JANUARY
Makugihon
FEBRUARY
Mahigugmaon
MARCH
Matinabangon
APRIL
Matinahuron
MAY
Mahapsay og Malimpyo
JUNE
Maabtik og Musunod sa Itsuletong Oras
JULY
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AUGUST
Maginhunahunaon para sa Uban
SEPTEMBER
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OCTOBER
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NOVEMBER
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DECEMBER
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Republic of the Philippines
Department of Education
Regional Office IX, Zamboanga Peninsula

6

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MATHEMATICS

Quarter 2 – Module 2:

Types of Proportion

Name of Learner: _____

Grade & Section: _____

Name of School: _____

Mathematics– Grade 6
Alternative Delivery Mode
Quarter 2 – Module 2: Types of Proportion
First Edition, 2020

Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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What I Need to Know

This module was designed and written with you in mind. It is here to help you find the missing term in a proportion (direct, indirect or inverse, and partitive) and solve word problems in a proportion (direct proportion, indirect or inverse, and partitive) . The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. 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.

The module has two lessons, namely:

Lesson 1 – Finding the missing term in a proportion either a direct proportion, an indirect proportion, and inverse proportion.**M6NS-IIb-133**
Lesson 2 – Solving word problems in a proportion either a direct proportion, an indirect proportion, and inverse proportion.**M6NS-IIc-134**

After going through this module, you are expected to:

1. Find the missing term in a proportion either a direct proportion, an inverse or indirect proportion, and partitive proportion;
2. Solve word problems in a proportion either a direct proportion, an inverse or indirect proportion, and partitive proportion.

Lessons 1-2	**Finding the Missing Term in a Proportion and Solving Problems Involving Kinds of Proportions(Direct, Inverse, and Partitive)**

When two ratios are equal, a ***proportion*** is formed. A ***proportion*** is a statement of equality between two ratios. Each part of a proportion is a ***term***. The first and the last terms are called ***extremes*** while the second and the third terms are called ***means***.

In the proportion 2 : 3 = 4 : 6 , where 3 and 4 are called the **means** , and where 2 and 6 are the **extreme**s. The product of the means must be equal to the product of the extremes, in order to say that two ratios are equal or it is a proportion.

What's In

A. Find the cross products. Write the symbol for equal = and unequal ≠ in the box.

1. $\frac{1}{2}$ $\frac{3}{4}$ ☐
2. $\frac{2}{3}$ $\frac{6}{9}$ ☐
3. $\frac{1}{4}$ $\frac{4}{1}$ ☐

B. Get the product of both means and the product of both extremes. If both products are the same, write PROPORTION or NOT PROPORTION, if they are not.

1. 10 : 13 and 40 : 52 =
2. 5 : 10 and 10 : 20 =
3. 12 : 17 and 36 : 501 =

What's New

Problem A: During weekends, Faye helps her mother sell buko juice. For every 2 buko, Faye adds 3 liters of water. How many liters of water does she need if she has 6 buko so that he will have the same taste?

What is the first ratio?
What is the second ratio? What is the missing term?

Problem B: The orphanage has enough food to feed 30 orphan for 12 days. If 10 more orphans are added, how many days will the same amount of food last?

What is the original number of orphans?
What is the original number of days?
What is the new number of people or how many people are added?
What is the new number of days or the missing term?

Problem C: Fabian Family held a family contest, whoever finish their household chores first will get the highest prize and each respectively. The total amount of prize is Php240 to be shared in a ratio of 3 : 2 : 1 accordingly. How much will the first prize, second prize, and third prize be?

What is the total amount to be shared?
How many parts will it be divided into?
How much will each part get?

What is It

Problem A: During weekends, Faye helps her mother sell buko juice. For every 2 buko, Faye adds 3 liters of water. How many liters of water does she need if she have 6 buko so that he will have the same taste?

This problem presented a ***Direct Proportion***, wherein *when one quantity increases, the other quantity also increases at the same rate and vice versa.*

To find the missing term in a direct proportion, follow this set-up, wherein first and third term are the same quantities, while second term and fourth term are of the same quantities

The first ratio is 2 buko : 3 L of water, while the second ratio is 6 buko : (__L of water__)

$$2 : 3 = 6 : N$$

means

extremes

Solution: multiply the means $3 \times 6 = 18$

multiply the extremes $2 \times N = 18$

$18 \div 2 = 9$

$2 \times N = 18$

$18 \div 2 = 9$

To check : $2 : 3 = 6 : 9$

18

18

$2 \times 9 = 18$

$3 \times 6 = 18$

So, *the cross products should be equal, to form a proportion.*

Problem B: The orphanage has enough food to feed 30 orphan for 12 days. If 10 more orphans are added, how many days will the same amount of food last?

