



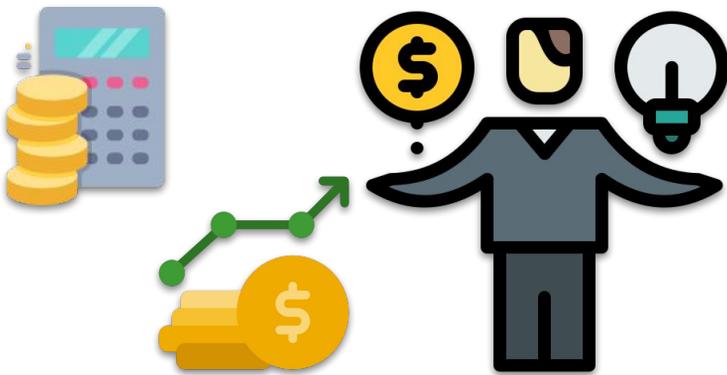
# Helping With Math

## Graphing Proportional Relationships and Identifying Slope of the Line

**GRADE 8**



The concept of proportional relationship and slope of the line are very essential in many aspects especially in economic aspect. In these worksheet, you will further understand these concepts.



Hi! I'm Mavy, I am an accountant.  
Let's discuss about graphing proportional relationship and identifying slope of the line.

Proportional relationship follows the equation  $y = mx$ , whereas variable  $y$  varies directly as  $x$  and  $m$  is the constant of proportionality. This means that as  $x$  decreases,  $y$  decreases and vice-versa and that the ratio between  $x$  and  $y$  always stays the same.

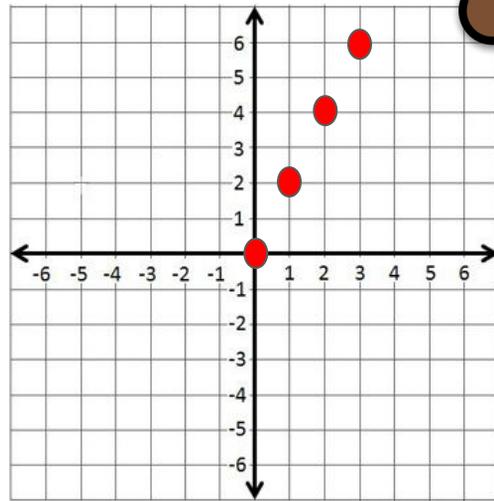


# STEPS IN GRAPHING AND IDENTIFYING SLOPE OF THE LINE

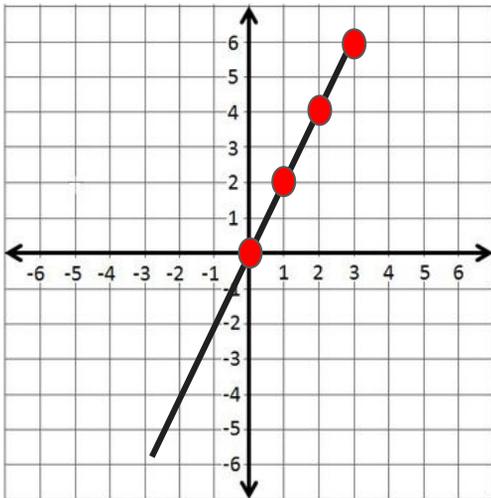
**Step 1: Given x and y values**

Month(x)	Investment (y)
0	0
1	2
2	4

**Step 2: Plot points of x and y**



**Step 3 : Connect the dots**



As you can see, the points formed a straight line that passes through the origin indicating a proportional relationship.

When the line does not pass through the origin it means that it is a non-proportional relationship.

From the equation  $y = mx + b$ :

- It is a **proportional relationship** when  $b = 0$  between  $x$  and  $y$ , so  $y = mx$
- It is a **non-proportional relationship** when  $b \neq 0$  between  $x$  and  $y$ .



# STEPS IN GRAPHING AND IDENTIFYING SLOPE OF THE LINE



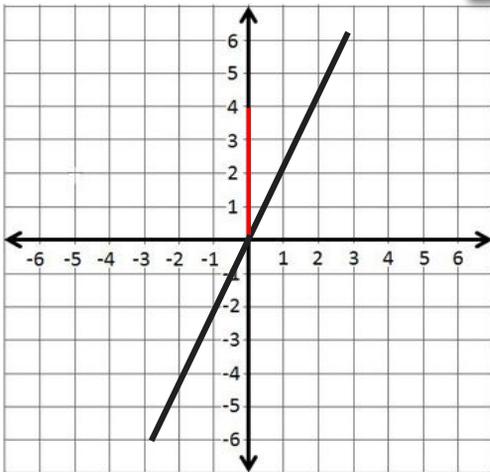
The **constant of proportionality** of line ( $m$ ) is the same as the **slope**. It can be solved by using the formula  $y = mx + b$ . When  $b = 0$  the equation will be  $y = mx$ , therefore you can rearrange the formula to  $m = y / x$  where  $y$  is rise and  $x$  is run.



