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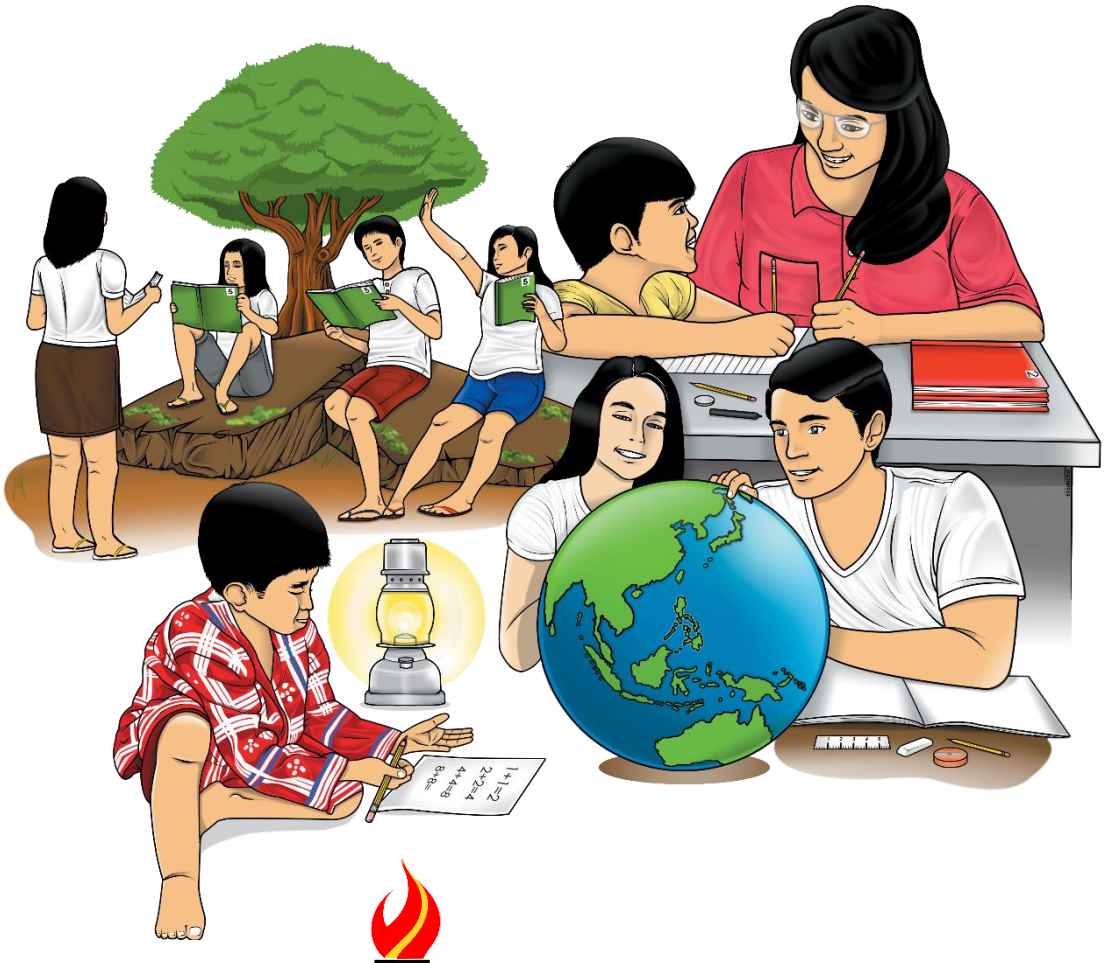
Mathematics

Quarter 3 – Module 15: Measures Time Using 12-Hour and 24-Hour Clock



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Mathematics

Quarter 3 – Module 15: Measuring Time Using 12-Hour and 24-Hour Clocks

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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.

What I Need to Know

Hi, mathletes☺. Time influences our daily activities so it is good to keep track of it. We have to use our time wisely. From ancient times to about the end of the sixteenth century, sundials were used to tell time. Later, the candle clock and water clock were invented. Today, we have more sophisticated watches, digital clocks, and other electronic devices to help us tell time. Remember to place a.m. or p.m. to indicate the use of the 12-hour clock format and H or Hour for the 24-hour clock format.

