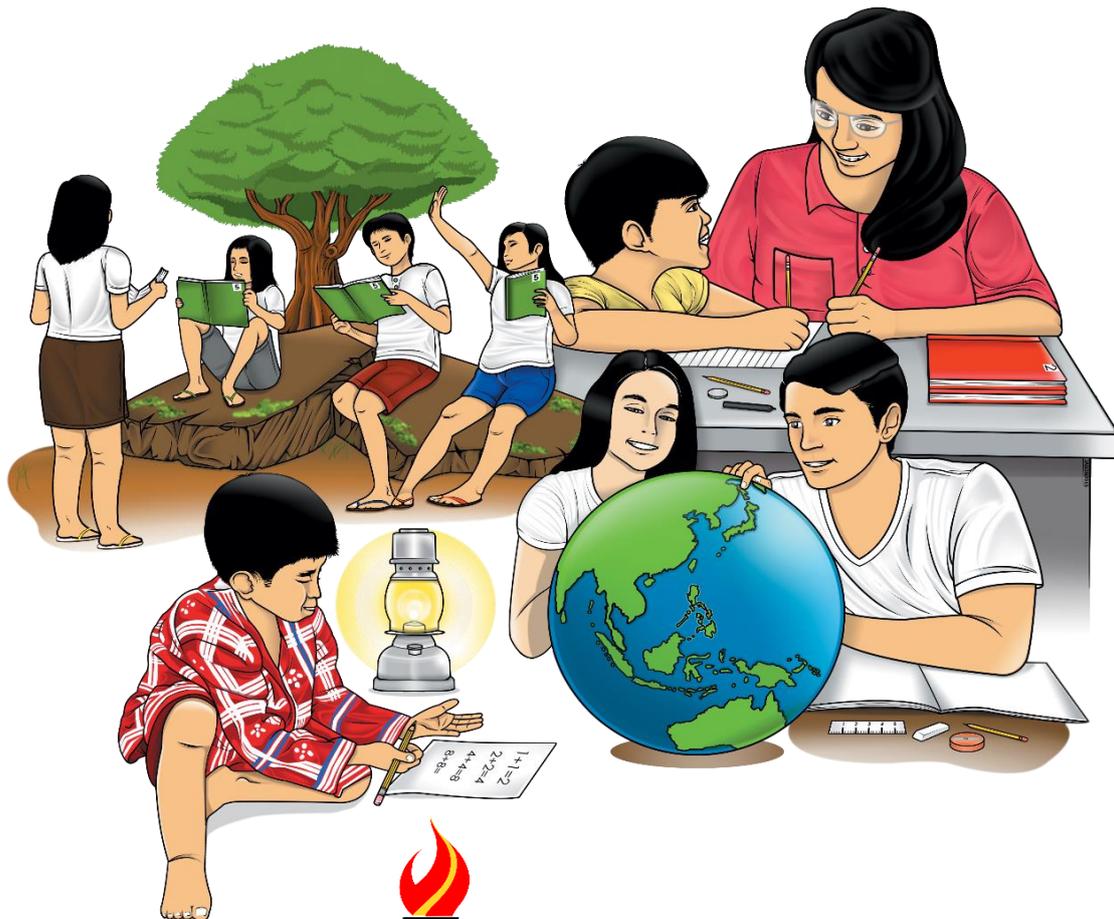


Mathematics

Quarter 1 – Module 9: Solving Multi-step Problems Involving Multiplication and Addition or Subtraction



Mathematics - Grade 4
Alternative Delivery Mode
Quarter 1 - Module 9: Solving Multi-step Problems Involving Multiplication
and Addition or Subtraction
First Edition, 2020

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Mathematics
Quarter 1 – Module 9:
Solving Multi-step
Problems Involving
Multiplication and
Addition or Subtraction

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.



What I Need to Know

Good day learner! You have learned from the previous module how to solve routine and non-routine problems involving multiplication. In this module, you will encounter more challenging problems: multi-step and problems with hidden questions. Please take time in using this module to learn more. Enjoy solving!