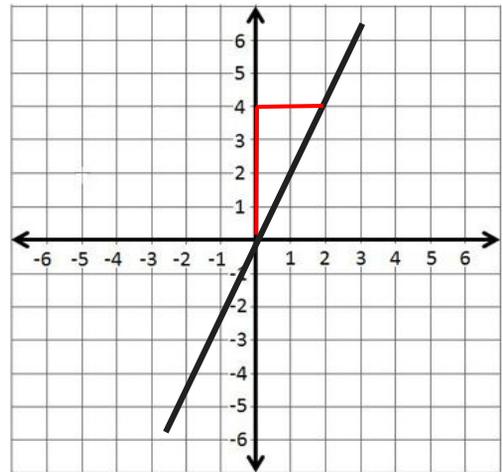
**Step 4 : Solve change in y axis or the rise.**



**Step 5 : Solve change in x axis or the run.**



$$\Delta y = 4 - 0$$



$$\Delta x = 2 - 0$$

**Therefore,**

$$m = \frac{\Delta y}{\Delta x} = \frac{4 - 0}{2 - 0}$$

$$m = 2$$

From the formula of the proportional relationship,  $y = mx$ . The equation of the line of the problem is  $y = 2x$ .



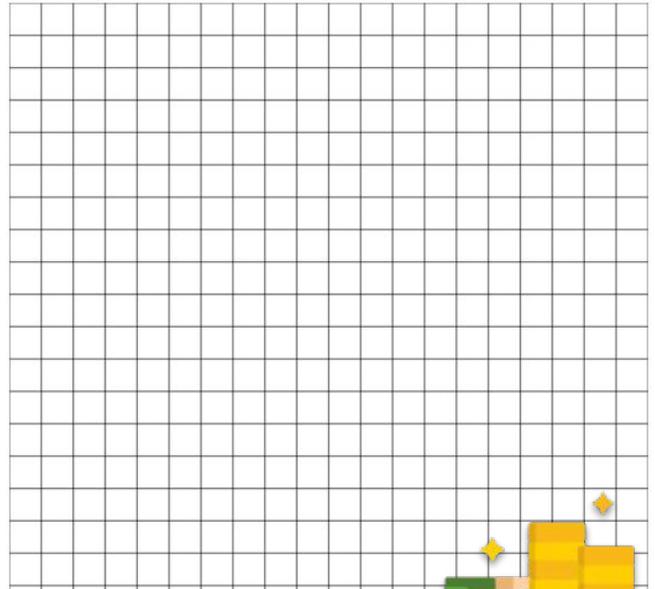
## LET'S PRACTICE

Practice and apply your understanding of the discussion. Graph and tell whether the line is proportional or non-proportional.

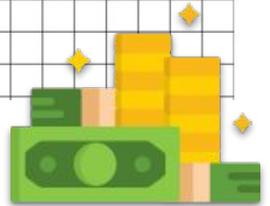


1.

Month	\$ Investment
0	0
2	4
4	8
6	12
8	16

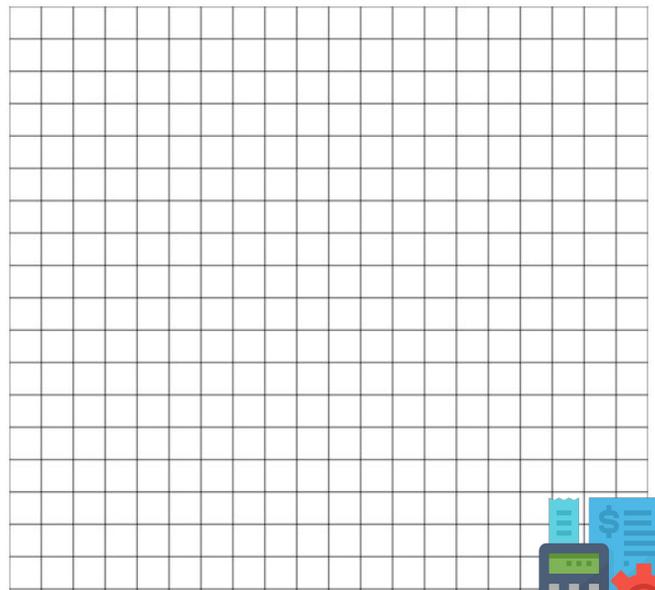


- Proportional Relationship
- Non-proportional Relationship



2.

Month	\$ Investment
2	4
4	10
7	14
8	16
9	17



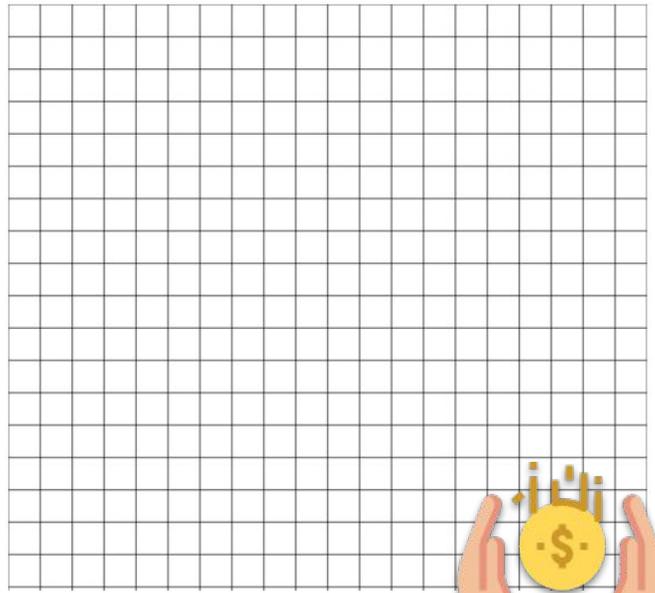
- Proportional Relationship
- Non-proportional Relationship



## LET'S PRACTICE

3.

