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Mathematics

Quarter 2 - Module 1
Illustrates Situations that Involve Direct, Inverse, Joint, and Combined Variations

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Mathematics - Grade 9
Alternative Delivery Mode
Quarter 2 - Module 1: Illustrates Situations that Involve Direct, Inverse, Joint, and Combined Variations

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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.

Lesson 1

Direct, Inverse, Joint and Combined Variations

In the previous grade levels, you have learned about ratio and proportion between two given quantities. You have also applied these concepts in solving real-life problems like mixture problems, cutting proportional lengths and the like. In this module, you will deepen your understanding on the relationship between two quantities called variations. Four types of variation will be discussed in this module. Have fun in learning and in discovering them!

LEARNING COMPETENCY

The learners will be able to:

- Illustrate situations that involve the following variations:
  a) direct variation
  b) inverse variation
  c) joint variation
  d) combined variation

  M9AL-IIa-1

What I Need to Know

Let's find out if you have some idea of what this module is all about. Write the letter that you think is the best answer to each question on a sheet of paper. Answer all items. After checking this short test, take note of the items that you were not able to answer correctly and look for the right answer as you go through this module.

1. How your score in a test does vary to its equivalent percent?
   a. directly b. indirectly c. inversely d. jointly

2. Which of the following represents: "y varies inversely to x" ?
   a. y = kx b. y = $\frac{k}{x}$ c. x = ky d. x = $\frac{k}{y}$

3. If y varies directly to x what happens to y when x is doubled?
   a. doubled b. halved c. quadrupled d. remains the same

4. Which of the following situations illustrates a joint variation?
   a. The heat required to melt a substance to its mass
   b. The perimeter of a square to its side
   c. The speed of the boat per hour to the amount of diesel
   d. The volume of a rectangular box to its length, width, and height

5. Which of the following illustrates combined variation?
   a. y = kwx b. y = $\frac{k}{wx}$ c. y = $\frac{kx}{w}$ d. k = xyw

6. In the formula, P = 4s, what happens to P when s is doubled?
   a. P is halved
   b. P is doubled
   c. P is tripled
   d. P is quadrupled

7. Three men can do a portion of a job in 8 days. If the number of men increases, what will be the effect in the number of days to finish the same job?
   a. increases b. decreases c. doubled d. remains the same

8. In the area of a rectangle, the length and width are inversely related. Which of the following statements explains this relationship?
   a. As the length increases, the width also increases.
   b. As the length increases, the width decreases.
   c. As the length and width increase, the area also increases.
   d. As the length and width increase, the area decreases.

9. The speed, s, of a moving object varies directly to the distance traveled, d, and varies inversely to the time taken, t. What kind of variation illustrates this statement?
   a. direct b. inverse c. joint d. combined

10. Using the statement in no. 9, which of the following relationships is true?
   a. The shorter the time, the faster the speed.
   b. The longer the time, the faster the speed.
   c. The longer the distance, the slower the speed.
   d. The shorter the distance, the faster the speed.

What's In

In your grade 7 class, you first learned how to translate verbal phrases to mathematical symbols. Let's see how much you can do in this activity.

Try This!

Match each verbal phrase to its corresponding mathematical symbol.

1. The number of minutes (m) spent in reading is 2 times the no. of pages (p) read .
2. The cost (C) of fish is 90 times the weight (w) in kilograms.
3. The rate (r) of work done by n people in h hours
4. The time (t) spent to travel 80 km at x kph..
5. The fare (f) is 9 times the number (n) of kilometer covered.

$r = \frac{n}{h}$	$t = \frac{80}{x}$	$m = \frac{2}{p}$	$f = \frac{n}{9}$	$t = \frac{x}{80}$
m= 2p	C = 90w	f = 9n	w = 90C	r = nh

Solve the given proportions.