At the end of this module, you will be able to solve multi-step routine and non-routine problems involving multiplication and addition or subtraction using appropriate problem solving strategies and tools.



What I Know

A. Solve each problem and choose the letter of the correct solution.

1. Marjorie has a daily snack allowance of ₱30. She buys two pieces of *Lumpiang Toge* at ₱12 each and saves the rest. How much is her daily savings?

A.
$$\begin{array}{l} 2 \times \text{₱}12 = \text{₱}24 \\ \text{₱}30 - \text{₱}24 = \underline{\text{₱ } 6} \end{array}$$

C.
$$\begin{array}{l} 2 \times \text{₱}30 = \text{₱}60 \\ \text{₱}30 - \text{₱}24 = \underline{\text{₱ } 6} \end{array}$$

B.
$$\begin{array}{l} 2 \times \text{₱}30 = \text{₱}60 \\ \text{₱}60 - \text{₱}12 = \underline{\text{₱}48} \end{array}$$

D.
$$\begin{array}{l} 2 \times \text{₱}12 = \text{₱}24 \\ \text{₱}30 - \text{₱}12 = \underline{\text{₱}18} \end{array}$$

2. Mrs. Cruz has a cellphone load retail store. She adds ₱3 as her profit for every ₱30 and ₱20 load. How much is her

total sales and profit if 4 customers purchased cellphone load worth ₱30 each and 3 customers purchased ₱20 each?

- A.
$$\begin{aligned} \text{₱}30 \times 4 &= \text{₱}120 \\ \text{₱}20 \times 3 &= \text{₱}60 \\ \text{₱}120 + \text{₱}60 &= \underline{\text{₱}180} \end{aligned}$$
- B.
$$\begin{aligned} (\text{₱}30+3) \times 4 &= \text{₱}132 \\ (\text{₱}20+3) \times 3 &= \text{₱}69 \\ \text{₱}132 + \text{₱}69 &= \text{₱}201 \\ (4+3) \times \text{₱}3 &= \text{₱}21 \end{aligned}$$
- C.
$$\begin{aligned} \text{₱}33 \times 4 &= \text{₱}132 \\ \text{₱}23 \times 3 &= \text{₱}69 \\ \text{₱}132 + \text{₱}69 &= \underline{\text{₱}201} \end{aligned}$$
- D.
$$\begin{aligned} \text{₱}30 \times 4 &= \text{₱}120 \\ \text{₱}20 \times 3 &= \text{₱}60 \\ \text{₱}120 + \text{₱}60 &= \text{₱}180 \\ (4+3) \times \text{₱}3 &= \text{₱}21 \end{aligned}$$

3. Mang Roque harvested 12 500 ears of corn from each of the 12 plots of his farm while Mang Romy harvested 8 540 ears of corn from each of the 18 plots of his farm. Who harvested more ears of corn?

- A.
$$\begin{aligned} 12\,500 \times 12 &= 150\,000 \\ 8\,540 \times 18 &= 153\,720 \\ \text{Mang Roque harvested} \\ &\text{more ears of corn than} \\ &\text{Mang Romy} \end{aligned}$$
- B.
$$\begin{aligned} 12 \times 18 &= 216 \\ 12\,500 - 8\,540 &= 6\,660 \\ \text{Mang Roque harvested} \\ &\text{more ears of corn than} \\ &\text{Mang Romy} \end{aligned}$$
- C.
$$\begin{aligned} 12\,500 \times 12 &= 150\,000 \\ 8\,540 \times 18 &= 153\,720 \\ \text{Mang Romy harvested} \\ &\text{more ears of corn than} \\ &\text{Mang Roque.} \end{aligned}$$
- D.
$$\begin{aligned} 12 \times 18 &= 216 \\ 12\,500 - 8\,540 &= 6\,660 \\ \text{Mang Roque harvested} \\ &\text{more ears of corn than} \\ &\text{Mang Romy} \end{aligned}$$