When you finish this module, you will be able to:

- measure time using a 12-hour and 24-hour clocks.

What I Know

Directions: Choose the letter of the correct answer. Write your answers on a separate sheet.

1. How many days are there in 48 hours?
   A. 2 B. 3 C. 4 D. 5

2. What time is 1 hour and 30 minutes after 6:00 in the morning?
   A. 7:30 p.m. B. 4:30 p.m. C. 7:30 a.m. D. 4:30 a.m.

3. What time in the 24- hour format is 11:45 a.m.?
   A. 23:45 H B. 11:45 a.m. C. 23:45 p.m. D. 11:45 H

4. What is 90 seconds when expressed in minutes and seconds?
   A. 90 minutes C. 1 minute and 30 seconds
   B. 1 minute and 20 seconds D. 1 minute and 40 seconds

5. What is 16:40 hours military time when expressed in 12-hour time?
   A. 16:40 p.m. B. 4:40 a.m. C. 4:40 p.m. D. 4:40 H

6. Junior high school students end their class at 5:00 p.m. What time is it in the 24-hour format?
   A. 15:00 H B. 17:00 a.m. C. 17:00 p.m. D. 17: 00 H

7. Office hours usually starts at 8 a.m. What is this time in 24-hour format?.
   A. 8:00 a.m. B. 08:00 H C. 20:00 p.m. D. 20:00 H

8. How many hours are there in one and a half days?
   A. 36 B. 30 C. 44 D. 48

9. What time is 5 minutes to 1:00 in the afternoon in 12-hour format?
   A. 12:55 a.m. B. 12:55 p.m. C. 12:55 H D. 1: 05 p.m.

10. What time is 12:00 midnight in military time?
    A. 00.00 H B. 00.00 p.m. C. 00.00 a.m. D. 00.00 mn

What's In

Recall the units of time conversion.

Units of Time Conversion Table
1 millennium = 10 centuries
1 century = 10 decades
1 decade = 10 years
1 year = 12 months
1 month = 4 weeks
1 week = 7 day
1 day = 24 hours
1 hour = 60 minutes
1 minute = 60 seconds

Alfred wants to be on time. He is working from home. The table shows his morning routine and time spent for each task.

If Alfred starts his work at 7: 30 a.m. What time should he wake up to be able to do all activities in his morning routine before starting his work? What is the allocated period of time or scheduled time for each morning routine?

Morning Routine	**Time Needed**	**Scheduled Time**
Prayer	5 minutes	
Cleaning of Bed	10 minutes	
Breakfast	25 minutes	
Bath	20 minutes	
Dressing up	30 minutes	
Work	8 hours	7:30 a.m. to 3:30 p.m.

What's New

What time should Alfred wake up? What is the total time needed for his morning routine?

Add the time spent for each task before work:

5 + 10 + 25 + 20 + 30 = 90 minutes

Therefore, Alfred needs 90 minutes for his morning routine before work.

Use ratio and proportion to convert 90 minutes to hours:

1 hour: 60 minutes = n hours: 90 minutes

$$\frac{1}{60} = \frac{n}{90}$$

$$60n = 90$$

$$n = \frac{90}{60}$$

n = 1.5 hours or 1 hour and 30 minutes

90 minutes is equal to 1 hour and 30 minutes.

Subtract 1 hour and 30 minutes from 7:30 AM:

hour: minutes

7:30 a.m.

\-

1:30

_____

6:00 a.m.

Thus, Alfred should wake up at 6:00 a.m. to have enough time for his morning routine and be ready for work on time.

Be familiar with the following terms that are used in telling time.

1. *Midnight:* 12:00 a.m
2. *Quarter* = ¼ hour = 15 minutes
3. *Half* = ½ hour = 30 minutes
4. 20 minutes *after* 9 in the morning*:* add 20 minutes to the current time 9:00 a.m.
5. 5 minutes *before* 12 noon: subtract 5 minutes from the current time 12:00 p.m.
6. 10 minutes *past* 12 midnight: add 10 minutes to the current time 12:00 a.m.
7. *Quarter to* 2 in the afternoon*:* means *before*; subtract 15 minutes from the current time 2:00 p.m.