Month	\$ Investment
1	2
2	5
3	7
4	8
5	10



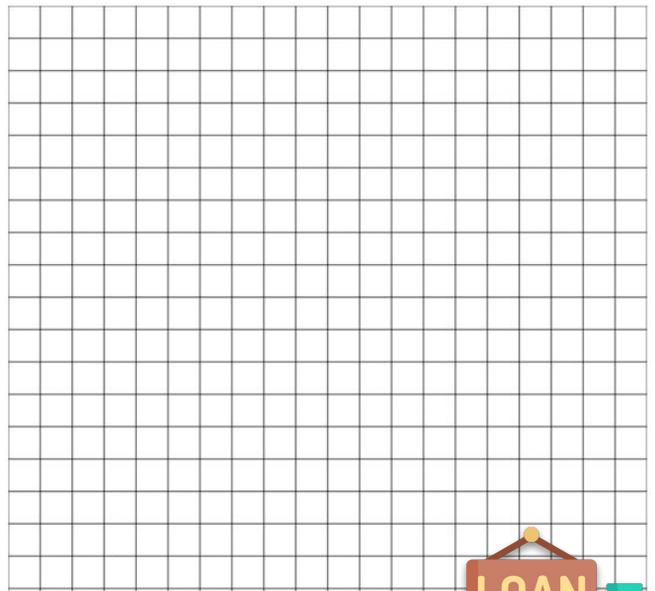
- Proportional Relationship
- Non-proportional Relationship



Practice and apply your understanding of the discussion. Graph and solve for the value of proportionality constant.

4.

Month	\$ Investment
0	0
4	8
5	10
8	16
10	20



Solution:



Graphing Proportional Relationships and Identifying Slope of the Line



# TABLE OF ACTIVITIES

1. Taxation
2. Revenue
3. Fiscal Closing
4. Fund
5. Credit and Debit Card
6. Account Codes
7. Financial Market
8. Auditing
9. Banking and Investment
10. Microeconomics



# TAXATION

To help the government collect tax from citizens, choose the correct answer from the choices below. Write the letter of your answer on the space provided.

- \_\_\_ 1. Constant of proportionality is equal to \_\_\_\_\_.  
a. x value  
b. slope



- \_\_\_ 2. When you draw a slope triangle you begin with \_\_\_\_\_.  
a. vertical change  
b. horizontal change

- \_\_\_ 3. You can find the constant proportionality by finding the ratio of \_\_\_\_\_.  
a. change of y over change of x  
b. change of x over change of y



- \_\_\_ 4. What line does graph of proportional relationship form?  
a. curve line  
b. straight line

- \_\_\_ 5. How do you know if the line is a proportional or non-proportional relationship.  
a. when the line passes through the second quadrant.  
b. when the line passes through the origin.



# REVENUE

To help me increase my net assets, you need to answer the following questions. Write TRUE, if the graph states proportional relationship and FALSE, if the graph states non-proportional relationship. Explain your answer.

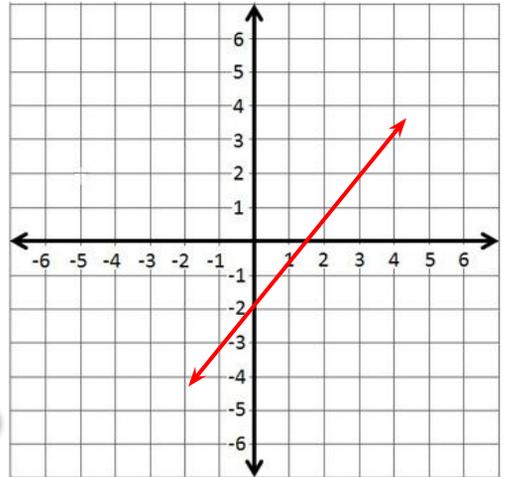
1.

---

---

---

---



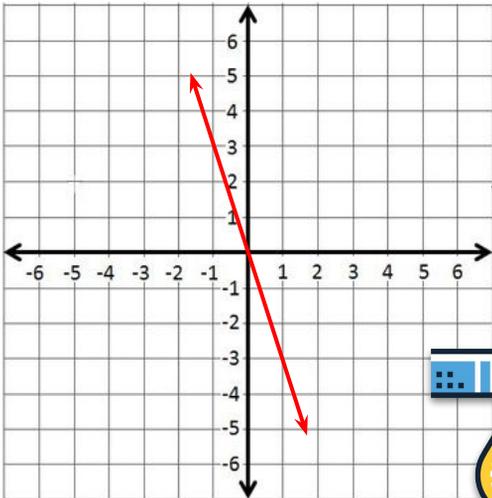
2.