4. Vito can make 123 hangers in 5 days while David can make 210 hangers in 10 days. Who makes more hangers in 10 days?

- A.
$$\begin{aligned} 123 \times 5 &= 615 \\ 210 \times 10 &= 2\,100 \\ \text{Vito can make more} \\ &\text{hangers than David.} \end{aligned}$$
- C.
$$\begin{aligned} 123 \times 5 &= 615 \\ 210 \times 10 &= 2\,100 \\ \text{David can make more} \\ &\text{hangers than Vito.} \end{aligned}$$

B. $5 \text{ days} = 123$
 $10 \text{ days: } 123 \times 2 = 246$
 $10 \text{ days} = 210$
 Vito can make more hangers than David.

D. $5 \text{ days} = 123$
 $10 \text{ days: } 123 \times 2 = 246$
 $10 \text{ days} = 210$
 David can make more hangers than Vito.

5. Jennifer's mother can sew 15 pairs of short pants in a day, while Rita can sew 12 pairs a day. How many more pairs of short pants can Jennifer's mother sew in 5 days as compared to Rita?

A. $15 - 12 = 3$
 $3 \times 15 = 45$
 $45 - 3 = 42$

C. $15 + 12 = 27$
 $27 - 5 = 22$
 $27 - 22 = 5$

B. $15 \times 5 = 75$
 $12 \times 5 = 60$
 $75 - 60 = 15$

D. $15 \times 5 = 75$
 $12 \times 5 = 60$
 $75 + 60 = 135$

B. Read and solve the following problems.

6. Filemon caught 5 kilos of fish. He sold his catch at ₱180 a kilo. After receiving the payment, he saved ₱100. How much money can be used for the expenses?
7. Each of the five sections of Grade 4 has 30 pupils. If 12 Grade 4 pupils transferred to other schools, how many Grade 4 pupils did not transfer?
8. One box of bottled water contains 24 bottles. If there are 21 boxes with one box having only 4 bottles left, how many bottles are there in all supposing that all other boxes still have 24 bottles each?
9. During the opening of classes, all Grade Five pupils are issued with 5 books. At the end of the school year, only 64 pupils completely returned the books. How many books are not yet returned if there are 84 grade five pupils?

10. Loi went to the market and bought 4 kilos of rice at ₱40 a kilo and 2 kilos of fish at ₱220 a kilo. How much did she spend in all?

Are you done answering? If yes, time to check. Please go to page 16 for the **Answer Key**.



What's In

Do you remember how to solve one-step word problems?

In solving one-step routine word problems, follow the Four-step Plan: **Understand, Plan, Solve, and Check and Look Back**.

If the problem is non-routine, analyze the problem very well and make illustrations if possible. One-step word problem can be solved using only one operation.

Solve the following problems. Choose the letter that corresponds to your answer.

1. The manager of a poultry farm pays each of his workers ₱270 a day. How much does he pay for 15 workers in a day?
A. ₱4 050 B. ₱285 C. ₱4 500 D. ₱255
2. A leading bag manufacturer can produce at an average, 375 bags an hour. At this rate, how many bags can it produce in 24 hours?
A. 900 B. 9 000 C. 399 D. 351
3. One square table can sit four persons with one person occupying each side. How many persons can sit if four tables are placed end to end?
A. 8 B. 10 C. 16 D. 32

Are you done answering? If yes, time to check. Please go to page 16 for the **Answer Key**.





What's New

Do you have pets? How do you take care of them? What are the uses of animals to us?

Read the problem.

During weekends, Edwin helps his father in their farm by taking care of the animals like ducks, chickens, cows, and goats. Edwin and his father collected 4 trays of duck eggs and 12 trays of chicken eggs. If each tray contains 30 eggs, how many eggs are there in all?



This is an example of a multi-step routine problem. Routine problem solving are useful for daily living.

Try answering the given problem.



What is It

Let us see if we have the same answer.