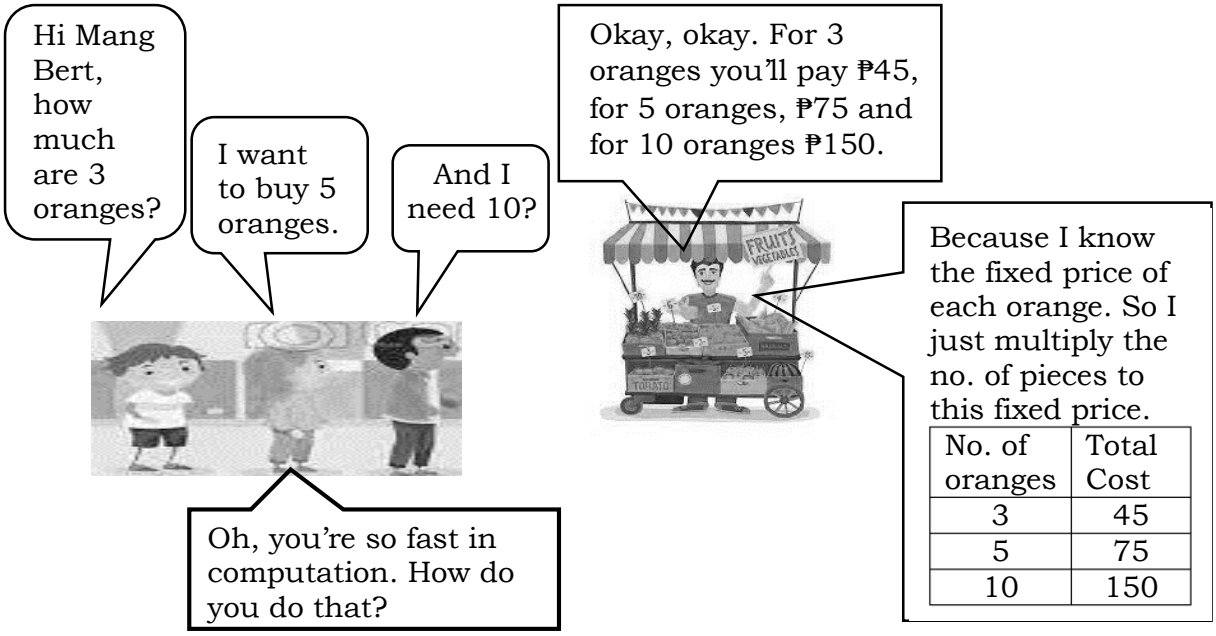
1. $\frac{21}{n} = \frac{7}{5}$ 2. $\frac{12}{11} = \frac{n}{22}$ 3. $\frac{4}{48} = \frac{16}{n}$ 4. $\frac{n}{5} = \frac{4}{20}$ 5. $\frac{15}{12} = \frac{20}{n}$

