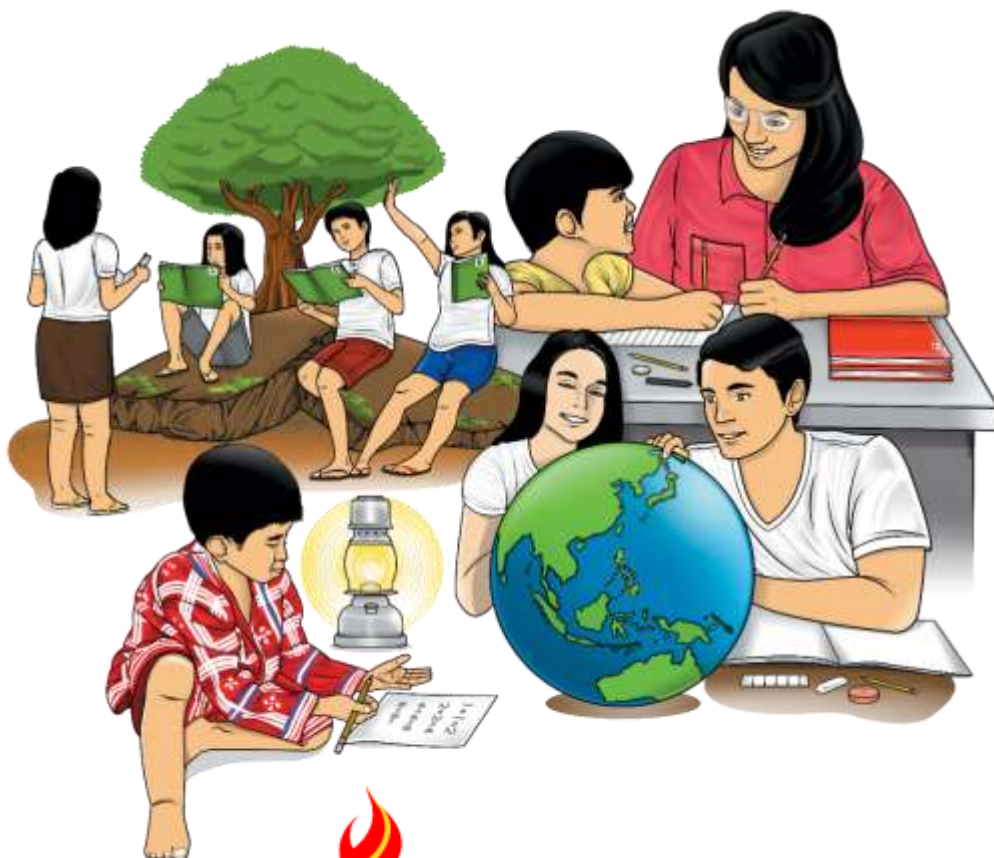


Mathematics

Quarter 1 – Module 11

Describing the Graph of a Linear Equation



Mathematics – Grade 8
Alternative Delivery Mode
Quarter 1 – Module 11 Describing the Graph of Linear Equation in Terms of its
Intercepts and Slope
First Edition, 2020

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Mathematics

Quarter 1 – Module 11

**Describing the Graph of a
Linear Equation**

Introductory Message

For the facilitator:

Welcome to the Mathematics 8 Alternative Delivery Mode (ADM) Module on Graphing Linear Equations!

This module was collaboratively designed, developed and reviewed by educators both from public and private institutions to assist you, the teacher or facilitator in helping the learners meet the standards set by the K to 12 Curriculum while overcoming their personal, social, and economic constraints in schooling.

This learning resource hopes to engage the learners into guided and independent learning activities at their own pace and time. Furthermore, this also aims to help learners acquire the needed 21st century skills while taking into consideration their needs and circumstances.

In addition to the material in the main text, you will also see this box in the body of the module:



Notes to the Teacher

This contains helpful tips or strategies that will help you in guiding the learners.

As a facilitator, you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their own learning. Furthermore, you are expected to encourage and assist the learners as they do the tasks included in the module.

For the learner:

Welcome to the Mathematics 8 Alternative Delivery Mode (ADM) Module on Graphing Linear Equations!

This module was designed to provide you with fun and meaningful opportunities for guided and independent learning at your own pace and time. You will be enabled to process the contents of the learning resource while being an active learner.

This module has the following parts and corresponding icons:



What I Need to Know

This will give you an idea of the skills or competencies you are expected to learn in the module.



What I Know

This part includes an activity that aims to check what you already know about the lesson to take. If you get all the answers correct (100%), you may decide to skip this module.



What's In

This is a brief drill or review to help you link the current lesson with the previous one.



What's New

In this portion, the new lesson will be introduced to you in various ways; a story, a song, a poem, a problem opener, an activity or a situation.



What is It

This section provides a brief discussion of the lesson. This aims to help you discover and understand new concepts and skills.



What's More

This comprises activities for independent practice to solidify your understanding and skills of the topic. You may check the answers to the exercises using the Answer Key at the end of the module.