---

---

---

---



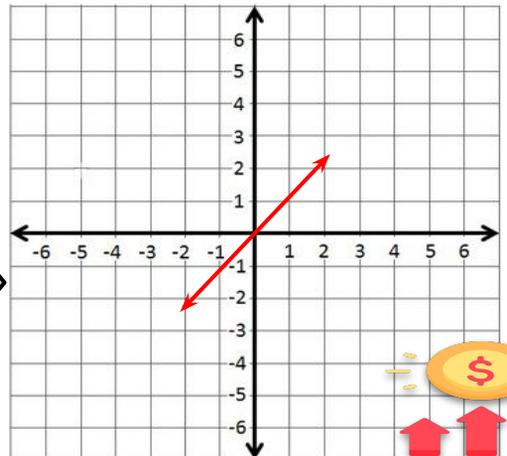
3.

---

---

---

---



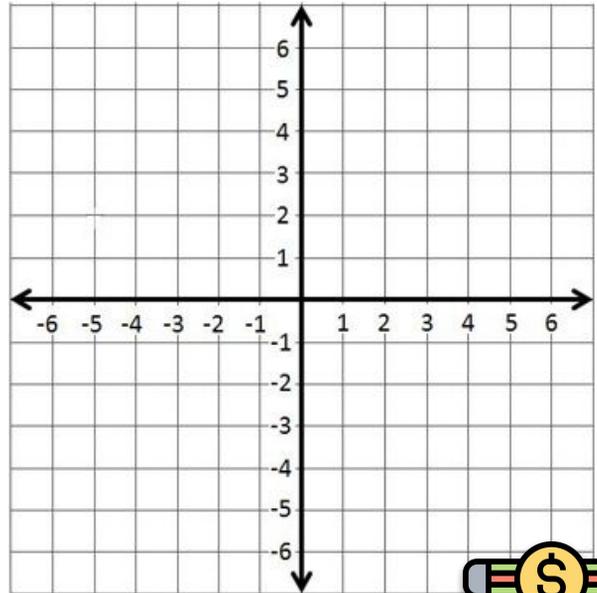
# FISCAL CLOSING

Before shifting data from temporary to permanent accounts balance sheet, you need to answer the following first. Choose the correct answer to complete the problem and draw the line on the graph. Write your answer on the space provided.

\_\_\_1. The amount of annual financial statement is proportional to the number of months as shown in the table. Which of the following choices represents the values of X, Y and Z.

Annual financial	0	3	Y	9	12
No. of months	0	X	16	24	Z

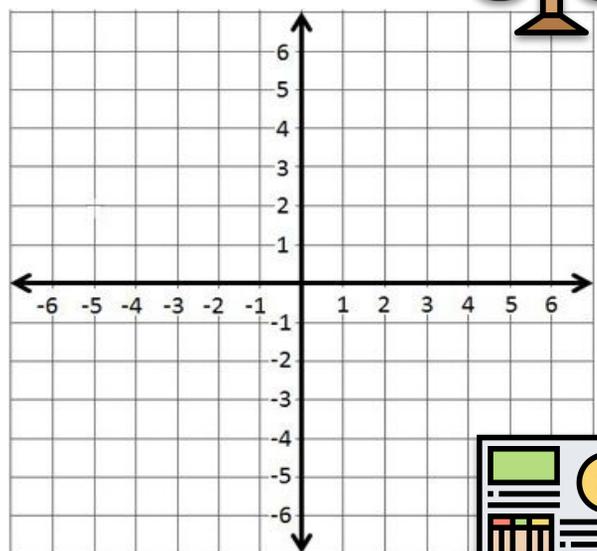
- a. 8,6,32    b. 8,10,24    c. 9,7,34



\_\_\_2. Nehemiah's investment is proportional to the number of months, as shown in the table. Which of the following choices represents the values of A, B and C.

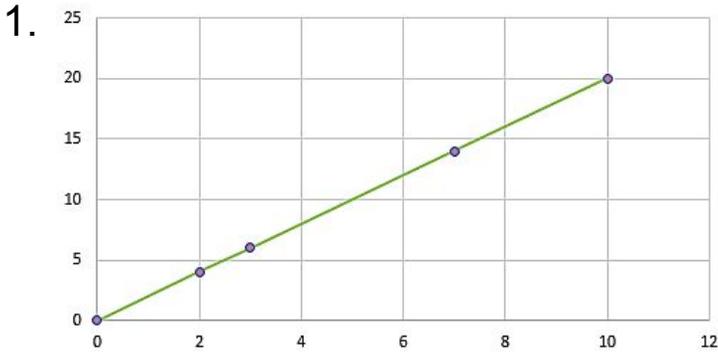
Investment (\$)	0	A	15	C	25
No. of months	0	10	B	40	50