Example:

1. What will be the time 3 hours and 10 minutes after 4:20 p.m.?

Solution: Add 3 hours to 4:20 pm. That is, 3:00 + 4:20 = 7:20 p.m.
Add 10 minutes to 7:20 p.m. That is, 00:10 + 7:20 p.m. = 7:30 p.m.

The answer is 7:30 p.m.

2. What time is 40 minutes past 3:30 p.m.?
   Solution: Add 40 minutes to 30 minutes. The answer is 70 minutes. Since 60 minutes is equal to 1 hour, rewrite 70 minutes as 60 minutes + 10 minutes. Then, add 1 to 3 for hours and annex the 10 minutes. Thus

   70 minutes = 60 minutes + 10 minutes
   70 minutes = 1 hour + 10 minutes
   1:10 + 3:00 = 4:10 p.m.

   The answer is 4:10 p.m.

3. What time is 1 hour and 20 minutes before 8:00 a.m.?

   Solution: Subtract 1 hour and 20 minutes from 8:00 a.m.
   Since 60 minutes is equal to 1 hour, rewrite 8:00 as 7 hours: 60 minutes. Subtract 1 from 7 and 20 from 60 minutes, thus,

   8:00 = 7: 60
   Subtract: 7 - 1 = 6 and 60 - 20 = 40 minutes.

   The answer is 6:40 a.m.

Activity:

Directions: Identify the time indicated.

1. 2 hours and 15 minutes before 4:35 p.m. _____
2. 10 minutes to midnight _____
3. Quarter after 8:55 a.m. _____
4. 1 hour and 45 minutes after 9:00 a.m. _____
5. Half past 6 in the evening _____

What Is It

You can tell time in 12-hour or 24-hour format. The table below shows correspondence between the 12-hour clock and 24-hour clock.

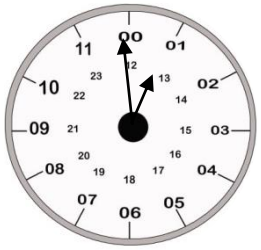
12-hour Clock	24-hour Clock
12:00 midnight	00:00 H
12:01 a.m. – 11: 59 a.m.	00:01 H – 11:59 H
12: 00 noon - 11:59 p.m.	12:00 H – 23:59 H

The 12-hour and 24-hour clocks are both written in the format:

Hours: Minutes

The 12-hour clock uses the abbreviations a.m. and p.m. after the time.

The 24-hour clock does not have a.m. and p.m.. It uses H for hours.



1:00 p.m. becomes 13:00 in 24-hour clock

Examples:	
9:05 a.m. is 9:05 H	9:05 p.m. is 21:05 H
7:27 a.m. is 7:27 H	7:27 p.m. is 19:27 H
12:10 a.m. is 00:10 H	12:10 p.m. is 12:10 H

For the 12-hour clock, a.m. and p.m. are placed to tell if the time is in the morning or afternoon.

***Ante meridiem* (a.m., A.M., AM)** means this time is from midnight until morning before noon, that is, 12:00 a.m. to 11:59 a.m.

***Post meridiem* (p.m., P.M., PM)** means this time is the afternoon before midnight, that is, 12:01 noon to 11:59 p.m.

The 12-hour clock runs from 12 midnight (12:00 a.m.) to 11:59 a.m. and then from 12 noon (12:00 p.m.) to 11:59 p.m.

The 24-hour clock, is often called **military clock** or **military time.** It starts at 00:00 which is midnight, until 23:59 (11:59 pm). It does not require a.m. and p.m. to be written after the time. Instead, H or hours is placed to indicate the use of the 24-hour clock format. The 24-hour notation without H is also accepted.

Changing 12-hour clock (a.m./p.m.) to 24-hour clock

1. **Add 12** to any hour after noon (**1:00 p.m. to 11:59 p.m.**).

   Example: Change the following in 24-hour time format.

   a. 4:45 p.m.
   b. 11:30 p.m.

   Solution:

   a. Add 12 to 4:45 p.m.
      4:15 + 12 = 16:45
      The 24-hour time format of 4:45 p.m. is 16:45H.

   b. Add 12 to 11:30 p.m.
      11:30 + 12 = 23:30
      The 24-hour notation of 11:30 p.m. is 23:30H.