What I Have Learned

This includes questions or blank sentence/paragraph to be filled in to process what you learned from the lesson.



What I Can Do

This section provides an activity which will help you transfer your new knowledge or skill into real life situations or concerns.



Assessment

This is a task which aims to evaluate your level of mastery in achieving the learning competency.



Additional Activities

In this portion, another activity will be given to you to enrich your knowledge or skill of the lesson learned.



Answer Key

This contains answers to all activities in the module.

At the end of this module you will also find:

References

This is a list of all sources used in developing this module.

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer *What I Know* before moving on to the other activities included in the module.
3. Read the instruction carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone.

We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!



What I Need to Know

This module was designed and written with you in mind. It is here to help you master the skills of illustrating triangle congruence. You are provided with varied activities to process the knowledge and skills learned and to deepen and transfer your understanding of the lesson. The scope of this module enables you to use it in many different learning situations. The lessons are 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 – Describing the Graph of a Linear Equation

After going through this module, you are expected to:

1. determine the different trends of the graph of a linear equation;
2. describe the trends of the graph of a linear equation in terms of its intercepts and slope; and
3. relate the graph of linear equations in real-life situations.



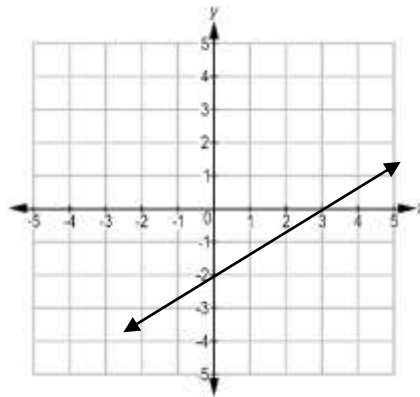
What I Know

Choose the letter of the best answer. Write your answer on a separate sheet of paper.

1. What is the trend of the graph of a linear equation that has a slope of 5?
 - 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.

2. What is the trend of the graph of a linear equation having a slope of $-\frac{3}{2}$?
 - 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 3 and 4.

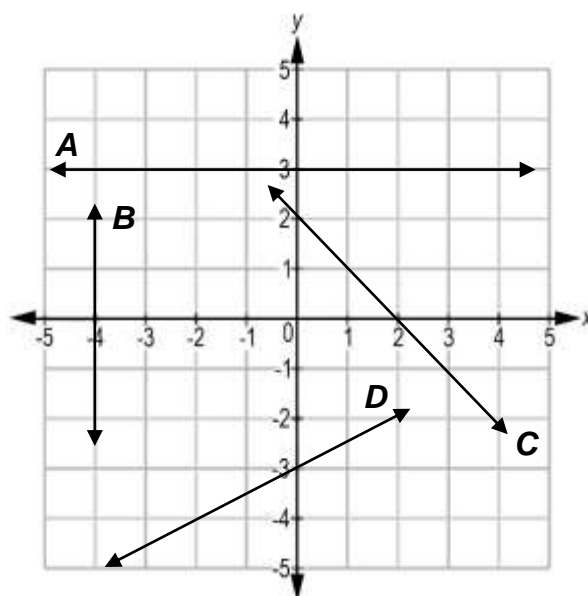


3. What is the slope of the line?

A. $\frac{3}{2}$	C. $-\frac{2}{3}$
B. $\frac{2}{3}$	D. $-\frac{3}{2}$

4. 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.

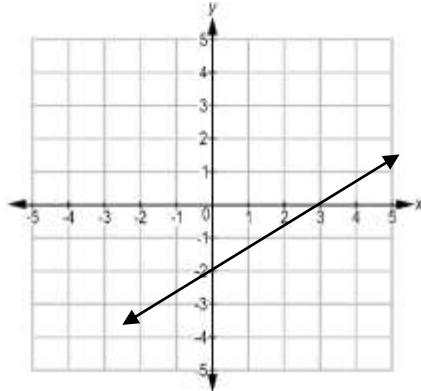
Use the graph below to answer questions 5 – 9.



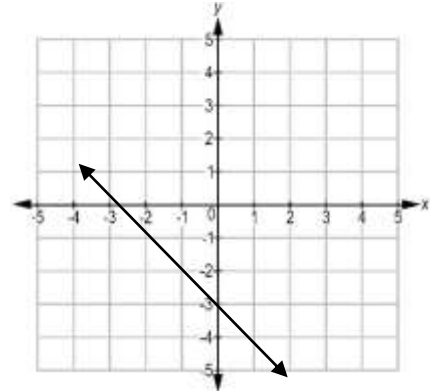
5. Which line has a positive slope?
- A. Line A
B. Line B
C. Line C
D. Line D
6. Which line has a negative slope?
- A. Line A
B. Line B
C. Line C
D. Line D
7. Which line has a zero slope?
- A. Line A
B. Line B
C. Line C
D. Line D
8. Which line has an undefined slope?
- A. Line A
B. Line B
C. Line C
D. Line D
9. What is the slope of the equation $y = -6$.
- A. -6
B. -1
C. 0
D. undefined
10. Describe the graph of the linear equation $y = -6$.
- A. It is a vertical line.
B. It is a horizontal line.
C. It is increasing from left to right.
D. It is decreasing from left to right.