- a. 6,7,8    b. 8,9,10    c. 5,30,20

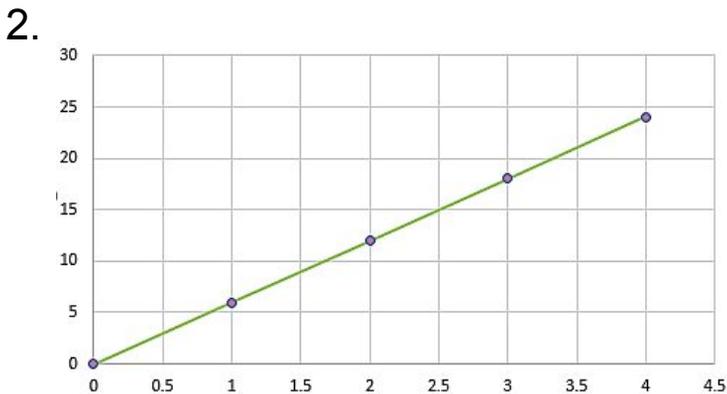


# FUND

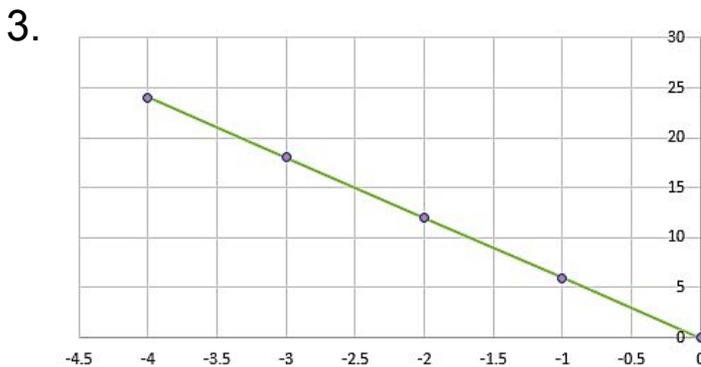
To help your community raise funds, you need to solve for the following problems. Determine the slope of the line based on the given graph and show your solution on the space provided.



SOLUTION:



SOLUTION:



SOLUTION:



# CREDIT AND DEBIT CARD

You are only allowed to use your credit card if you manage to determine the constant of proportionality of the given set of data. Show your solution on the space provided.

No. of items	0	5	6	12	15
Price (\$)	0	20	24	48	60

No. of items	0	1	2	3	4
Price (\$)	0	4	8	12	16



1

2

No. of items	0	2	4	6	8
Price (\$)	0	4	8	12	16

No. of items	0	2	3	4	5
Price (\$)	0	30	45	60	75

3

4



No. of items	0	2	4	6	8
Price (\$)	0	7	14	21	28



5

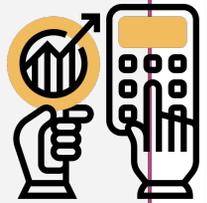


# ACCOUNT CODES

To secure your account, you need to answer the following to get a security code. Complete the table and show your solution on the space provided.

1. Solution :

No. of days	—	—	7	10
Profit (\$)	3	6	21	—



2. Solution :

time (hr)	—	4	5	9
Profit (\$)	16	—	40	—

3. Solution :

time (hr)	—	3	6	8
Profit (\$)	1.4	2.1	—	—



4. Solution :

No. of days	—	—	8	10.5
Profit (\$)	3	9	16	—

5. Solution :

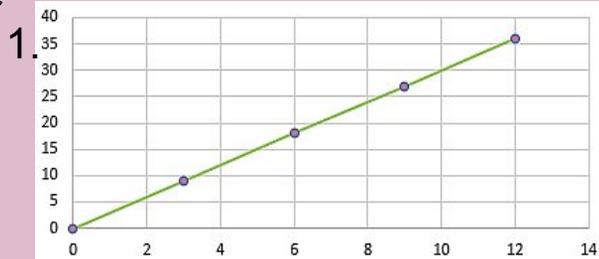
No. of days	1	2	3	—
Profit (\$)	—	—	18	24

**CODE**

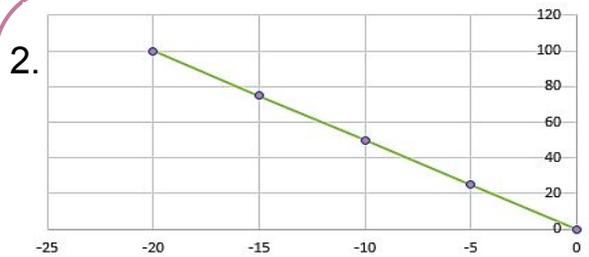


# FINANCIAL MARKET

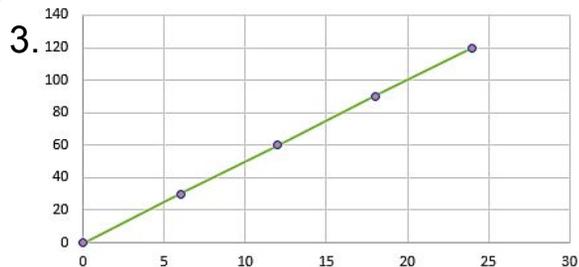
Lack of money? You can earn money to finance your needs if you answer the following problems. Determine the slope and equation of the line and express it in the form  $y = mx$ . Show your solution on the space provided.



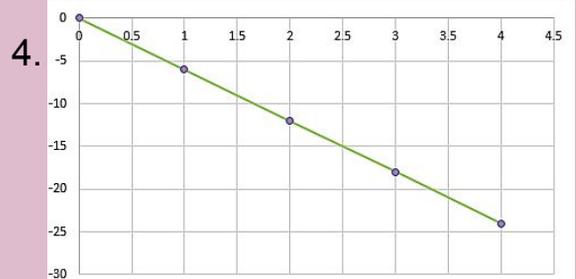
Solution :



Solution :



Solution :



Solution :



# AUDITING

Help me to audit HK Corporation's account by solving the problems below. Choose the letter that shows constant rate change then draw the line on the graph provided. Justify your answer.