Remember: *The product of the means is equal to the product of the extremes.*

What's New

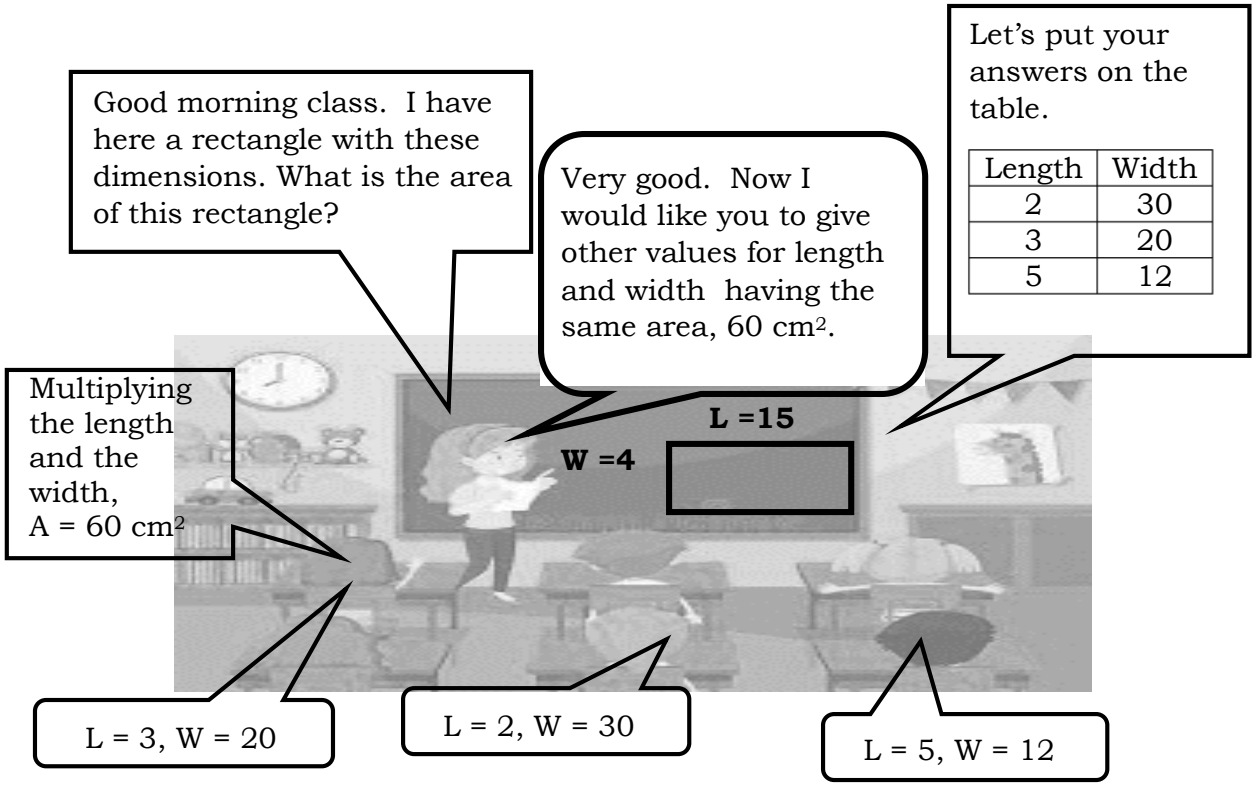
Study the following scenarios:

Scenario 1:



No. of oranges	Total Cost
3	45
5	75
10	150

Scenario 2:



Length	Width
2	30
3	20
5	12

The two given scenarios show a relationship between two quantities in which a change in one quantity produces a change in another quantity. These situations illustrate the concept of **variation**.

No. of oranges bought (n)	Total cost paid (c)
3	45
5	75
10	150

Ratio of c to n:

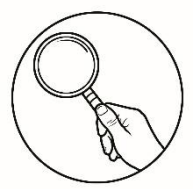
$\frac{45}{3} = 15$

$\frac{75}{5} = 15$

$\frac{150}{10} = 15$

In the first scenario, "the total cost paid" is related to "the number of oranges bought". In this relation as illustrated in the table, as the number of oranges bought increases, the total cost paid also increases based on the fixed price per orange. The relationship between the number of oranges bought and the total cost paid is called Direct Variation.

We say, "The total cost (c) paid varies directly to the number of oranges (n) bought" or "The total cost paid is directly proportional to the number of oranges bought". In mathematical symbols, we write c = kn, where k is called the **constant of variation** or **constant of proportionality**. In the first scenario k = 15 which is the fixed price per orange. This can be verified if we get the ratio of the two quantities, c and n, its value is constant. Thus, in the given situation, its equation is c = 15n.



What is It

Direct Variation or Direct Proportion:

Direct variation is a relationship between two quantities, x and y, where, as x increases y also increases or as y decreases, x also decreases and the ratio between them is constant or the same for all given values of the variables. So if y varies directly as x, then we say y = kx or $k = \frac{y}{x}$ and k is called the constant of variation.

Example 1

Which shows direct variation?

a) The time (t) required to perform the given amount of work to the number of persons (p) working.
b) The circumference (C) of a circle to its diameter (d).

Answer:

a) When the number of persons working on a certain amount of work increases, the time for them to finish that work decreases. This is **not direct variation.**
b) C = πd, so the circumference of a circle is directly proportional to its diameter.
This shows **direct variation.**

Example 2

The commission (C) of a salesman varies directly to the amount of his sales (S). How will his commission change when his sales are doubled?

Solution:

$C = k(S)$

$C = k(2S)$

$C = 2kS$

Therefore, the commission is **also doubled.**

Example 3

The area (A) of the umbrella varies directly to the square of its radius (r). If the radius of the umbrella is tripled, how is the area of the umbrella changed?