11. Which graph shows the equation $y = x - 3$.

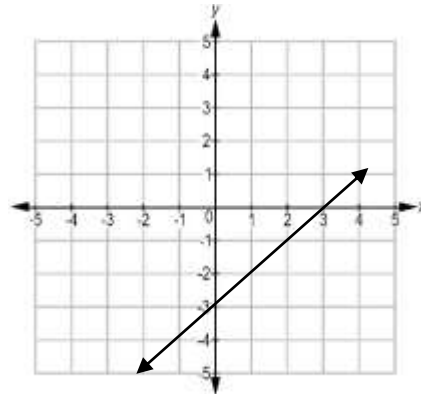
A.



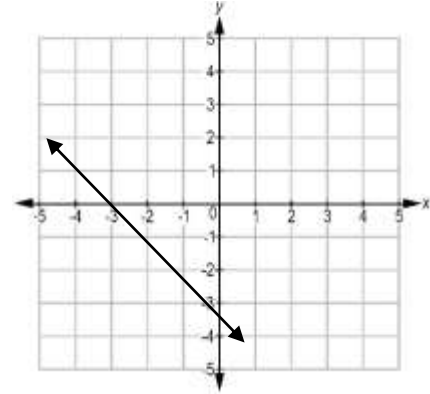
C.



B.



D.

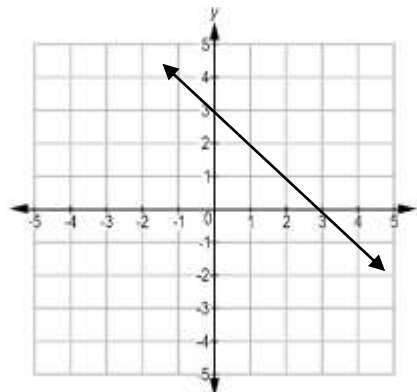


12. Nel was asked to describe the trend of the graph of an equation whose slope is 2. He answered, "it is increasing from left to right". Is Nel's answer correct?

- A. No, because the graph should be horizontal.
- B. No, because the graph should be a vertical line.
- C. Yes, because the graph is a slanting line.
- D. Yes, because the equation whose slope is positive should be increasing from left to right.

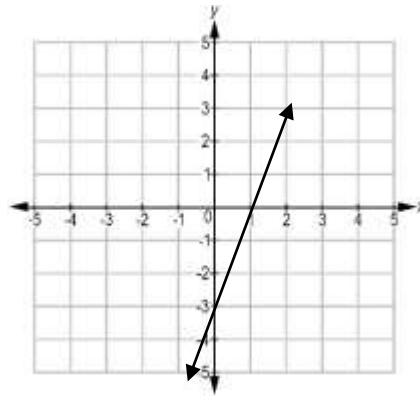
13. Describe the slope of the graph given below.

- A. Negative
- B. Positive
- C. Undefined
- D. Zero



14. Find the slope of this line.

- A. 3
- B. $\frac{1}{3}$
- C. $-\frac{1}{3}$
- D. -3



15. What is the trend of the graph presented in number 14?

- A. It is a horizontal line.
- B. It is a vertical line.
- C. It is increasing from right to left.
- D. It is decreasing from left to right.

Lesson**1****Describing the Graph of a Linear Equation in Terms of its Intercepts and Slope**

A line can be described by its slope. The slope of a line is a number 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.

***What's In***

Directions: Determine the slope of each line below. Use a separate sheet of paper.