This problem presents an **Inverse or Indirect Proportion**, wherein *when one quantity increases, the other quantity decreases and vice versa.*

In this proportion, the quantities change in opposite directions, that is, as one quantity increases (number of people), the other quantity decreases (number of days)

To find the missing term in an inverse or indirect proportion, follow this set-up:

Original Number of people: New Number of People= New No. of Days: Original No. of Days

Solution : $30 : 40 = N : 12$

means

extremes

Therefore : multiply the extremes $30 \times 12 = 360$

multiply the means $40 \times N = 40$

$360 \div 40 = 9$

To check : $30 : 40 = 9 : 12$

360

360

So, *the product of the means is equal to the product of the extremes.*

Here is another solution:

To solve word problems in an inverse or indirect proportion follow this proper set-up.

Step 1 *Write the proportional relationship following this set-up*

$$\frac{\text{Original Amount}}{\text{New Amount}} = \frac{\text{New No. of Days}}{\text{Original No. of Days}} \quad \text{(fraction form)}$$

Step 2 Convert to equation, can be in fraction form or colon form

$$\frac{30\ orphans}{40\ orphans} = \frac{}{12\ days}$$

Step 3 Find the cross products of the given proportion

$\frac{30}{40} = \frac{}{12}$ Cross multiply the terms.

30 x 12 = 360

40 x N = 360

360 ÷ 40 = 9

Step 4 Check if the products are equal.

30 x 12 = 360

40 x9 = 360

Problem C: Fabian Family held a family contest, whoever finish their household chores first will get the highest prize and each respectively. The total amount of prize is Php240 to be shared in a ratio of 3 : 2 : 1 accordingly. How much will the first prize, second prize, and third prize be?

This problem presented a Partitive Proportion, *wherein a whole is divided into parts that is proportional to the given ratio.*

To find the missing term in a direct proportion, follow these steps:

Formula:

Let ***n*** be the amount each of them will get:

In equation, we write it as :

3n + 2n + 1n = Php240

6 x n = Php240

n = Php240 ÷ 6

n = Php40

Therefore 3 x n + 2 x n + 1 x n

= 3 x 40 + 2 x 40 + 1 x 40

= 120 + 80 + 40

= Php240

To check :

120 + 80 + 40

= Php240

What's More

A. Solve for the following in the direct proportion.

1.) 3 : ____ = 6 : 10

2) A motorist travels 270 km in 5 hours. How far can he travel in 9 hours at the same speed?

B. Solve for the following in an inverse or indirect proportion.

1.) 4 farmers can plow a land in 6 days, in how many days can they finish the jobif there are 8 farmers?

2) A carpenter working 8 hours a day could finish the work in 5days. How many days could he finish a similar piece of work by working overtime for 10 hours a day?

C. Solve for the following partitive proportion.

1.) Php 90,000 incentive to be divided in a ratio of 5 : 3 : 1. How much will each receive?

2) Three boys sold face masks in the ratio of 2 : 3 . Together they sold 225 face masks. How many did they each boy sell?

What I Have Learned

There are three types of proportion, namely :

- ***Direct proportion****, when one quantity increases ,the other quantity increases at the same rate and vice versa.*
- *The product of the means should be equal to the product of the extremes or the cross products should be equal.* Wherein first and third term are the same quantities, while second term andfourth term are of the same quantities.
- ***Inverse or indirect proportion****, when one quantity increases, the other quantity decreases , and vice versa.*
- *The product of the means should be equal to the product ofthe extremes or the cross products should be equal but you must follow this set-up :*

  (colon form)

  Original Amount : New Amount = New No. of Days : Original No. of Days

  (fraction form)

  $$\frac{\text{Original Amount}}{\text{New Amount}} = \frac{\text{New No. of Days}}{\text{Original No. of Days}}$$

- ***Partitive proportion****, a whole is divided into parts that is proportional to the given ratio*
- *First add the quantities in the ratio, Second divide the sum by the whole number, Third multiply the quotient to each of the quantity in the ratio.*

What I Can Do

Answer the following.

A. Direct Proportion (Answer in colon form.)

> The children are having a field trip to Rizal Park at Dapitan City. Two buses will transport 130 pupils. How many buses are needed to transport 780 pupils?

B. Inverse or Indirect Proportion (Answer in fraction form.)

> Eight sewers can finish the job in 5 days? But only 2 sewers are hired, in how many days will it take the sewers to finish the same job?

C. Partitive Proportion

> The ratio of boys to girls at a school is 5 : 7 ? The total population of the school is 360 pupils. How many boys and girls are there ?

Assessment

Direction: Solve for the following.

1) $\frac{\_}{8} = \frac{30}{48}$

2) 1 scoop of milk : 2 ounce of water = 4 scoops of milk :____ ounce of water

3) 3 construction workers in 5 days (solve in fraction form)

6 construction workers in ___ days

4) 25 kgs of rice in 14 days (solve in colon form)

____kgs of rice 7 days

5) Father and his farm workers were able to harvest 720 sacks of palay to be divided in a sharing of 3 shares for father and 2 share for the workers. How many sacks of palay does the farm workers receive?