Answer:

$A = kr^2$

$A = k(3r)^2$

$A = 9kr^2$

Hence, the area of the umbrella will be **9 times its original area.**

Example 4

If y varies directly as x, how is y change if x is increased by 15%.

Answer :

If y varies directly to x, then what happens to x also happens to y.

Therefore, y also increased by 15 %

INVERSE VARIATION OR INVERSE PROPORTION

Let's go back to the second scenario above. There is a given fixed value of area of the rectangle which is 60 cm^2. The students gave different values of length and width with the same value of area. These are shown in the table.

Length	Width
2	30
3	20
5	12

Product of L and W:
(2)(30) = 60
(3)(20) = 60
(5)(12) = 60

In the table, notice that the set of values of length and width are related in such a way that as the values of the length increase, the values of the width decrease with the area being fixed at 60 cm^2. This type of relationship of two set of values with fixed value of one variable is called an **inverse variation**. We say, "The length of the rectangle varies inversely to its width." or "The length of the rectangle is inversely proportional to its width." In mathematical symbols, we write $L = \frac{k}{W}$ or $k = LW$ where k is the constant of variation or constant of proportionality. The value of k in this scenario is 60. This can be obtained by getting the product of L and W. Notice that this product is equal or the same for any given pair of values of L and W.

Inverse variation involves a relation of two quantities, x and y, where in, as x increases y decreases, or when y increases x decreases and that their product remains constant. So, if **"y varies inversely as x"** *or* ***"y is inversely proportional to x"***, then the equation will be, $\boldsymbol{y = \frac{k}{x}}$, *or* $\boldsymbol{k = xy}$ where k is the constant of variation or constant of relationship.

Example 1:

At constant temperature, the Volume (V) of a gas varies inversely to the Pressure (P). What happens to the volume when the pressure increases?

Answer:

Since the Volume varies inversely with the pressure, then the Volume decreases as the pressure increases.

Example 2:

The number of hours (t) required to do a certain job varies inversely to the number of men (n) working. If additional workers were hired, how will the number of hours to finish the job changed?

Answer:

Since the relationship between the number of men and number of hours is inverse, the number of hours to finish the job will **decrease.**

Example 3:

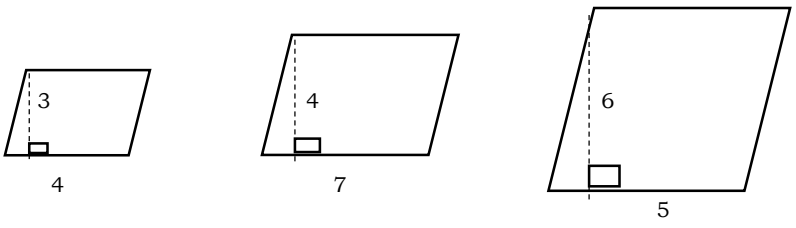
The length (*l*) of a violin string varies inversely to the frequency (*f*) of its vibrations. A violin string 14 inches long vibrates at a frequency of 450 cycles per second. If the length of the string is reduced, what will happen to the frequency of its vibrations?

Answer:

The frequency of its vibration will **increase.**

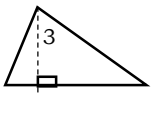
JOINT VARIATION

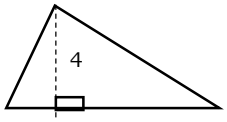
In finding the area of a rectangle, we use the formula A = lw, The length and width in this formula are inversely related, and A is considered a constant as shown in scenario 2. Thus only two variables are actually used in this formula. Since a rectangle is also a parallelogram, we can also say that A = bh. The width becomes the base and the length becomes the height. Look at these parallelograms.