Figure 1

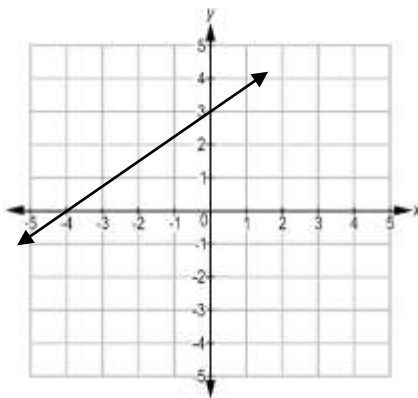
*Slope =*

Figure 3

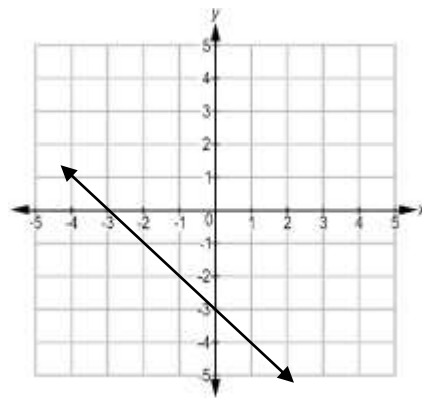
*Slope =*

Figure 2

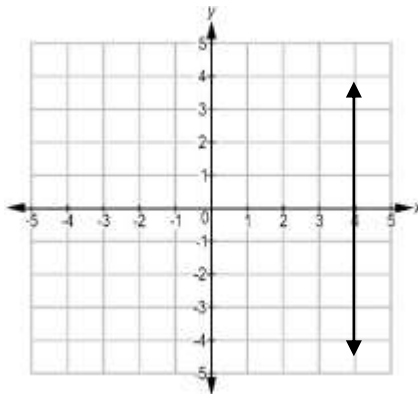
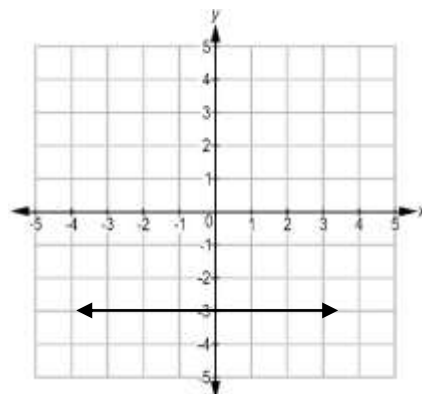
*Slope =*

Figure 4

*Slope =*

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?



What's New

Activity: Let's Have a Walk

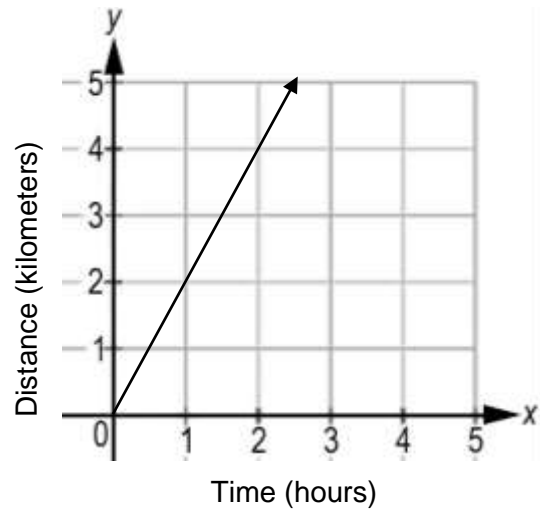
Read and analyze the situation, then answer the questions that follow. Use a separate sheet of paper.

Situation

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



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



Questions:

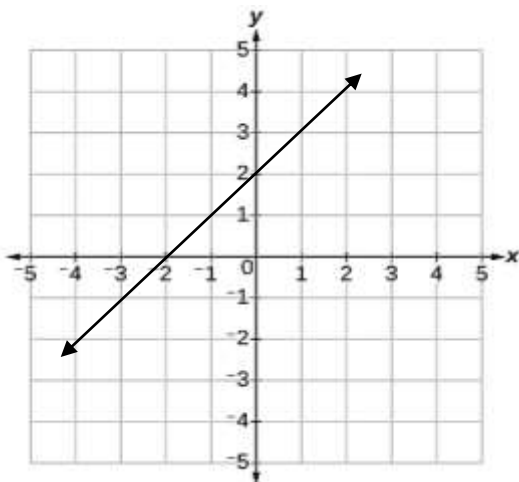
- What is the constant speed of Ben in walking?
- What happens to the value of distance for every one hour increase?
- Slope is defined as “the value of y for every unit of x ”, in this line representing the data about the distance walked by Ben, what is the slope of the line?



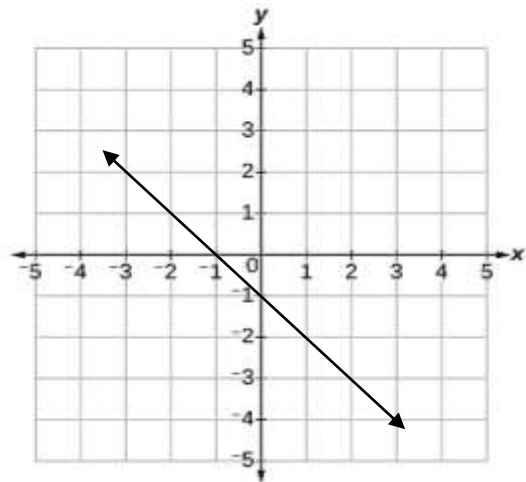
What is It

Trend of the Graph

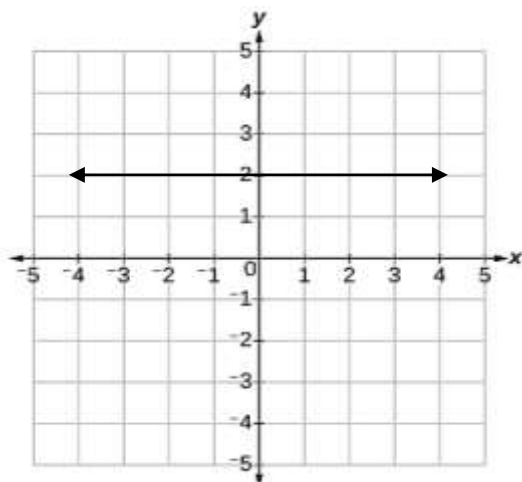
The value of the slope m tells the trend of the graph of a linear equation.