Answer Key

What's In

A. 1) ≠

2) =

3) ≠

B. 1) PROPORTION

2) PROPORTION

3) NOT PROPORTION

What's More

A. 1) 5

2) 486

B. 1) 3

2) 4

C 1) Php50,000
Php30,000
Php10,000

2) 90 and 135

What I Can Do

1) 12 buses

2) 20 days

3) 150 boys and
210 girls

Assessment

1) 5

2) 8

3) 2.5 or $2\frac{1}{2}$

4) 50

5) 288 sacks of palay

References

- 21st Century MATHletes 6
- Lesson Guides in Elementary Mathematics 6

I AM A FILIPINO
by Carlos P. Romulo

I am a Filipino – inheritor of a glorious past, hostage to the uncertain future. As such, I must prove equal to a two-fold task – the task of meeting my responsibility to the past, and the task of performing my obligation to the future.

I am sprung from a hardy race – child many generations removed of ancient Malayan pioneers. Across the centuries, the memory comes rushing back to me: of brown-skinned men putting out to sea in ships that were as frail as their hearts were stout. Over the sea I see them come, borne upon the billowing wave and the whistling wind, carried upon the mighty swell of hope – hope in the free abundance of the new land that was to be their home and their children's forever.

This is the land they sought and found. Every inch of shore that their eyes first set upon, every hill and mountain that beckoned to them with a green and purple invitation, every mile of rolling plain that their view encompassed, every river and lake that promised a plentiful living and the fruitfulness of commerce, is a hollowed spot to me.

By the strength of their hearts and hands, by every right of law, human and divine, this land and all the appurtenances thereof – the black and fertile soil, the seas and lakes and rivers teeming with fish, the forests with their inexhaustible wealth in wild and timber, the mountains with their bowels swollen with minerals – the whole of this rich and happy land has been for centuries without number, the land of my fathers. This land I received in trust from them, and in trust will pass it to my children, and so on until the world is no more.

I am a Filipino. In my blood runs the immortal seed of heroes – seed that flowered down the centuries in deeds of courage and defiance. In my veins yet pulses the same hot blood that sent Lapulapu to battle against the alien foe, that drove Diego Silang and Dagohoy into rebellion against the foreign oppressor.

That seed is immortal. It is the self-same seed that flowered in the heart of Jose Rizal that morning in Bagumbayan when a volley of shots put an end to all that was mortal of him and made his spirit deathless forever; the same that flowered in the hearts of Bonifacio in Balintawak, of Gregorio del Pilar at Tirad Pass, of Antonio Luna at Calumpit, that bloomed in flowers of frustration in the sad heart of Emilio Aguinaldo at Palanan, and yet burst forth royally again in the proud heart of Manuel L. Quezon when he stood at last on the threshold of ancient Malacanang Palace, in the symbolic act of possession and racial vindication. The seed I bear within me is an immortal seed.

It is the mark of my manhood, the symbol of my dignity as a human being. Like the seeds that were once buried in the tomb of Tutankhamen many thousands of years ago, it shall grow and flower and bear fruit again. It is the insigne of my race, and my generation is but a stage in the unending search of my people for freedom and happiness.

I am a Filipino, child of the marriage of the East and the West. The East, with its languor and mysticism, its passivity and endurance, was my mother, and my sire was the West that came thundering across the seas with the Cross and Sword and the Machine. I am of the East, an eager participant in its struggles for liberation from the imperialist yoke. But I know also that the East must awake from its centuried sleep, shake off the lethargy that has bound its limbs, and start moving where destiny awaits.

For I, too, am of the West, and the vigorous peoples of the West have destroyed forever the peace and quiet that once were ours. I can no longer live, a being apart from those whose world now trembles to the roar of bomb and cannon shot. For no man and no nation is an island, but a part of the main, and there is no longer any East and West – only individuals and nations making those momentous choices that are the hinges upon which history revolves. At the vanguard of progress in this part of the world I stand – a forlorn figure in the eyes of some, but not one defeated and lost. For through the thick, interlacing branches of habit and custom above me I have seen the light of the sun, and I know that it is good. I have seen the light of justice and equality and freedom, my heart has been lifted by the vision of democracy, and I shall not rest until my land and my people shall have been blessed by these, beyond the power of any man or nation to subvert or destroy.

I am a Filipino, and this is my inheritance. What pledge shall I give that I may prove worthy of my inheritance? I shall give the pledge that has come ringing down the corridors of the centuries, and it shall be compounded of the joyous cries of my Malayan forebears when first they saw the contours of this land loom before their eyes, of the battle cries that have resounded in every field of combat from Mactan to Tirad Pass, of the voices of my people when they sing:

"I am a Filipino born to freedom, and I shall not rest until freedom shall have been added unto my inheritance—for myself and my children and my children's children—forever."