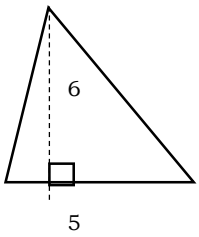


base = 4	base = 7	base = 5
height = 3	height = 4	height = 6
Area = 12	Area = 28	Area = 30

Suppose you cut each parallelogram into halves. You will then have triangles.







base = 4	base = 7	base = 5
height = 3	height = 4	height = 6
Area = 6	Area = 14	Area = 15

The areas of these triangles are half the areas of their corresponding parallelograms. That is why in finding the area of a triangle, we use the formula $A = \frac{1}{2}bh$. In this case, there are three variables involved, A, b and h. The constant in the formula is ½. Notice that the area of the triangle increases whenever the product of the base and height increases. This situation illustrates a **joint variation**. It is a type of variation in which one variable varies **directly** to the product of two **or more variables**. Thus, we say, "the area of a triangle varies jointly to its base and height. The constant of variation, ½, is obtained by dividing the area of the triangle by the product of its base and height. In mathematical symbols, $A = kbh$ or $k = \frac{A}{bh}$ and k = ½.

Example 1

Determine if the given illustrates joint variation or not.

a) Amount of interest; I = Prt
b) Volume of a box ; V = lwh
c) Acceleration of a car ; A = $\frac{s}{t}$

Answer:

a) The amount of interest varies directly to two variables, P (Principal) and t(time). The constant is r (rate of interest) so it is **joint variation.**
b) The Volume of a box varies directly to three variables (length, width, and height) so it is **joint variation**.
c) The acceleration (A) of a car varies directly to its speed (S) and inversely to the time (t). It is **not a joint variation** because two types of variation were used.

Example 2

The volume (V) of a circular cylinder varies jointly to the square of the radius (r) of the base and its height (h) with π *as the constant of variation.* If the radius is fixed and h is doubled, how is V affected?

Solution:

V = $\pi r^2 h$
V = $\pi r^2 (2h)$
V = $2\pi r^2 h$

Therefore, the volume is also **doubled.**

COMBINED VARIATION

When direct and inverse variations happen at the same time, it is called the **combined variation**. Combined variation describes a relationship where a variable depends on two or more other variables, varies directly with some of them and inversely with others.

Combined Variation is a combination of direct and inverse variations. That is, if y varies directly to x and inversely to z, then in mathematical symbols **y =** $\frac{kx}{z}$ **or** $\frac{yz}{x}$ **= k**

Example 1

Determine if the relationship is combined variation or not.

a. The distance (d) traveled by a car to its speed (r) and time of travel (t).
b. The speed (r) of the car to the distance (d) traveled and time of travel (t).
c. The time of travel (t) of a car to the distance (d) traveled and its speed (r).

Answer:

a. In mathematical symbols, d = rt. The distance varies directly to the speed and time.
   It is **not combined variation**. It is joint variation.
b. In mathematical symbols, r = $\frac{d}{t}$. The speed varies directly to the distance and inversely to the time. It is **combined variation**.
c. In mathematical symbols, t = $\frac{d}{r}$. The time varies directly to the distance and inversely to the speed. It is **combined variation**.

Example 2

If **x** is directly proportional to **y** and inversely proportional to **z**, what happens to x if z is tripled?

Solution

x = $\frac{ky}{z}$

x = $\frac{ky}{3z}$

The value of x becomes 1/3 of the original value or it decreases by 67%.

What's More

TEST YOURSELF!
Activity 1: Flag Raising!!!

Draw a blue flag if the given situation illustrates a direct variation, a red flag if it is an inverse variation, yellow flag if it is a joint variation and a green flag if it is a combined variation.

1. The diameter of a circle to its circumference.
2. The area of a rectangle to its length and width
3. The cost of a ballpen to the number of ballpen.
4. The height of a cone to its volume and square of the radius
5. The perimeter of a square to its side.
6. The circumference of a coin to its radius
7. The cost per person renting a private resort to the number of persons sharing the rent.
8. The volume of a rectangular prism to the area of the base and the height.
9. The number of days to repair a road to the number of workers.
10. The surface area of a cube ice to its side.

Activity 2: Ups and Downs

Jean and Jericho who are playing in the school grounds decided to sit on a seesaw. Jean, who is heavier, tends to raise Jericho on the other end of the seesaw. They tried to position themselves in order to balance the weight of each other.

Questions: Underline the correct answer.

1. This situation illustrates (direct, inverse) variation.
2. The two quantities that must vary in this situation are (weight and distance from the center, height and weight).
3. The heavier the kid, the (closer, farther) he/she should be at the center to balance the seesaw?
4. When Jean moves farther from the center, Jericho tends to go (up, down).
5. If Jericho moves closer to the center, Jean tends to go (up, down).

