4

Mathematics 4

Microlearning Module

QUARTER 2 – Module 10

Solving Problems Involving Conversion of Units of Length, Mass, Capacity, and Time including Problems Involving Elapsed Time in Hours and Minutes

Microlearning Module

REGION XII - DIVISION OF SULTAN KUDARAT

Mathematics 4
Microlearning Module (MLM)
Quarter 2 – Module 10: Solving Problems Involving Conversion of Units of Length, Mass, Capacity, and Time Including Problems Involving Elapsed Time in Hours and Minutes
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MICROLEARNING MODULE

Name: _____Grade & Sec: _____ Score: _____
Subject: Mathematics Quarter: 2 MLM No. _____
Teacher: _____
Competency: Solve problems involving conversion of units of length, mass, capacity, and time including problems involving elapsed time in hours and minutes.

A. Look Back!

Directions: Convert the given time measurement to its equivalent unit. Write your answer in the blank provided.

600 seconds	=	_____ minutes
180 minutes	=	_____ hours
240 hours	=	_____ days
144 months	=	_____ years
21 days	=	_____ weeks

B. What's New?

Directions: Read and analyze the problem. Write your explanation in the blanks provided.

You were asked by your mother to buy milk in the store. Which of the following are you going to buy to save money?

1 liter of milk for P150.00	4 bottles of 500 milliliters of milk for P240.00
	

_____

_____

_____

_____.

C. What Is It?

PROBLEM-SOLVING INVOLVING UNITS OF LENGTH

For our first lesson, let's read and analyze this problem.

Jun is planning for a hike. If the trail is 2,500 meters long, how many centimeters is it?

We remember that **length refers to the distance from one point to another.**

To solve the problem, the easiest way to convert metric units is to move decimal places. Below is the table for metric units for length.

Notice that the table below shows two steps to the right from meter to centimeter. This means we must move the decimal point two places to the right in 2,500 meters to get its equivalent in centimeters.

kilometer	hectometer	decameter	meter	decimeter	centimeter	millimeter

So,

2,500. 0 0

250,000

Complete answer: June hiked for 250,000 centimeters long.

PROBLEM-SOLVING INVOLVING UNITS OF MASS

Now, let's read and analyze this problem.

Paula bought a bag of bread with a mass of 50 grams. Determine its mass in milligrams.

We should remember that **mass refers to the amount of matter an object has or the heaviness of an object.**

To solve the problem, the easiest way to convert metric units is by moving decimal points.

Notice that the table below shows three steps to the right from gram to milligram. This means we must move the decimal point three places to the right in 50 grams to get its equivalent in milligrams.

kilogram	hectogram	decagram	gram	decigram	centigram	milligram

So,

50 0 0 0

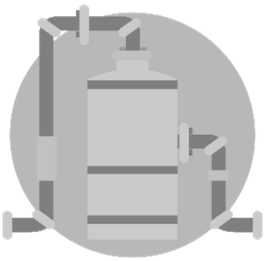
50,000

Complete answer: Paula bought 50,000 milligrams of bread.

PROBLEM-SOLVING INVOLVING UNITS OF CAPACITY

To continue our discussion, let's read and analyze this problem.

A large tank has a capacity of 500 liters of water. A water pipe fills 400 centiliters of water per minute. How long will it take for the pipe to fill the large tank?



In our previous lesson, we learned that **capacity refers to the space occupied or enclosed by a three-dimensional figure.**

To solve the problem, you need to determine how long the pipe can fill the large tank. To do this, we must divide 500 liters by 400 centiliters. However, we cannot perform this immediately because the given measurements differ in units.

First, let us convert 400 centiliters to liters.

Looking at the table below, notice two steps to the left from centiliter to liter. Hence, we move decimal points two places to the left in 400 centiliters to convert it into liter.

kiloliter	hectoliter	decaliter	liter	deciliter	centiliter	milliliter

400

4.00

Hence, 400 centiliters = 4 liters

We can now divide 500 liters by 4 liters. We'll obtain,

500 ÷ 4 = 125

Complete answer: This means that the pipe can fill the tank after 125 minutes.

PROBLEM-SOLVING INVOLVING UNITS OF TIME

Marko plans to go on a vacation to Balot Coral Beach in Kalamansig, Sultan Kudarat for 8 weeks. How many days will he be on vacation?

Remember that **time refers to the duration of the sequence of events.** For instance, we measure time to determine how long you read this MicroLearning Module.

Let's now discuss how to convert units of time.

Moving decimal points does not apply to converting time units, unlike the length, mass, and capacity metric units. Instead, we have to refer to the conversion values for each unit.

Shown below is the table for the conversion of time units:

1 minute	60 seconds
1 hour	60 minutes
1 day	24 hours
1 week	7 days
1 month	4 weeks

1 year	12 months
1 decade	10 years
1 century	100 years
1 millennium	1000 years

Solution:

Step 1: Identify the given unit and the unit to which it will be converted it.

The problem requires us to convert 8 weeks into days.

Step 2: Determine the relationship between the given units.

There are 7 days in one week, or 1 week = 7 days.

Step 3: Express the relationship between the given units as a conversion factor in fractional form, such that the denominator has a unit that is the same as the original unit.

In the previous step, we determined that 1 week is equivalent to 7 days. Express this as a fraction with the original unit as the denominator. Since the original unit is "week," the conversion factor should be expressed as 7 days/1 week.