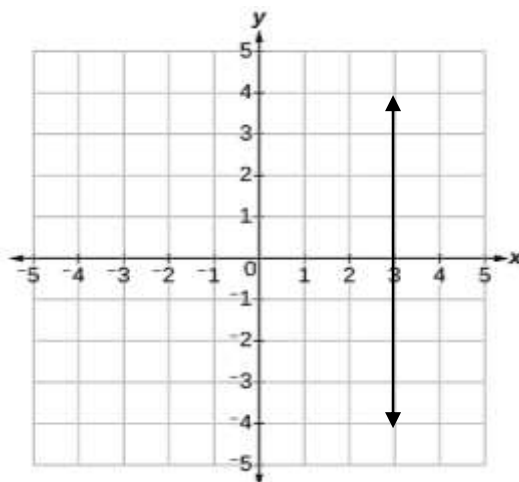
If m is positive, then the graph is increasing from left to right.



If m is negative, then the graph is decreasing from left to right.



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



If m is undefined, then the graph is a vertical line.

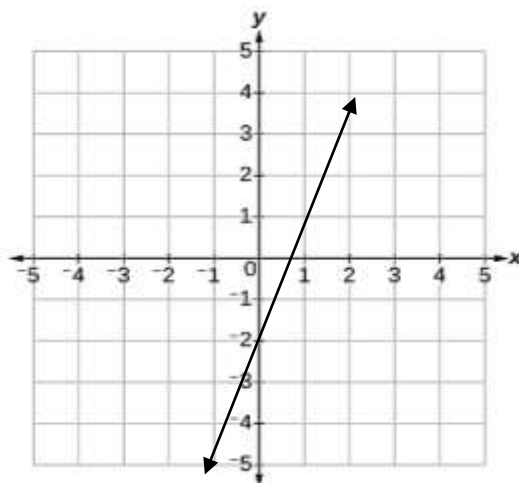
Example 1

Describe the graph of the linear equation $y = 3x - 2$.

Solution

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

Also, notice that the equation has a positive slope 3. Thus, it can be deduced that the graph of the given equation increases from left to right.



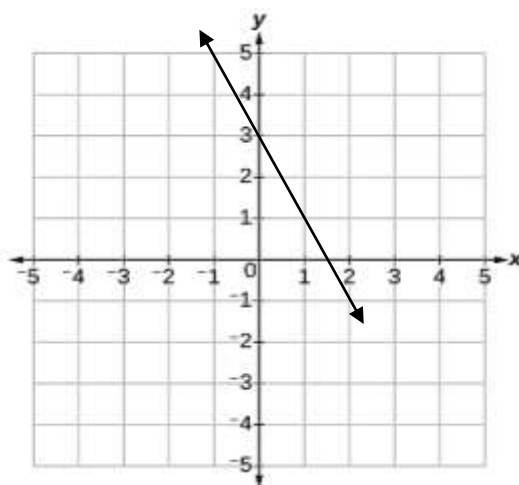
Example 2

Describe the graph of the linear equation $y = -2x + 3$.

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 -2 . Thus, it can be deduced that the graph of the given equation decreases from left to right.



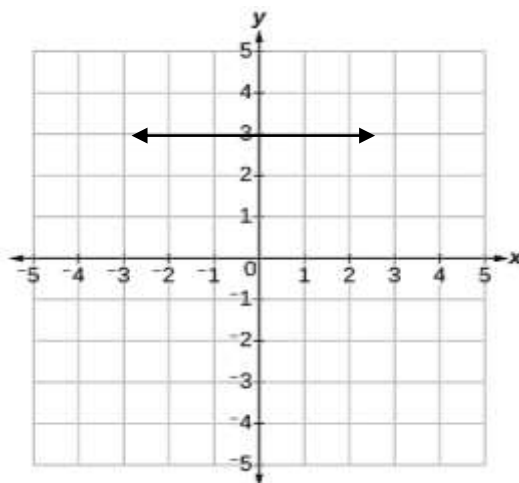
Example 3

Describe the graph of the linear equation $y = 3$.

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 $y = 3$, where 3 is the y -intercept.



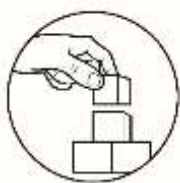
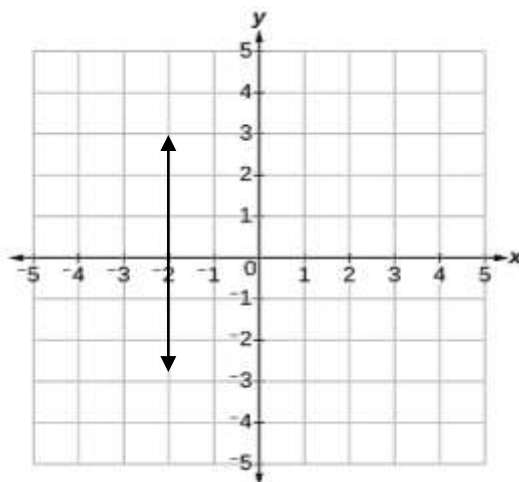
Example 4

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.