To analyze and solve the problem, you can use these steps:

A. UNDERSTAND

1. Read and understand the problem.
2. Know **what is asked** in the problem.
The total number of eggs (duck and chicken eggs combined)
3. Know the hidden information.
The number of duck eggs in 4 trays
The number of chicken eggs in 12 trays

4. Find the necessary information.

The **given facts** are:

Four (4) trays of duck eggs are collected

12 trays of chicken eggs are collected

There are 30 eggs in each tray

B. PLAN

1. Determine the **operations** to be used.

MULTIPLICATION and ADDITION

2. Write the **number sentences for the hidden information.**

$4 \times 30 = d$ (duck eggs) $12 \times 30 = c$ (chicken eggs)

Write the number sentence for the final answer.

$(4 \times 30) + (12 \times 30) = n$ (total number of eggs collected)

C. SOLVE

Solve using the operations.

$\begin{array}{r} 30 \\ \times 4 \\ \hline 120 \end{array}$	$\begin{array}{r} 30 \\ \times 12 \\ \hline 60 \\ + 30 \\ \hline 360 \end{array}$
There are 120 duck eggs.	There are 360 chicken eggs.

For the final solution:

$\begin{array}{r} 120 \\ + 360 \\ \hline 480 \end{array}$
The total collected eggs is 480.

D. CHECK AND LOOK BACK

See if your answer makes sense.

State the complete answer.

Edwin and his father collected 480 duck and chicken eggs in all.

This is how to solve a multi-step routine problem. How about solving multi-step non-routine problems? Go on with the next example. Study the example and ask questions if necessary.

Routine problems are those which can be easily interpreted and solved while non-routine problems are more challenging because the solutions are not immediately clear. Both problems can be solved in multiple ways.

One-step problems can be solved with only one operation, while multi-step problems need two or more operations in order to be solved.

Study this problem.

Marlon is a pet lover. He has 5 pets composed of birds and cats. If there are 14 legs in all, how many birds are there? How many are cats?

You can solve the problem using different strategies like *listing*, *making a table*, *guess and check* or *using pictorial representations*.

Multi-step non-routine problem solving develops reasoning power. This kind of problem needs a deep and clear analysis and understanding.

Strategy 1: Listing

Birds	Cats
2 legs	4 legs
2 legs	4 legs
2 legs	

Each bird has 2 legs and each cat has 4 legs.

Strategy 2: Making a Table

	Birds	Cats	Total
Number of Pets	3	2	5
Number of Legs	6	8	14

Strategy 3: Guess and Check

First Guess: 4 birds and 1 cat

$$4 \times 2(\text{legs}) + 1 \times 4(\text{legs}) = 12 \text{ legs } (\mathbf{WRONG \ GUESS})$$

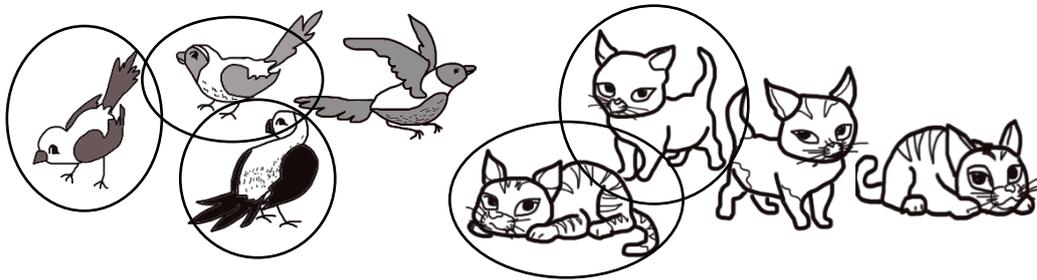
Second Guess: 2 birds and 3 cats

$$2 \times 2(\text{legs}) + 3 \times 4(\text{legs}) = 16 \text{ legs } (\mathbf{WRONG \ GUESS})$$

Third Guess: 3 birds and 2 cats

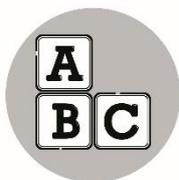
$$3 \times 2(\text{legs}) + 2 \times 4(\text{legs}) = 14 \text{ legs } (\mathbf{CORRECT \ GUESS})$$

Strategy 4: Pictorial Representation



Therefore, Marlon has 3 birds and 2 cats.