1.

A

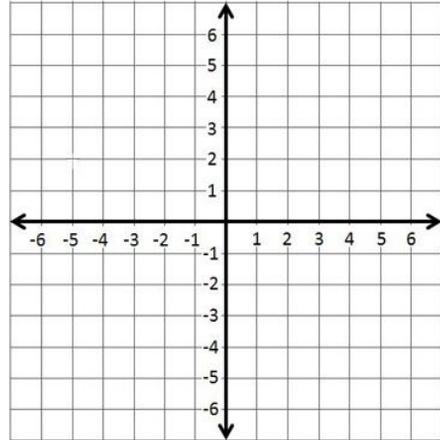
% Completion	2	3	7	10
# Accounts	4	6	14	20

B

% Completion	1	2	4	5
# Accounts	3	6	7	9

C

% Completion	2	3	8	11
# Accounts	4	6	16	20



Reason:

2.

A

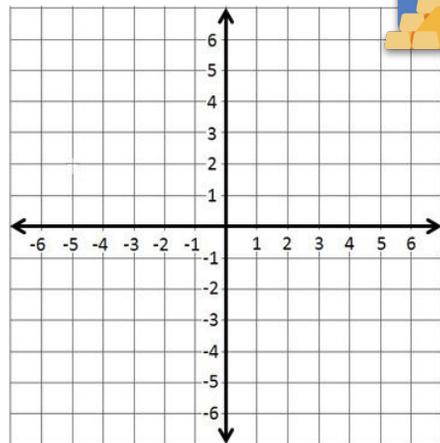
% Completion	0	3	7	8
# Accounts	0	4	5	7

B

% Completion	1	2	3	4
# Accounts	4	8	12	16

C

% Completion	1	3	4	2
# Accounts	4	9	12	10



Reason:



# BANKING AND INVESTMENT

Before going to the bank you need first to answer the following problems. Complete the table and determine the constant of proportionality. Show your solution on the space provided.

1.

<b>Pedigree (kg)</b>	3	8	—	6
<b>\$ Price</b>	—	—	100	60

Solution :

Proportionality constant: \_\_\_\_\_

2.

<b>Top Breed (kg)</b>	5	—	6	9
<b>\$ Price</b>	—	30	—	27

Solution :

Proportionality constant: \_\_\_\_\_

3.

<b>Royal Canin (kg)</b>	—	7	6	8
<b>\$ Price</b>	342	—	228	—

Solution :

Proportionality constant: \_\_\_\_\_

4.

<b>Nutri Chunks (kg)</b>	7	8	6	—
<b>\$ Price</b>	14	—	—	20

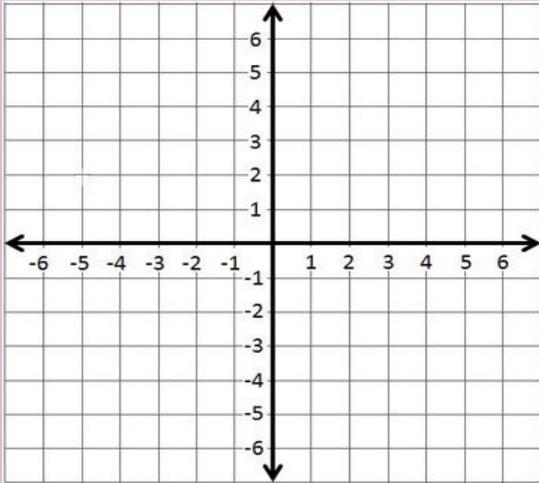
Solution :

Proportionality constant: \_\_\_\_\_

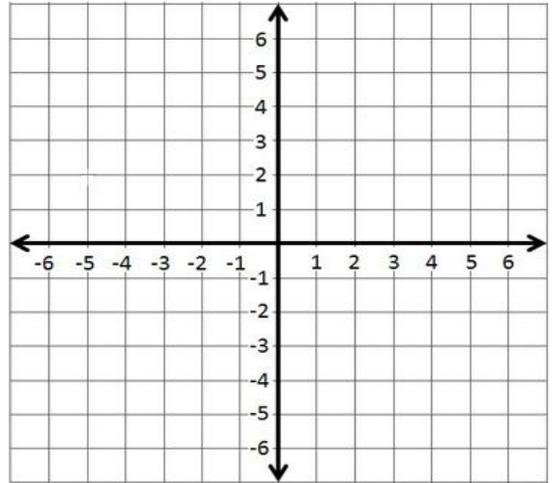


# MICROECONOMICS

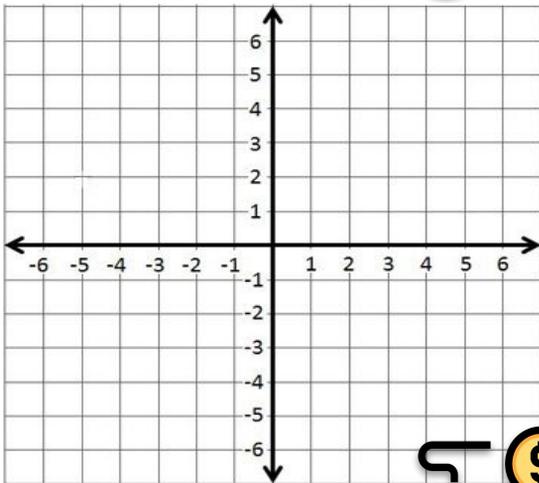
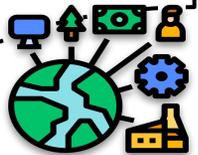
To make right decisions regarding the proper allocation of scarce resources, you need first to draw the line of the given slope. Use the graph provided for your answer.