What's More

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

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

Trend of the Graph: _____

2. $y = -9$

Trend of the Graph: _____

3. $y = 4x - \frac{3}{2}$

Trend of the Graph: _____

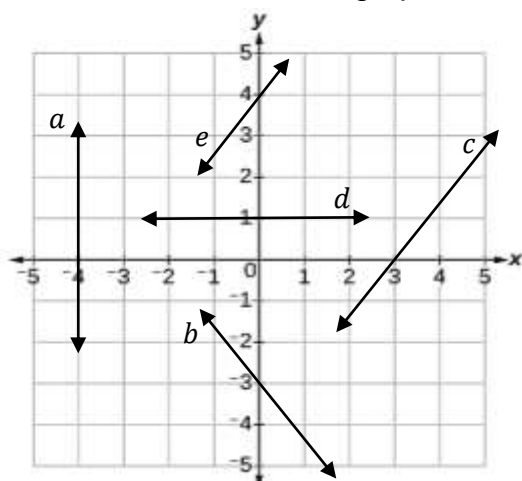
4. $x = -2$

Trend of the Graph: _____

5. $4x + y = 7$

Trend of the Graph: _____

B. Describe the trend of the graph.



Line a _____

Line b _____

Line c _____

Line d _____

Line e _____



What I Have Learned

This activity will enable you to master how to describe the trend of the graph of a linear equation.

Directions: Complete the sentences below by supplying an appropriate information about the sign of the slope which tells the trend of the graph.

1. If the slope m is positive, then _____.
2. If the slope m is negative, then _____.
3. If the slope m is zero, then _____.
4. If the slope m is undefined, then _____.
5. If the slope m is -7 , then _____.
6. If the slope m is $4/3$, then _____.

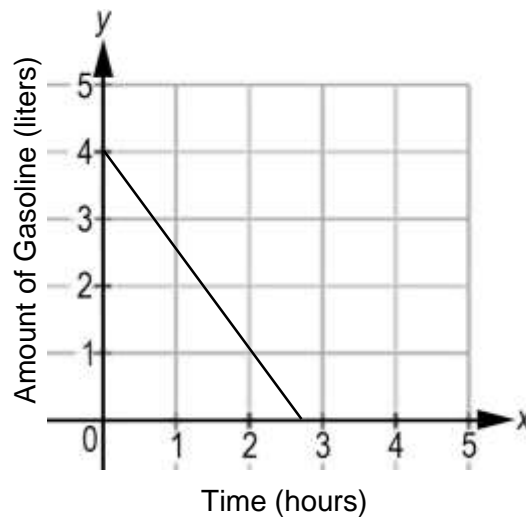


What I Can Do

Read and analyze the situation, then answer the questions that follow. Use a separate sheet of paper.

Situation

Jayson fills his motorcycle with 4 liters of unleaded gasoline. Every hour he travels, the motorcycle consumes 1.5 liters at constant speed. The graph represents the gasoline left in his motorcycle (y) after traveling for (x) hours.



Questions:

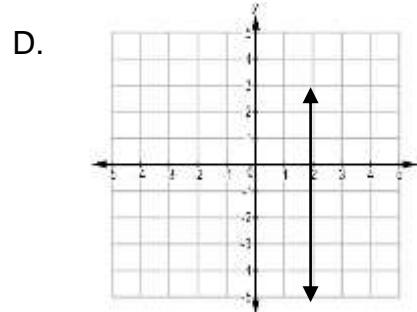
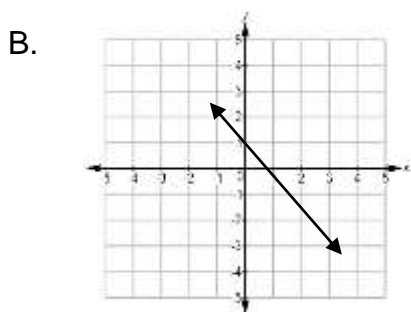
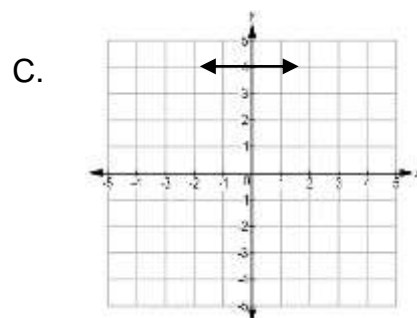
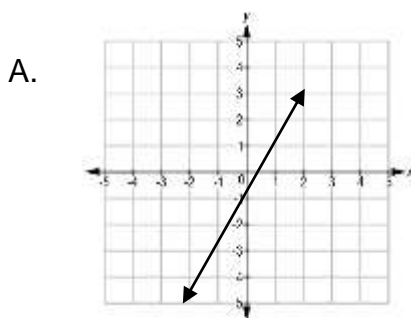
- What is the amount of gasoline after a certain hour?
- What is the constant decrease of gasoline per hour?
- After how many hours will he need to fill or to buy gasoline again?
- How many liters of gasoline is needed if he will travel a certain distance with the same speed?