Now, you have learned to solve multi-step non-routine problems. This time you are now ready for the activities. LET'S GO!



What's More

Activity 1

- A. Solve the problem below by answering the following questions.

Aldrin has 8 boxes of crayons. Each box contains 24 crayons. If he gave 26 crayons to his friend, how many crayons were left?

1. What is asked in the problem? _____
2. What is the hidden information? _____
3. What are the given facts? _____
4. What are the operations to be used? _____
5. What is the number sentence? _____
6. What is the final answer? _____

B. Solve the problem below. Show your solutions and state the final answer.

There are 53 electric posts along a straight highway. The first post is in the town of Mabini and the last post is in the town of Matiwasay. If each post is 50 meters away from the next, how far are the 2 towns from each other?

Solution/Illustration

Final Answer: _____

Are you done answering? If yes, time to check.
Please go to page 16 for the **Answer Key**.



Assessment 1

Solve the following problems. Show your solutions.

1. In an office, there are two rooms. In the small room, there are 4 seats in each row. In the big room, there are 7 seats in each row. If each room has 4 rows of seats, how many seats are there in all?

SOLUTIONS:

FINAL ANSWER:

2. Edwin rides on a jeepney to deliver a tray of chicken eggs to a customer. The jeepney fare is ₱10 for the first four kilometers and ₱2 for each succeeding kilometer. How much will Edwin pay for his 8-kilometer ride?

SOLUTION/ILLUSTRATION:

FINAL ANSWER:

Are you done answering? If yes, time to check.
Please go to page 16 for the **Answer Key**.



Activity 2

Use the table to answer the following questions.

1. How much will two sets of female uniform and a school bag cost

Back to School SALE!

Female Uniform	: ₱210
Male Uniform	: ₱160
School Bag	: ₱200
Tumbler	: ₱ 85
Pencil Case	: ₱ 40

- Mrs. Feliciano bought one set of male uniform, a tumbler and a pencil case. How much did she spend?
- Aling Ofelia bought one set of female and male uniforms, two school bags, two tumblers and two pencil cases for her children. How much change did she receive from her ₱1 500?

Are you done answering? If yes, time to check.
Please go to page 16 for the **Answer Key**.



Assessment 2

Solve the following problems. Use any strategy to solve.

- A grocery store offers a discount of ₱5 for each pack of chocolate drinks. If Sarah bought 10 packs at ₱85 per pack (discount not yet applied), how much change will she receive from her ₱1000?
- Find the value of the word QUARANTINE by using the letter values below. Use multiplication and addition for your solutions.

AEIOU	BCD	FGH	JKLMN	PQRST	VWXYZ
100	10	20	30	40	50

- There are 60 minutes in one hour. How many minutes have already been spent by a worker who has worked for 9 hours and 30 minutes?

Are you done answering? If yes, time to check.
Please go to page 16 for the **Answer Key**.





What I Have Learned

How do you solve multi-step routine and non-routine word problems involving multiplication and addition or subtraction using appropriate strategies and tools?

To solve multi-step routine word problems involving multiplication and addition or subtraction using appropriate strategies and tools, follow these steps:

UNDERSTAND

- Know what is asked in the problem.
- Know the hidden information.
- Know what the given facts are.

PLAN

- Determine the operations to be used.
- Write the number sentence.

SOLVE

- Show the solutions.

CHECK AND LOOK BACK

- Check your answer
- State the complete answer.

Multi-step non-routine problems can be solved by drawing a picture, using a number line, making a table, guess and check, and other pictorial representations.



What I Can Do

Solve the following problems. Choose the letter of the correct answer.