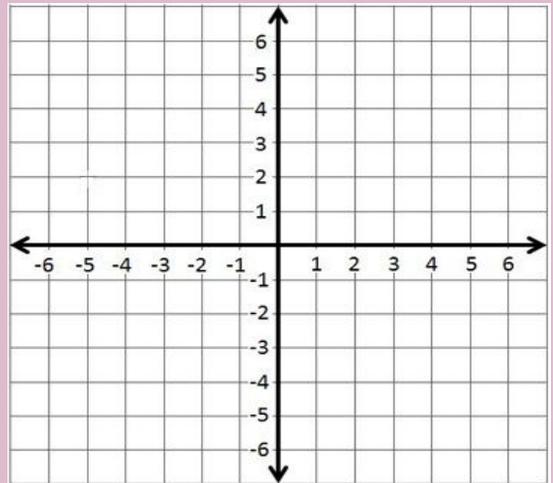
1.  $y = 2x$



2.  $y = 3x$



3.  $y = 4x$



4.  $y = 5x$



Graphing Proportional Relationships and Identifying Slope of the Line



# ANSWER GUIDE

## Activity 1

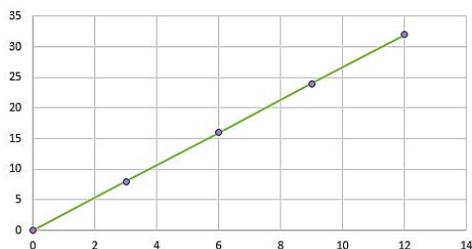
1. b    2. a    3. a    4. b    5. b

## Activity 2

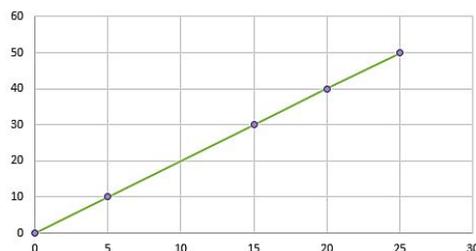
1. FALSE, the line did not pass through the origin.
2. TRUE, the line pass through the origin.
3. TRUE, the line pass through the origin.

## Activity 3

1. a



2. c



## Activity 4

$$1. m = \frac{\Delta y}{\Delta x} = \frac{20-0}{10-0} = 2 \quad 2. m = \frac{\Delta y}{\Delta x} = \frac{25-0}{4-0} = 25/4$$
$$3. m = \frac{\Delta y}{\Delta x} = \frac{24-0}{-4-0} = -6$$

## Activity 5

$$1. m = \frac{\Delta y}{\Delta x} = \frac{60-0}{15-0} = 4 \quad 3. m = \frac{\Delta y}{\Delta x} = \frac{16-0}{8-0} = 2 \quad 5. m = \frac{\Delta y}{\Delta x} = \frac{28-0}{8-0} = 7/2$$
$$2. m = \frac{\Delta y}{\Delta x} = \frac{16-0}{4-0} = 4 \quad 4. m = \frac{\Delta y}{\Delta x} = \frac{75-0}{5-0} = 15$$



# ANSWER GUIDE

## Activity 6

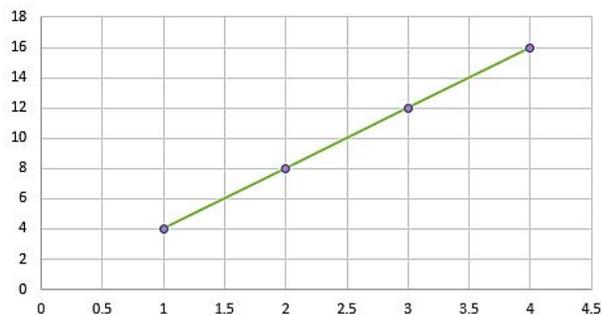
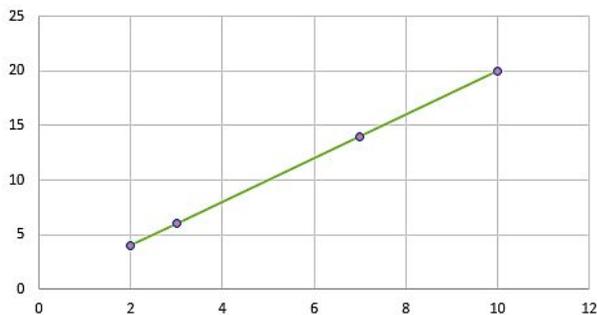
- $\frac{21}{7} = \frac{6}{x} = \frac{3}{y} = \frac{z}{10}$ ; answers are (1,2,30)
- $\frac{40}{5} = \frac{16}{x} = \frac{y}{4} = \frac{z}{9}$ ; answers are (2,32,72)
- $\frac{2.1}{3} = \frac{1.4}{x} = \frac{y}{6} = \frac{z}{8}$ ; answers are (2,4,2,5,6)
- $\frac{16}{8} = \frac{3}{x} = \frac{9}{y} = \frac{z}{10.5}$ ; answers are (1.5,4.5,2.1)
- $\frac{18}{3} = \frac{x}{1} = \frac{y}{2} = \frac{24}{z}$ ; answers are (6,12,4)