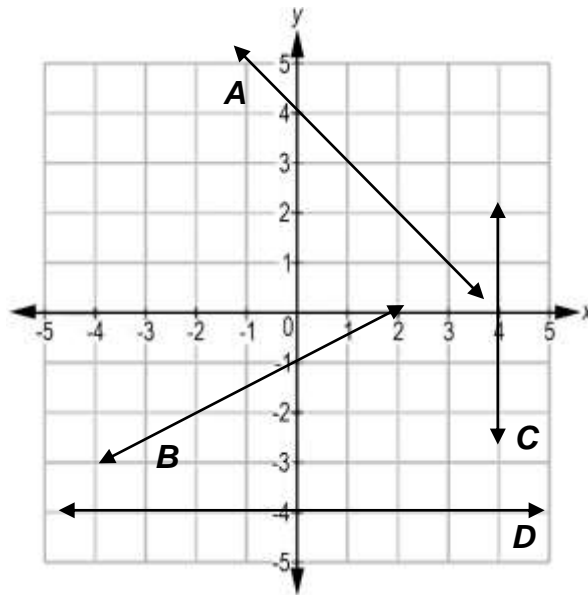
Assessment

Multiple Choice: Choose the letter of the best answer. Write the letter on the space before the number.

1. What is the graph of the linear equation that has a slope of $\frac{1}{2}$?
 - 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.
2. Describe the graph of the linear equation $y = 8$.
 - 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.
3. Which of the graph below has a negative slope?

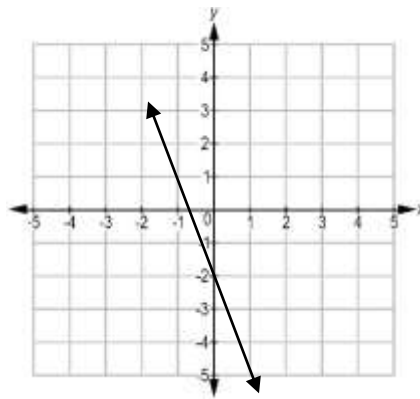


Use the graph below to answer questions 4 – 7.



4. Which line has a positive slope?
A. Line A
B. Line B
C. Line C
D. Line D
5. Which line has a negative slope?
A. Line A
B. Line B
C. Line C
D. Line D
6. Which line has a zero slope?
A. Line A
B. Line B
C. Line C
D. Line D
7. Which line has an undefined slope?
A. Line A
B. Line B
C. Line C
D. Line D
8. What is the trend of the graph of a linear equation $y = -\frac{9}{8}x + 2$?
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 9 and 10.



9. What is the slope of the line?

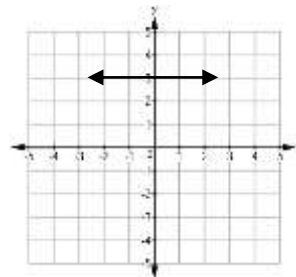
- A. -3
- B. -2
- C. 2
- D. 3

10. 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.

11. Describe the slope of the line given the graph below.

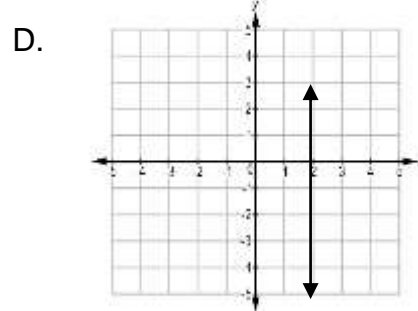
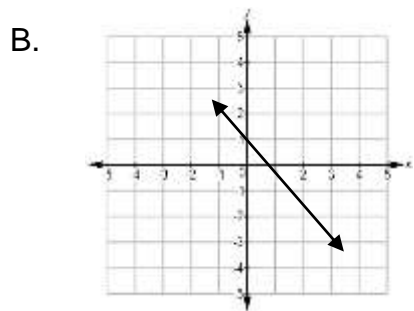
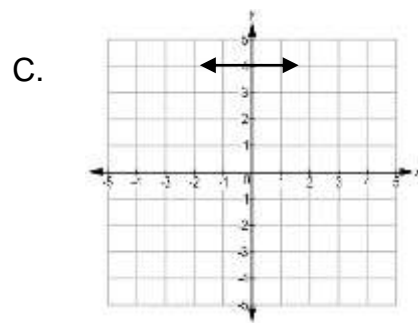
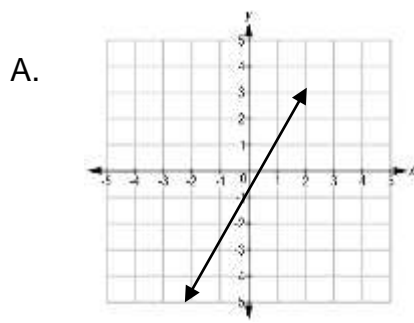
- A. The slope is zero.
- B. The slope is positive.
- C. The slope is negative.
- D. The slope is undefined.