2. Subtract 12 for the first hours of the day (**12 midnight to 12:59 a.m.**)

   Example: Change the following to the 24-hour time format.

   a. 12:35 a.m.
   b. 12 midnight

   Solution:

   a. Subtract 12 from 12:35 a.m.
      12:35 – 12 = 0:35
      The 24-hour time format of 12:35 a.m. is 0:35 H.

   b. Subtract 12 from 12 midnight.
      12:00 – 12 = 0:00
      The 24- hour notation of 12 midnight is = 0:00 H.

3. Retain hours: minutes format and use H instead of a.m. from 1:00 a.m. to 11:59 a.m.

   Example: Change 11:30 a.m. in 24-hour time format.

   Answer: 11:30 H

Changing 24-hour clock to 12-hour clock

The following simple steps will help you change a 24-hour time to a 12-hour time with 'a.m.' and 'p.m.'.

- If the hour is exactly 12, simply annex p.m. to the time.
- If the hour is 00, change it to 12 and annex a.m. to the time.
- If the hour is greater than 12, simply subtract 12 from the hour and annex p.m. to the time.
- If the hour is less than 12, simply annex a.m. to the time and take away any leading zeros.

Note: The minutes and seconds never change when changing between 24 hour and 12-hour times.

Examples

1. Change 14:36 to 12-hour format.
   Solution: Subtract 12 from 14 and annex p.m. to the time, thus

   14:36 – 12 = 2:36 p.m.

2. Change 00:45 to 12-hour format.
   Solution: Change 00 to 12 and annex a.m. to the time, thus

   00:45 = 12:45 a.m.

3. Change 20:36 to 12-hour format.
   Solution: Subtract 12 from 20 and annex p.m. to the time, thus

   20:36 – 12 = 8:36 p.m.

4. Change 02:12 to 12-hour format.
   Solution: Simply annex a.m. to the time and take away the zero before the hour 2.

   02:12 = 2:12 a.m.

Activity: Filling Me- Up

Directions: Fill in the correct time in each blank. Write your answer on a separate answer sheet.

Number	12-hour	24-hour	Number	12-hour	24-hour
1.	5:59 p.m.		3.		18:45 H
2.		14:24 H	4.	7:05 a.m.	

What's More

Activity 1: Change Me

Directions: Change the 24-hour clock times to 12-hour clock times.

12-hour clock	24-hour clock	12-hour clock	24-hour clock
	04:25 H		16:25 H
	09:20 H		21:20 H
	02:55 H		14:55 H

Activity 2: Change Me More
Directions: Change the 12-hour clock times to 24-hour clock times.

12-hour clock	24-hour clock	12-hour clock	24-hour clock
4:25 a.m.		4:25 p.m.	
9:20 a.m.		9:20 p.m.	
2:55 a.m.		2:55 p.m.	

Activity 3. Fill Me More

Directions: Express the following times in 12-hour and 24-hour clock formats.

	Time	12-hour clock	24-hour clock
1.	10 minutes past 05:00H		
2.	30 minutes to 7:00 p.m.		
3.	Noon		
4.	quarter after 4:00 a.m.		
5.	1 hour and 10 minutes before 8:45 p.m.		

What I Have Learned

Activity: Modified True or False

Directions: Write **True** if the statement is correct. If the statement is incorrect, change the underlined word(s) to make it correct.

1. Quarter means ¼ an hour.
2. Ante Meridiem (a.m.) means the time is before 12 midnight and after 12 noon.
3. Post Meridiem (p.m.) means the time is after 12 noon and before 12 midnight.
4. 12-hour clock were used by soldiers.
5. "Before" in "5 minutes before 1 PM" means you have to add from the current time.

What I Can Do

Directions: Tell the time. Choose the letter of the correct answer. Write your answers on a separate sheet.

1. I am between 15:00H and quarter past 3 in the afternoon. What time am I?
   A. 3:05 a.m. B. 3:45 a.m. C. 3:05 p.m. D. 3:45 p.m.