1. Bino and his twin sister, Vina, went to a beach to gather some shells for their school project. Bino has 3 bags with 30 shells each and Vina has 2 bags with 25 shells each. How many shells do they have in all?
A. 125 shells
B. 165 shells
C. 140
D. 110
2. Mr. Dechavez has pigs and ducks in his farm. He counted 5 heads and 16 feet. How many pigs are there? How many ducks are there?
A. 2 pigs and 3 ducks
B. 3 pigs and 2 ducks
C. 1 pig and 4 ducks
D. 4 pigs and 1 duck
3. The Grade 4 pupils of Maligaya Elementary School went on a field trip. Six buses were filled with 46 pupils each. However, 18 pupils traveled in cars. How many pupils in all joined the field trip?
A. 249 pupils
B. 276 pupils
C. 284
D. 294

Are you done answering? If yes, time to check.
Please go to page 16 for the **Answer Key**.



Assessment

Read, analyze, and then solve each problem.

1. Linda has 12 boxes of paper plates. Each box contains 36 paper plates. She used 173 paper plates for the snacks of the

participants in a training. How many paper plates were left unused?

2. Mary Ann does 124 sit-ups a day for 6 days while Paul Jake does 152 sit-ups a day for 4 days. Who does more sit-ups?
3. There are motorcycles and tricycles parked along the road. There are 5 vehicles and 12 wheels in all. How many motorcycles are there? How many tricycles are there?
4. A certain water refilling station refills four-gallon jug at ₱30 for delivery or ₱25 for pick-up. What is the total payment for 10 deliveries and 21 pick-ups?
5. A PisoNet Café offers 3 – minute internet surfing for only ₱1 and printing for ₱2 per page. If the café collected ₱589 for the internet surfing and printed 800 pages, how much will be the total sales?
6. Harold posted a picture of his mother's birthday celebration on Facebook at 6:00 pm. After two hours, he saw different reactions of his post, so he counted them. There are 35 likes, 40 love, and 20 wow reactions. And in the next morning, when he checked his post, he noticed that all the reactions are doubled. How many reactions are there in all?
7. A grocery store strictly observes social distancing of one meter for their customers paying at the cashier. What is the total distance from the first paying customer to the last customer if there are 20 customers in a straight line?
8. Florida is cooking *leche flan*. She mixes 8 eggs and 2 cans of condensed milk for one *Leche Flan*. How many eggs and cans of condensed milk are needed if she will cook 24 *leche flans*?
9. Mrs. Montes bought a washing machine at ₱6 540 and two DVD players at ₱850 each. How much will she need to pay?
10. Lilibeth bought 100 pieces of apples at ₱12 each and sells them at ₱15 each. How much will she gain if all the apples are sold?

Are you done answering? If yes, time to check.
Please go to page 16 for the **Answer Key**.





Additional Activities

Solve the following problems.

1. Bernie is saving money for a sports bag worth ₱585. He has been saving ₱30 a day for ten days. How much more does he need to save to be able to buy the sports bag?
2. Lolo Jose has a farm with 10 mango trees, 8 pigs, 22 chickens, and 2 *carabaos*. How many animal feet are there in all in his farm?
3. A pile of ₱20-peso bills is consecutively numbered from BU349374 to BU349689. What is the total peso value of the bills?
4. In a school, there are 10 classrooms. If each of the two classrooms has 38 chairs and the remaining classrooms have 45 chairs each, how many chairs are there in all?
5. Gheric has six shapes composed of triangles and squares. If there are 20 corners in all, how many triangles are there? How many squares are there?
6. Printer A prints 155 copies in one hour, while Printer B prints 134 copies in one hour. If the two printers are simultaneously used for 4 hours, how many copies are printed in all?

Are you done answering? If yes, time to check.
Please go to page 16 for the ***Answer Key***.