Activity 3: Its Your Turn!

Answer as indicated.

1. If your income is constant, what will happen to your savings when your expenses increase?
2. The price of a certain commodity varies inversely with the supply. If the supply decreases, what will happen to the price?
3. If r is jointly proportional to p and q, happens to r if p is multiplied 5 times and remains constant?
4. If y varies directly to x, how is y changed if x is increased by 10%?
5. If you eat more than what your body needs, what will happen to your weight?

What I Have Learned

Direct variation is a relation between two quantities in which an increase in one quantity produces an increase in another quantity and that their ratio remains the same.
If y varies directly as x, then y = kx or $k = \frac{y}{x}$ where k is the constant of variation. This proportion can be applied to direct variation:

$$\frac{y_1}{x_1} = \frac{y_2}{x_2}$$

Inverse variation is a relation between two quantities in which an increase in one quantity produces a decrease in another quantity and that their product remains constant.

If y varies inversely as x, then $y = \frac{k}{x}$ or k = xy**,** where k is the constant of variation. This proportion can be applied to inverse variation:

$$x_1y_1 = x_2y_2 \text{ or } \frac{y_1}{x_2} = \frac{y_2}{x_1}$$

Joint variation is a type of variation in which one variable varies directly to the product of two or more variables. That is, if y varies jointly as x and z then in mathematical symbols
$y = kxz$ or $\frac{y}{xz} = k$

Combined Variation is a combination of direct and inverse variations. That is if y varies directly to x and inversely to z then in mathematical symbols, y = $\frac{kx}{z}$ or $\frac{yz}{x}$ = k

What I Can Do

A. After Lesson Response

Read the phrases found on the right column in the table below. If the phrase is a direct variation, place a letter **DV** in the After Lesson Response column, if it is an inverse variation, place a letter **IV,** if it a joint variation writes **JV** and if it is a combined variation write **CV.**

After Lesson Response	Phrase
	1. The number of hours to finish a job to the number of men working
	2. The cost of operating appliance varies as the number of watts drawn, hours of operation and the cost per kilowatt-hour.
	3. The number of persons sharing a pie to the size of slices of the pie.
	4. The temperature of the room with the time when air conditioning is running.
	5. The time spent in walking to the rate at which a person walks
	6. The area of the circle to its radius
	7. The Kinetic energy of a moving object to the mass of the object and inversely the square of the velocity
	8. The frequency of an electromagnetic wave as to the wavelength
	9. The surface area of a cube to the square of its side
	10. The volume of a sphere to its radius and height.

B. Who Is This Filipino Inventor?

He is a Filipino Mathematician who developed a board game called DAMATHS. The board game applies the moves used in the Filipino board game DAMA to solve problems on the different concepts in Mathematics. Who is he?

To find the answer to this trivia, match the letter that corresponds to the answer to the numbered item on your left. The letters will spell out the name of this Filipino Mathematician.

"The rate (r) at which a person type a certain manuscript as to the time (t) spent in typing"

1. What will happen to r if t is doubled?
2. In #1, is r increases or decreases?
3. If r is multiplied 5 times, what happens to t?

"The area A of a rectangle of length *l* and width w is given by the formula A = lw"

4. If w is tripled and *l* remains fixed, what change takes place in A?
5. if *l* decreased by 30% and w remains fixed, what will happen to A?
6. If w decreases and *l* also decreases, what will happen to A?

E. multiplied 5 times
B. divided by 5
D. decreased by 30%
F. increased by 30%
U. increases
N. tripled
A. decreases
H. doubled

ANSWER : _____ _____ _____ _____ _____ _____

1 2 3 4 5 6

C. Who Am I?

Using your knowledge in illustrating variation, decode the following.

The First Man to Orbit the Earth

In 1961, this Russian cosmonaut orbited the earth in a space ship. Who was he? To find out, identify the kind of variation suited to the given situation. Then write the correct letter in the box below. These letters will spell out the name of this Russian cosmonaut. Have fun!

