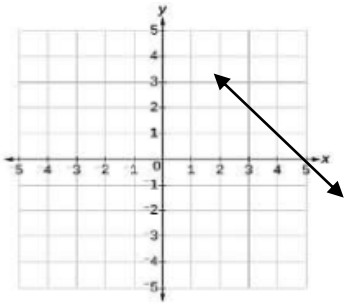
Post-Test:

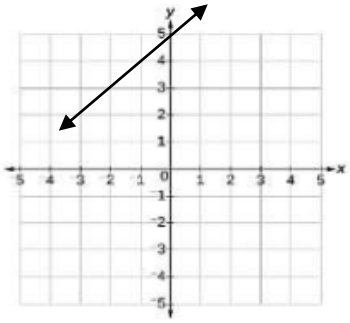
Direction: Find out how much have you learned from the lesson. Choose the letter which you think best answer to the question. Write your answer in a separate sheet of paper.

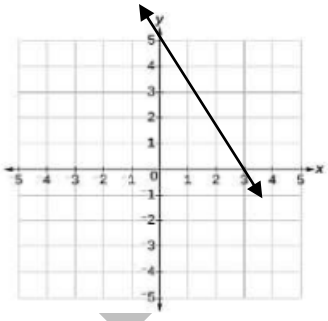
1. The slope-intercept form of the equation of a line is $y = mx + b$. Which of the following equations is in slope-intercept form?
   A. $y = 3x + 8$ B. $x + 7y = 6$
   C. $-5y = y + 2$ D. $7 + y = 5$
2. In the equation y = -3x +5, What is the slope?
   A. -3 B. -1 C. -1/2 D. 6
3. In the equation y = 5x- $\frac{1}{3}$, determine the y – intercept.
   A. -5 B. - $^1/_3$ C. $^1/_3$ D. 5
4. Which of the following linear equations is written in standard form?
   A. 5x – 3y = 15 B. y = 4
   C. y = - $\frac{2}{3}x + 5$ D. x = 3y – 7
5. In the equation 4x+y = 6, What is the slope?
   A. -6 B. -4 C. 4x D. 6x
6. Which of the following is true about the graph of a linear equation?
   A. It is a line. B. It is an ellipse. C. It is a parabola. D. It is a hyperbola
7. Which line passes through the points $(-1, 0)$ and $(0, -2)$?
   A. $y = 2x + 2$ B. $y = 2x - 2$ C. $y = -2x + 2$ D. $y = -2x - 2$
8. What does the graph of the line look like if the x and y-intercepts are (2,0) and (0,2), respectively?
   A.

   B.

   C.

   D.


9. Which of the following shows the graph of the equation $y = x + 5$?

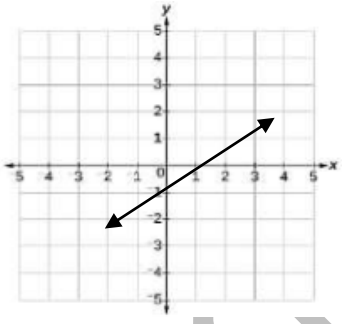
A. 

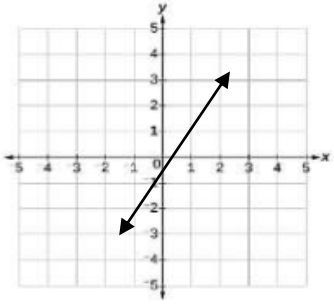
B. 

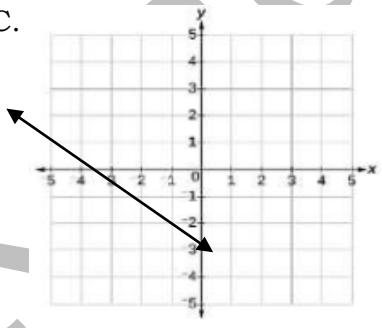
C. 

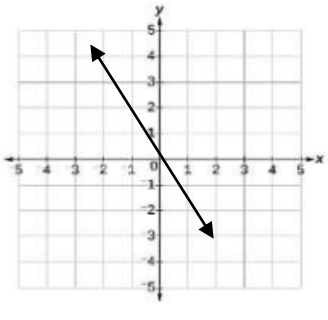
D. 

10. What is the graph of the linear equation whose slope is $-\frac{3}{4}$ and passes through the point $(-1, -2)$?

A. 

B. 

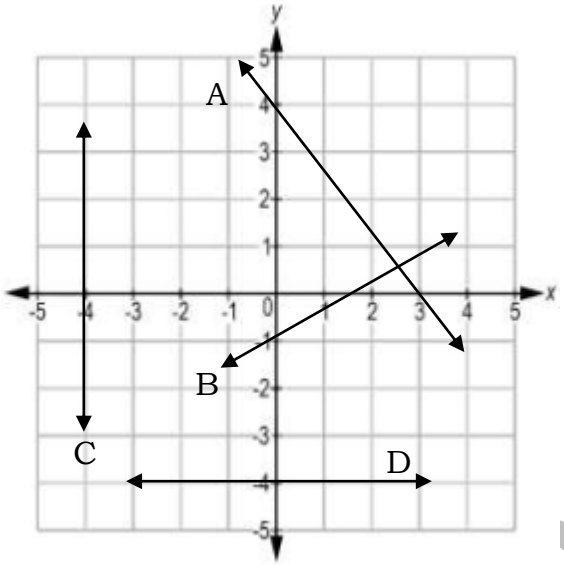
C. 

D. 

11. Your classmate insisted that the graph of the linear equation whose slope m = $\frac{3}{4}$ is increasing from left to right. Is your classmate correct?

A. No, because the graph of the equation is a horizontal line.
B. No, because the graph of the equation is a vertical line.
C. Yes, because the equation has a positive slope.
D. Yes, because the equation has a fractional slope.

Use the graph below to answer questions 12 – 15.



12. Which line has a positive slope?
    A. Line A B. Line B C. Line C D. Line D
13. Which line has a negative slope?
    A. Line A B. Line B C. Line C D. Line D
14. Which line has a zero slope?
    A. Line A B. Line B C. Line C D. Line D
15. Which line has an undefined slope?
    A. Line A B. Line B C. Line C D. Line D

References

Abuzo, Emmanuel P., et.al. (2013). Grade 8 Mathematics Learners Module, Philippines. Book Media Press, Inc. and Printwell, Inc. pp. 181-183.

Orines, Fernando B., et.al. (2003). Second Edition Next Century Mathematics, Manila, Philippines. Phoenix Publishing House, Inc. pp. 101-105,

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Links

"The finger pointing", NICEPNG, December 2020 https://www.nicepng.com/ourpic/u2w7t4q8u2q8u2t4_index-finger-the-finger-pointing-download-clip-art/

"How to Convert Slope Intercept Form to Standard Form", Sciencing, December 2020, https://.com/how-to-convert-slope-intercept-form-to-standard-form-13712257.html

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