2. My hour will not change in the next 20 minutes. What time am I?
   A. 12:35 B. 1:45 C. 11:50 D. 2:40

3. I am quarter to 10 in the evening. What time am I?
   A. 9:45 a.m. B. 10:15 a.m. C. 10:15 p.m. D. 9:45 p.m.

4. I am half past 8 in the morning. What time am I?
   A. 7:30 a.m. B 8:30 a.m. C. 7:30 p.m. D. 8:30 p.m.

5. My time corresponds to midnight. What time am I?
   A. 0:00 B. 0:05 C. 11:59 D. 12:00

Assessment

Directions: Choose the letter of the correct answer.

1. How many hours are there in 2 days?
   A. 24 B. 36 C. 44 D.48

2. What time is 2 hours and 30 minutes after 8:00 in the evening?
   A. 10:30 p.m. B.10:30 H C. 10:30 a.m. D. 10:30

3. Office hours usually starts at 8 a.m. What is this time in a 12-hour format?.
   A. 8:00 a.m. B. 08:00 H C. 20:00 p.m. D. 20:00 H

4. How many hours are there in 3 days?
   A. 36 B. 48 C. 72 D. 60

5. What is 15 minutes to 2:00 in the afternoon in 24-hour format?
   A. 14:45 p.m. B. 14:45 a.m. C. 14:45 H D. 13: 45 H

6. What is 12:00 midnight in military time?
   A. 00.00 H B. 00.00 p.m. C. 00.00 a.m. D. 00.00 m.n.

7. How will you write 10:45 p.m. in 24-hour format?
   A. 22:45 H B. 20:45 H C. 10:45 p.m. D. 10:45 a.m.
   B.
8. What is 75 seconds when expressed in minutes and seconds?
   A. 75 minutes C. 1 minute and 20 seconds
   C. 1 minute and 25 seconds D. 1 minute and 15 seconds
   D.
9. How will you express 08:40 hours military time in 12-hour time?
   A. 6:40 p.m. B. 8:40 a.m. C. 8:40 p.m. D. 8:40 H

10. Classes of elementary pupils end at 4:00 p.m. What is this time in 24-hour format?
    A. 04:00 H B. 04:00 p.m. C. 16:00 H D. 16: 00 p.m.

Additional Activities

Directions: Change the 12-hour clock times in 24-hour clock format. Write your answers on a separate sheet.

Example: 3:00 p.m. = 15:00 H

1. 6:45 p.m.
2. 5:15 p.m.
3. 4:15 p.m.
4. 7:15 p.m.
5. 8:05 p.m.

Answer Key

Assessment	Additional Activities		What I Know
1. D	1. 18.45 H		1. A
2. A	2. 17:15 H		2. C
3. A	3. 16.15 H		3. D
4. C	4. 19:15 H		4. C
5. D	5. 20:05 H		5. C
6. A			6. D
7. A	**What's More**		7. B
8. D			8. A
9. B	**Change Me**		9. B
10. C	1. 4:25 a.m.	4:25 p.m.	10.A
What I Can Do	2. 9:20 a.m.	9:20 p.m.	
1. C	3. 2:55 a.m.	2:55 p.m.	**What's New**
2. A			
3. D	**Change Me More**		1. 2:20 p.m.
4. B	1. 04:25H	16:25H	2. 11:50 p.m.
5. A	2. 09:20H	21:20H	3. 9:10 a.m.
What is It	3. 02:55H	14:55H	4. 10:45 a.m.
1. 17:59H	Fill Me More		5. 6:30 p.m.
2. 2:24 p.m.	12 – hour	24 - hour	
3. 6:45 p.m.	1. 5:10 a.m.	0?5:10H	**What I have**
Learned			
4. 07:05H	2. 6:30 p.m.	18:30H	1. True
What's In	3. 12:00 noon	12:00H	2. After, before
1. 6:00-6:05 a.m.	4. 4:15 a.m.	04:15H	3. True
2. 6:05-6:15 a.m.	5. 7:35 p.m.	19:35H	4. 24-hour
3. 6:15-6:40 a.m.			5. subtract
4. 6:40-7:00 a.m.			
5. 7:00-7:30 a.m.			

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Mathematics Grade 5 Teacher's Guide

"*24-Hour Clock Conversion Worksheets"*
https://www.mathsalamanders.com/24-hour-clock-conversion.ht

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