**CONGRATULATIONS! You are performing very well.
See you in the next module.**



Answer Key

WHAT'S IN

- A
- B
- B

WHAT I KNOW

- A
- B
- C
- B
- B
- A
- 138 pupils
- 484 bottles
- 100 books
- ₱600

WHAT'S MORE

Activity 1

- The number of crayons left.
- The total number of crayons.
- 8 boxes of crayons
- 24 crayons in each box
- 26 crayons given to his friend
- Multiplication and Subtraction
- $(8 \times 24) - 26 = n$
- $24 \times 8 = 192$
- $192 - 26 = 166$
- Aldrin has 166 crayons left.

- $53 - 1 = 52$ electric post
- $52 \times 50 \text{ m} = 2600 \text{ m}$
- The two towns are 2600 meters apart from each other.

Assessment 1

- Small room $4 \times 4 = 16$
Big room $7 \times 4 = 28$

There are 44 seats in all.
 $16 + 28 = 44$

2.

Edwin will pay ₱18 for his 8-km ride.

$N = 10 + 2 + 2 + 2 + 2$
 $N = 18$
 or
 $N = 10 + (2 \times 4)$
 $N = 10 + 8$
 $N = 18$

WHAT'S MORE

Activity 2

- ₱620
- ₱285
- ₱480

Assessment 2

- ₱200
- Solutions:
- UVAIE: $100 \times 5 = 500$
 - QRT: $40 \times 3 = 120$
 - NN: $30 \times 2 = 60$
 - $500 + 120 + 60 = 680$
 - 570 minutes

WHAT I CAN DO

- C
- B
- D

ASSESSMENT

- There are 259 unused paper plates
- Mary Ann has more sit-ups (744)
- There are 3 motorcycles and 2 tricycles.
- The total payment is ₱825
- The total sales is ₱2189
- There are a total of 190 reactions.
- The total distance is 19 meters.
- 192 eggs and 48 cans of condensed milk are needed
- Mrs. Montes needs to pay ₱8240
- Lilithbeth will gain ₱300.

ADDITIONAL ACTIVITIES

- He needs to save ₱285 more to be able to buy the sports bag.
- There are 84 animal feet in his farm.
- The total peso value of the bills is ₱6320 (including BU349689)
- There are 436 chairs in all.
- There are 4 triangles in all.
- There are 2 squares in all.
- The two printers printed 1156 copies in all.

Score update: What I Know, What's More Activity 1 and Assessment

- 10 WOW! GREAT JOB!
 - 7-9 VERY NICE!
 - 5-6 NICE!
 - 3-4 OOOPPPS! Let us review and go over with the test again.
 - 0-2 Don't worry. Take time to go over the lesson again. Do not be shy to ask help from your teacher or facilitator.
- Have fun!

Score update: What's In, What's More Activity 2, Assessment 2, What I Can Do,

- 3 WOW! EXCELLENT JOB!
The next activity will be easy for you.
 - 2 NICE!
 - 0-1 It is fine. Take time to go back to the lesson, review, and ask questions as necessary before doing the next activity.
- Have fun!

Score update: What 's More Activity 1 (A)

- 6 WOW! GREAT JOB!
- 4-5 NICE!
- 0-3 Don't worry. Your teacher will be happy to help you. Do not be shy to ask questions. Have fun!

Score update: What's More Assessment 1 and Additional Activities

- 4 WOW! EXCELLENT JOB!
The next activity will be easy for you.
 - 3 NICE!
 - 0-2 It is fine. Take time to go back to the lesson, review, and ask questions as necessary before doing the next activity.
- Have fun!

Rubrics: What 's More Activity 1 (B)

- 4 Solution/Illustration is correct and final answer is correctly stated.
- 3 Solution/ Illustration is not clear but the final answer is correctly stated.
- 2 Solution/ Illustration is wrong but the final answer is correctly stated.
- 1 Solution/Illustration is wrong and the final answer is not clearly stated.
- 0 Solution/Illustration and final answer are wrong.

References

K to 12 Mathematics Curriculum Guide, August 2016.

Tabilang, A. et. al. (2015). *Mathematics: Learner's Material*, Pasig City: Lexicon Press.

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