1. The perimeter of a regular octagon to its side.
   Y. Direct Variation Z. Inverse Variation
2. The volume of a gas at a fixed temperature as to its pressure
   O. Joint Variation U. Inverse Variation
3. Gravitational attraction between two bodies as their masses and the square of the distance between them.
   Q. Joint Variation R. Combined Variation
4. Volume of a cone to its height and length of its base.
   E. Combined Variation I. Joint Variation
5. The volume of a cube to its side.
   G Direct Variation H. Joint Variation
6. The number of tiles needed to cover a particular area to the size of each tile.
   A Inverse Variation M Combined
7. The volume of a cylinder as the area of the base and its height.
   F Inverse Variation G Joint Variation
8. The distance that an object falls from some point above the ground as the square of the time it falls.
   S Combined Variation A Direct Variation
9. The simple interest earned in a given time varies with the principal and the rate of interest.
   R Joint Variation B Combined Variation
10. The time to complete a project to the number of employees.
    A Direct Variation I Inverse Variation
11. The weight of an object as it stretches a spring to its distance.
    N Direct Variation S Joint Variation

Answer ;

___	___	___	___	___	___	___	___	___	___	___
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**

Assessment

Read carefully. For each item, choose and write the letter of the correct answer in your answer sheet.

1. How does the number of men working varies to the number of machines used?
   a. directly b. indirectly c. inversely d. jointly
2. In the circumference of a circle, $C = 2\pi r$, which is the constant of variation?
   a. C b. r c. π d. 2π
3. If m varies directly to n what happens to m when n is halved?
   a. doubled b. halved c. quadrupled d. remains the same
4. Which of the following statements illustrates a combined variation?
   a. The heat required to melt a substance to its mass
   b. The perimeter of a square to its side
   c. The speed of the boat per hour to the amount of diesel
   d. The length of a rectangular box to its area, width, and height
5. Which of the following illustrates joint variation?
   a. y = kwx b. $y=\frac{k}{wx}$ c. $y=\frac{kx}{w}$ d. k = xyw
6. The time it takes to hear thunder varies directly with the distance from lightning. What do you mean by this statement?
   a. As the distance from lightning increases, so does the time it takes you to hear the thunder.
   b. As the distance from lightning increases, the shorter the time it takes you to hear the thunder.
   c. The nearer you are from the lightning, the louder you hear the thunder.
   d. The distance of the lightning has no effect in the time it takes to hear the thunder.
7. The amount of tickets in a cinema varies as the number of people who watched it. If the number of people increases, what will be the effect in the amount of tickets?
   a. increases b. decreases c. doubled d. remains the same
8. The Illumination (I) on a page is proportional to the wattage (w) of the lamp and inversely proportional to the square of the distance (d) from the lamp. Which of the following statements explains this relationship?
   a. As the illumination and distance increases, the wattage also increases.
   b. As the illumination and wattage increase, the distance decreases.
   c. As the illumination increases, the wattage and distance also increase.
   d. As the wattage and distance increase, the illumination decreases.
9. The amount of gasoline used by a car varies directly to its distance travelled and the square root of the speed. What kind of variation illustrates this statement?
   a. direct b. inverse c. joint d. combined
10. Using the statement in no. 9, which of the following relationships is true?
    a. The larger the amount of gas used, the longer the distance travelled.
    b. The larger the amount of gas used, the shorter the distance travelled.
    c. The longer the distance traveled, the faster the speed.
    d. The shorter the distance traveled, the slower the speed.

Additional Activities

Do you believe that "sharing of what you have and the blessings you receive" are related? Why or why not? Is this directly or inversely related? Explain.

E - SEARCH

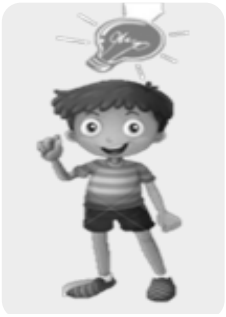
You may also check the following link for your reference and further learnings on illustrating quadratic equations.

You may also check the following link for your reference and further learnings on Direct and Inverse Variation.