## Activity 7

- $m = \frac{\Delta y}{\Delta x} = \frac{35-0}{12-0} = \frac{35}{12}; y = \frac{35}{12}x$
- $m = \frac{\Delta y}{\Delta x} = \frac{100-0}{-20-0} = -5; y = -5x$
- $m = \frac{\Delta y}{\Delta x} = \frac{120-0}{24-0} = 5; y = 5x$
- $m = \frac{\Delta y}{\Delta x} = \frac{-24-0}{4-0} = -6; y = -6x$

## Activity 8

- $\frac{4}{2} = \frac{6}{3} = \frac{14}{7} = \frac{20}{10}$ ; all equal to 2  
Answer: a
- $\frac{4}{1} = \frac{8}{2} = \frac{12}{3} = \frac{16}{4}$ ; all equal to 4  
Answer: b



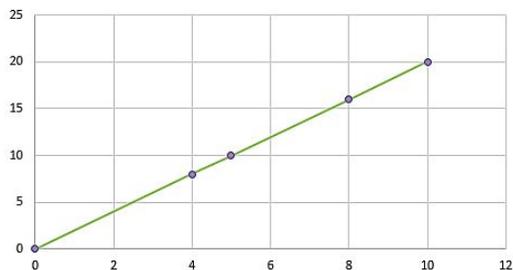
# ANSWER GUIDE

## Activity 9

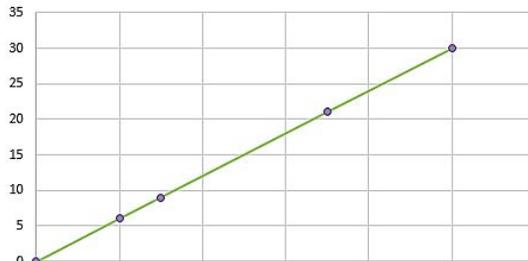
1.  $\frac{60}{6} = \frac{x}{3} = \frac{y}{8} = \frac{100}{z}$ ; answers are (30,80,10); For every kilogram of pedigree it costs \$10.
2.  $\frac{27}{9} = \frac{x}{5} = \frac{30}{y} = \frac{z}{6}$ ; answers are (15,10,18); For every kilogram of top breed it costs \$3.
3.  $\frac{228}{6} = \frac{342}{x} = \frac{y}{7} = \frac{z}{8}$ ; answers are (9,266,342); For every kilogram of royal canin it costs \$38.
4.  $\frac{14}{7} = \frac{x}{8} = \frac{y}{6} = \frac{20}{z}$ ; answers are (16,12,10); For every kilogram of nutrichunks it costs \$2.

## Activity 10

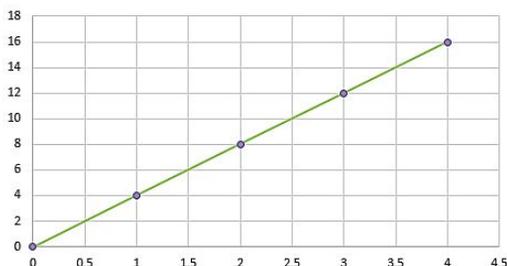
1.



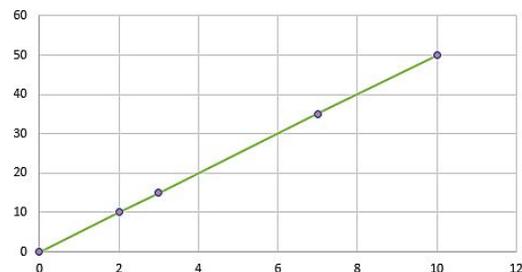
2.



3.



4.



# Copyright Notice

This resource is licensed under the [Creative Commons Attribution-NonCommercial 4.0](https://creativecommons.org/licenses/by-nc/4.0/) International license.

You are free to:

- **Share** – copy and redistribute the material in any medium or format
- **Adapt** – remix, transform, and build upon the material

Under the following terms:

- **Attribution** – You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
- **NonCommercial** – You may not use the material for commercial purposes.

For more information on this license, visit the following link:

<http://creativecommons.org/licenses/by-nc/4.0/>

Where possible, free-use images are sourced from online repositories such as Wikipedia and Wikimedia Commons. References and sources for images are provided in the speaker notes section of this document.

Thank you!



# Thank you

Thank you so much for purchasing and downloading this resource.

We hope it has been useful for you in the classroom and that your students enjoy the activities.

For more teaching and homeschooling resources like this, don't forget to [come back](#) and download the new material we add every week!

Thanks for supporting **Helping With Math**. We can provide teachers with low-cost, high-quality teaching and homeschooling resources because of our loyal subscribers and hope to serve you for many years to come.

- The Entire Helping With Math Team :)