Step 4: Multiply the given measurement by the conversion factor.

Now, let us multiply 8 weeks by 7 days/1 week:

$$8 \text{ weeks} \times \frac{7\ days}{1\ week}$$

$$8 \cancel{\text{weeks}} \times \frac{7\ days}{1\ \cancel{week}} = 8 \times 7 \text{ days} = 56 \text{ days}$$

Complete answer: Hence, Marko will be on vacation for 56 days.

PROBLEM-SOLVING INVOLVING ELAPSED TIME

Finally, let's take a closer look at this problem.

Anna's birthday party started at 3:30 p.m. and ended at 7:15 p.m. What was the duration of the party?

To solve the problem, you need to find the time that has elapsed from the start of the activity to its end. This time period is what you call *elapsed time*.

To get the answer, **"subtract"** the earlier time from the later one.
Party began: 3:30 p.m.
Party ended: 7:15 p.m.

To solve the problem, use the solution below.

$$\begin{array}{rrl} & & 6 \quad 75 \\ & 7 \text{ hr} \quad 15 \text{ min} & \longrightarrow \quad \cancel{7}\text{hr} \quad \cancel{15} \text{ min} \\ - & 3 \text{ hr} \quad 30 \text{ min} & \longrightarrow \quad 3\text{hr} \quad 30 \text{ min} \\ \hline & & 3\text{hr} \quad 45 \text{ min} \end{array}$$

Rename the minuend 7hr 15 min to 6 hr 75 min to make the subtraction possible. Note that there are 60 minutes in 1 hour. That is why you add 60 to the number of minutes to regroup.

Complete answer: The party lasted 3 hours and 45 minutes.

LET US SUMMARIZE

- To solve word problem involving conversion of same units of length, mass and capacity, the easiest way is to move decimal places.
- To convert one unit of time to another, follow these steps:
  1. Identify the given unit and the unit to which you will convert it.
  2. Determine the relationship between the given units.
  3. Express this relationship as a conversion factor in fractional form, ensuring that the denominator contains the unit that matches the original unit.
  4. Multiply the given measurement by the conversion factor.

D. Let's Try!

Directions: Read and understand the problems carefully. Encircle the letter of the correct answer.

1. The area of the roof is 9.4 meters. Determine its circumference in centimeters.

a. 94 centimeters c. 9,400 centimeters
b. 940 centimeters d. 940,00 centimeters

2. Convert 450 mL to L.

a. 45 L b. 4.5 L c. 0.45 L d. 0.045 L

3. How many weeks are equivalent to 504 hours?

a. 5 weeks b. 4 weeks c. 3 weeks d. 2 weeks

4. Convert 13 L to mL.
   a. 1,300 mL b. 13,000 mL c. 130,000 mL d. 130 mL

5. How many years are equivalent to 120 months?
   a. 8 years b. 9 years c. 10 years d. 12 years

E. Let's Evaluate

Directions: Read, analyze, and solve each problem. Write your solution and complete answer in the space provided.

1. Juan bought 1,250.50 grams of santol. What is the mass of the santol that he bought in kilograms?

2. A shoe box has a volume of 750 milliliters. Determine its capacity in liters.

3. A rope was divided into two. The first rope measures 176.50 centimeters, while the second measures 89.56 centimeters. What is the length of the original rope in meters?

4. After school, Lea started cleaning the poultry house at 4:50 p.m. She worked for 1 hour and 10 minutes. What time did she stop working?

5. Frank arrived at the habal-habal terminal at 3:50 p.m. The next trip is at 4:40 p.m. How long will he have to wait?

CHALLENGE!

Directions: Read, analyze, and solve the problem. Write your solution and complete answer in the space provided.

My sister is visiting our grandfather, who lives 200 km from our home. Her car's tank is full (20 liters) at the beginning of her drive and uses 1 liter to travel 6 kilometers. How many liters will she need to refill to reach our grandfather's house with 0 liters left in the tank?

F. References

Creag, Herminia C. 2022. *Real-Life Mathematics 4 Second Edition.* Quezon City, Philippines: ABIVA Publishing House, Inc.

Fabula, Jewel Kyle [2023]. "Solving Problems Involving Conversion of Units of Measurement." Retrieved April 28, 2024, from https://filipiknow.net/solving-problems-involving-conversion-of units-of measurement/

DISCLAIMER

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REGION XII - DIVISION OF SULTAN KUDARAT

Answer Key

A. Look Back!

1. 10 minutes
2. 3 hours
3. 10 days
4. 12 years
5. 3 weeks

B. What's New?

To save money, I would choose to buy the 4 bottles of 500 ml of milk for 240 pesos. With the 4 bottles each costing 60 pesos, the cost per liter is 120 pesos, while the 1-liter costs 150 pesos per liter.

D. Let's Try!

1. B
2. C
3. C
4. B
5. C

E. Let's Evaluate!

1. Juan bought 1.25 kilograms of santol.
2. The shoe box has a capacity of 0.75 liters.
3. The original length of the rope is 2.6606 meters.
4. She stopped working at 6:00 p.m.
5. She will wait for 50 minutes before the next trip.

F. Challenge!

Explanation:

The correct answer is 13.3 liters. $\frac{6\,kilometers}{1\,liter} * 20\,liters = 120km. 200 - 120 = 80.$
$\frac{1\,liter}{6\,kilometers} * 80\,kilometers = 13.3\,liters.$