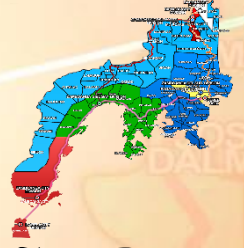




Republic of the Philippines  
**Department of Education**  
 Regional Office IX, Zamboanga Peninsula



**5**



Zest for **P**rogress  
 Zeal of **P**artnership

- JANUARY**  
*Makugihon*
- FEBRUARY**  
*Mohigugmaon*
- MARCH**  
*Matinabangon*
- APRIL**  
*Matinahuron*
- MAY**  
*Makapsay og Malimpyo*
- JUNE**  
*Maablik og Masunod sa  
Oksaltong Oras*
- JULY**  
*Maantigo og Maabilidad*
- AUGUST**  
*Maginhuhuhunon  
para sa Uban*
- SEPTEMBER**  
*Madaginoton*
- OCTOBER**  
*Matinud-anon*
- NOVEMBER**  
*Masaligan*
- DECEMBER**  
*Maalampon*

# Mathematics

Quarter 3 – Module 7  
 World Time: 12 and 24-Hour Format



Name of Learner: \_\_\_\_\_

Grade & Section: \_\_\_\_\_

Name of School: \_\_\_\_\_



# What I Need to Know

The module contains one lesson:

## Lesson 7: Measuring, Calculating and Solving Time Using 12 – Hour and 24 - Hour Clock

In this module, you will be able to:

1. Measure time using a 12-hour and 24-hour clock
2. Calculate time in the different world time zones in relation to the Philippines
3. Solve problems involving time



# What I Know

**Directions:** Encircle the letter of the correct answer.

The Patrol Leader of the Rat Patrol shouted, “We will cross the river at exactly 0700 hour”.

1. What is 0700 hour in 12-hour format?  
A. 7:00 p.m.      B. 7:00 a.m.      C. 7:07 a.m.      D. 7:07 p.m.
2. Which time is the same with 2300 hour?  
A. 2:30 p.m.      B. 2:30 a.m.      C. 11:00 a.m.      D. 11:00 p.m.

Scout Leader Ramel is still in the woods in search for firewood for dinner. The time is 4:30 p.m.

3. How many minutes left before the time reaches 1700 hour?  
A. 90 minutes      B. 30 minutes      C. 3 minutes      D. 10 minutes

For item number 4, refer to the illustration below.

DEPARTURE	Flight Number	ARRIVAL
	Flight CP-L112	
	Flight PA-A2009	
	Flight AP-A11	

4. How long will Flight PA-A2009 be flying?  
A. 40 minutes      B. 5H 45 minutes      C. 7 hours      D. 5 hours

Tokyo, Japan is 1 hour ahead of Philippines.

5. What time and day is it in Philippines, if it is 12:30 a.m., Friday in Tokyo?  
A. 1:30 a.m., Friday      C. 1:30 p.m., Thursday  
B. 11:30 p.m., Thursday      D. 11:30 p.m., Friday

Edmonton, Canada is 13 hours behind of Philippines.

6. What time is it in Edmonton, Canada if it is 5:00 p.m. in the Philippines?  
A. 2:00 a.m.      B. 3:00 a.m.      C. 4:00 a.m.      D. 1:00 p.m.

Jose takes a flight that arrives 9:00 p.m. in Wellington, New Zealand time to attend International Jamboree.

7. What time is the expected departure in the Philippines, if the flight takes 10 hours and 30 minutes?  
 A. 6:30 a.m.      B. 6:30 p.m.      C. 7:30 a.m.      D. 7:30 p.m.

Narcissa lives in Laos, Vientiane and plans to visit her mother in the Philippines. The trip is approximately 14 hours and 30 minutes.

8. What time will she arrive in the Philippines in PST, if she leaves at 2:00 a.m.,?  
 A. 4:30 a.m.      B. 3:30 a.m.      C. 4:30 p.m.      D. 3:30 p.m.

Jason a scout leader in the Philippines who needs to talk to Scout Executive in Washington, USA at 0700 hours, Monday Washington time.

9. What time in the Philippines will he make the call?  
 A. 12:00 a.m., Sunday      C. 7:00 p.m., Tuesday  
 B. 7:00 p.m., Monday      D. 8:00 p.m., Monday

Anne is planning a trip to visit her friend at Pagadian City. Due to Covid-19, IATF imposed measures to check temperatures and travel documents at the border. Travel time from Ipil, Zamboanga Sibugay to Pagadian City takes 3 hours and 25 minutes.

10. What time will Anne arrive at Pagadian City, if the passenger's van leaves Ipil at 7:00 a.m. and spends 15 minutes at the border?  
 A. 10:20 a.m.      B. 10:30 a.m.      C. 10:35 a.m.      D. 10:40 a.m.





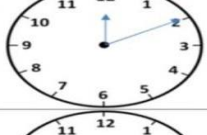

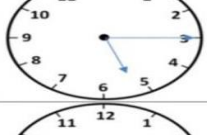
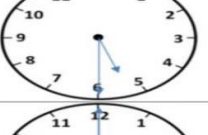




## What's In

### Activity 1: Time machine.

**Directions:** Encircle the letter of the best answer.

Work out the elapsed time between the times on the two clocks.