12. Your classmate insisted that the graph of the linear equation $y = \frac{3}{4}$ is increasing from right to left. 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 zero slope.
- D. Yes, because the equation has an undefined slope.

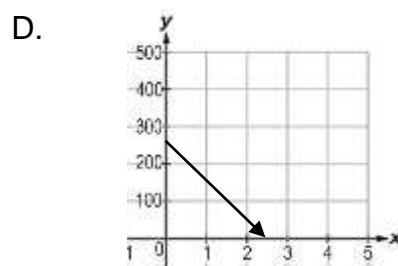
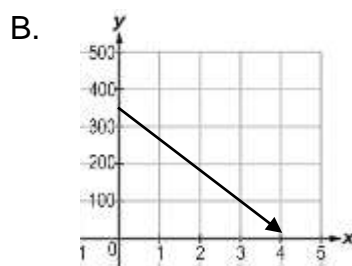
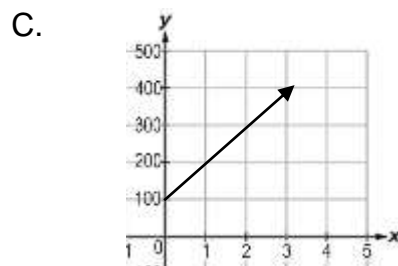
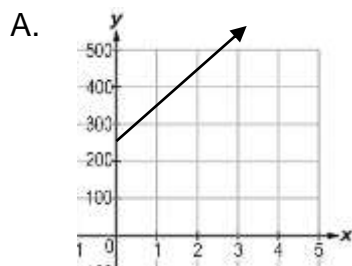
13. Which of the graph below has a zero slope?



14. Describe the trend of the graph of the equation $x = 10$.

- 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.

15. To become a fitness club member, one must pay a ₱ 250 start-up charge and a ₱ 100 monthly fee. Which of the graphs below is the total payment (y) for (x) months of using the gym?

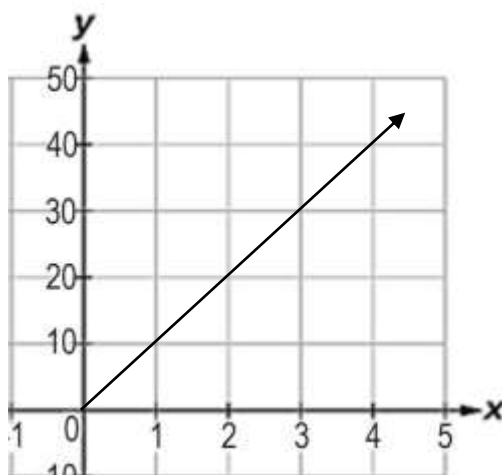




Additional Activities

Activity: Share your Story

Directions: Create a story out of the graph of the linear equation below. Use a separate sheet of paper.



Your output will be assessed using the rubric below.

RUBRIC

Criteria	Highly Proficient (5)	Proficient (4)	Approaching (3)	Beginning (2)
Connections	Strong mathematical connections are used to extend the concept learned to other mathematics or to a deeper understanding of mathematics.	Mathematical connections or observations are recognized.	Some attempt to relate the concept learned to other subjects or to own interests and experiences is made.	No connections are made.
Communication	A sense of audience and purpose is communicated and/or precise math language and symbolic notation is used to consolidate math thinking and to communicate ideas.	A sense of audience or purpose is communicated and/or formal math language is used throughout the story or situation to share and clarify ideas.	Some awareness of audience or purpose is communicated, or some formal math language is used, and specific example is provided to communicate ideas.	No awareness of audience or purpose is communicated.



Answer Key

What's More A. 1. Decreasing from left to right 2. Horizontal line 3. Increasing from left to right 4. Vertical line 5. Decreasing from left to right B. line a – Vertical line line b – Decreasing from left to right line c – Increasing from left to right line d – Horizontal line line e – Increasing from left to right	What's New a. 2 b. Increasing from left to right c. As the value of y increases the value of x increases	What's In Fig. 1 $m = \frac{4}{3}$ Fig. 2 $m = \text{undefined}$ Fig. 3 $m = -1$ Fig. 4 $m = 0$ Questions 1. Fig. 1 2. Fig. 3 3. Fig. 4 4. Fig. 2	What I Know 1. C 2. D 3. B 4. C 5. D 6. C 7. A 8. B 9. C 10. B 11. B 12. D 13. A 14. A 15. C
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Additional Activities Slope 1. 5 2. -1 3. 0 4. 3 5. -4 Trend 1. Increasing from left to right 2. Decreasing from left to right 3. Horizontal line 4. Increasing from left to right 5. Decreasing from left to right	What I have Learned	Assessment 1. C 2. B 3. B 4. B 5. A 6. D 7. C 8. D 9. A 10. D 11. A 12. A 13. C 14. A 15. A	What Can I Do a. $-\frac{2}{3}$ b. Decreasing from left to right c. As the value of y decreases the value of x increases
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