- https://www.khanacademy.org/math/algebra-home/alg-rational-expr-eq-func/alg-direct-and-inverse-variation/v/direct-and-inverse-variation
- https://www.varsitytutors.com/hotmath/hotmath_help/topics/direct-variation
- www.brainfuse.com › jsp › alc › resource
- https://www.qacps.org/cms/lib/MD01001006/Centricity/Domain/847/direct%20and%20inverse%20variation.pdf
- https://www.varsitytutors.com/hotmath/hotmath_help/topics/direct-variation
- https://www.onlinemathlearning.com/direct-variation.html
- http;//mrbuckmath.weebly.com/uploads/5/8/6/6/58669809/combined_variation.pdf

PISA-BASED WORKSHEET

LOCKDOWN!!!



All of these words give us negative thought. Words that make people panic. People are not ready for these.

"**Think Positive**!" that is Ruben's motto, a Grade 9 student of ERVHS. He thinks of something that will make him productive during lockdown.

Ruben's first move is to save a part of his P50 daily allowance. How much will he save if he decided to spend only 30% of his daily allowance? Below is Ruben's tabulated daily savings. How does the total amount of money saved varies with the number of days, directly or inversely?

No. of Days (d)		1	2	3	4	5
Total Amount Saved (A)		35	70	105	140	175

1. Make an equation showing how the total amount of money saved varies with the number of days.

2. How much money will he save in two weeks?

Fixing his closet is his 2nd activity. He decided to fix and paint the two doors of his closet each measuring 3 feet by 6 feet.

3. If the cost of a paint is Php150 per square meter, how much will it cost to paint the doors of his closet? (Hint: 1 m^2 = 10.76 ft^2)

Ruben's 3rd plan is to help his parents by earning extra income. He decided to make a pizza delivery within their community and posted it in his Facebook

4. A 5 inches radius pizza costs Php75.00. If the cost of pizza varies directly as the square of its radius. How much will a 10 inches radius pizza cost?

5. If the selling price varies directly as the cube of its radius and if a 5 inches pizza has a selling price of Php150, How much will Ruben sell a 10 inches pizza?

Answer Key

WHAT I KNOW

1. A	6. B
2. B	7. B
3. A	8. B
4. D	9. D
5. A	10. A

WHAT'S IN

1. m = 2p
2. C = 90w
3. $r = \frac{n}{k}$
4. $t = \frac{90}{x}$
5. f = 9n

PROPORTION

N = 15
N = 24
N = 192
N = 1
N = 16

WHAT'S MORE

ACTIVITY 1

1. Green	6. Blue
2. Yellow	7. Red
3. Blue	8. Yellow
4. Yellow	9. Red
5. Blue	10. Blue

ACTIVITY 2

1. Inverse Variation
2. weight and distance from the center
3. closer
   up
   down

ACTIVITY 3

1. Decrease
2. Increases
3. Multiplied 5 times
4. Also increased by 10%
5. Increases

WHAT I CAN DO

A.			
1. IV	6. DV	B. HUENDA
2. JV	7. CV	
3. IV	8. DV	C. YURI GAGARIN
4. DV	9. DV	
5. DV	10. JV	

ASSESSMENT

1. A	6. A
2. D	7. A
3. B	8. A
4. D	9. C
5. A	10. A

PISA-BASED QUESTIONS

1. y = kx
y = amount saved
x = number of days
k = constant of variation

2. k = P35
y = P35(14)
y = **P490** amount of money he saved for 2 weeks

3. Area of 1 door = 3 x 6
$= 18ft^2 \times m^2 / 10.76 ft^2$
$= 1.67 m^2$
$y = P150/m^2 \times 1.67m^2$
y = 250.50 since there are two doors you need to multiply the cost by 2. Therefore, the cost of painting the 2 doors is **P501.00.**

4. y = cost of pizza
x = radius of pizza
$y = kx^2$
$75 = k(5)^2$
$\frac{75}{25} = k$
k = 3

$y = 3(10)^2$
$y = 3(100)$
y = 300

References

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Angeles , Alma. &Semita, Gemmalyn Philippine Copyright 2016 Math Time pp. 1 – 12 (2nd Issue)
Dilao, Soledad and Bernabe, Julieta Intermediate Algebra Second
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Prentice Hall , Algebra 2 pages 144 and 55

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