1.)		TO		1.) A. 30 mins.      C. 90 mins. B. 6 mins.      D. 46 mins.
2.)		TO		2.) A. 3 mins.      C. 35 mins. B. 15 mins.      D. 38 mins.
3.)		TO		3.) A. 2 mins.      C. 10 mins. B. 4 mins.      D. 20 mins.
4.)		TO		4.) A. 6 mins.      C. 30 mins. B. 25 mins.      D. 15 mins.
5.)		TO		5.) A. 20 mins.      C. 4 mins. B. 40 mins.      D. 12 mins.

**Source/s:** "Elapsed Time Clock Worksheet", math.salamanders.com, 2010-2020, <https://www.math-salamanders.com/elapsed-time-worksheet.html>





# What's New

Good day! While turning the pages of this activity sheet, avoid wetting your finger with your saliva. Stay safe and stay at home.

Box below is a simple overview of the entire lesson we are about to take up.



Definition			Characteristics		
In <b>math</b> , <b>time</b> can be defined as the ongoing and continuous sequence of events that occur in succession, from the past through the present to the future.			There are two ways of telling the <b>time</b> : The <b>12-hour clock</b> runs from 1am to <b>12</b> noon and then from 1pm to <b>12</b> midnight. The <b>24-hour clock</b> uses the numbers 00:00 to 23:59 (midnight is 00:00).		
1000	3:00 a.m.	1100	9087	1294	97
1200	11:00 a.m.	1600	5689	5591	17
Examples			Non-examples		




# What Is It

## Measuring Time

We can measure time in two different ways, in 12- hour format and in 24-hour format.

### Analogue Clock



This is an analogue clock.

The numbers round the clock face are hours

There are 12 hours marked on the clock

### Telling the time



The **small hand** points to the hours.

The **big hand** points to the minutes.

When **big hand** hand points the 12 the time is o'clock.

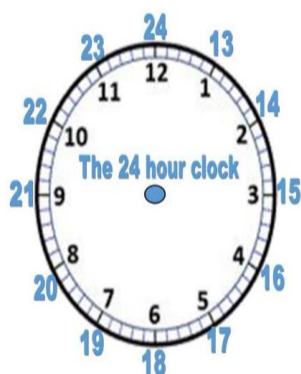
Table below guides you on how to properly read time in 24-hour format.

24 Hour Time			
Time	Read	Time	Read as
0000	Zero hour	1300	Thirteen hundred hours
0100	Zero hundred hours	1400	Fourteen hundred hours
0200	Zero two hundred hours	1500	Fifteen hundred hours
0300	Zero three hundred hours	1600	Sixteen hundred hours
0400	Zero four hundred hours	1700	Seventeen hundred hours
0500	Zero five hundred hours	1800	Eighteen hundred hours
0600	Zero six hundred hours	1900	Nineteen hundred hours
0700	Zero seven hundred hours	2000	Twenty hundred hours
0800	Zero eight hundred hours	2100	Twenty-one hundred hours
0900	Zero nine hundred hours	2200	Twenty-two hundred hours
1000	Ten hundred hours	2300	Thirteen hundred hours
1100	Eleven hundred hours	2400	Twenty-three hundred hours
1200	Twelve hundred hours	1300	Twenty-four hundred hours

Let us learn how to convert 12-hour format to 24-hour format.

CONVERSION TABLE

12 Hour	24 Hour	12 Hour	24 Hour	12 Hour	24 Hour
<b>12 a.m.</b>	<b>0000</b>	<b>8:00 a.m.</b>	<b>0800</b>	<b>4:00 p.m.</b>	<b>1600</b>
<b>1:00 a.m.</b>	<b>0100</b>	<b>9:00 a.m.</b>	<b>0900</b>	<b>5:00 p.m.</b>	<b>1700</b>
<b>2:00 a.m.</b>	<b>0200</b>	<b>10:00 a.m.</b>	<b>1000</b>	<b>6:00 p.m.</b>	<b>1800</b>
<b>3:00 a.m.</b>	<b>0300</b>	<b>11:00 a.m.</b>	<b>1100</b>	<b>7:00 p.m.</b>	<b>1900</b>
<b>4:00 a.m.</b>	<b>0400</b>	<b>12:00 n</b>	<b>1200</b>	<b>8:00 p.m.</b>	<b>2000</b>
<b>5:00 a.m.</b>	<b>0500</b>	<b>1:00 p.m.</b>	<b>1300</b>	<b>9:00 p.m.</b>	<b>2100</b>
<b>6:00 a.m.</b>	<b>0600</b>	<b>2:00 p.m.</b>	<b>1400</b>	<b>10:00 p.m.</b>	<b>2200</b>
<b>7:00 a.m.</b>	<b>0700</b>	<b>3:00 p.m.</b>	<b>1500</b>	<b>11:00 p.m.</b>	<b>2300</b>



The picture at the left is a 24-hour clock. Numbers in black are for a.m. Numbers in blue are times in p.m.

- 24-hour time shows the hours and minutes since midnight.
- 12 midnight is zero hour (0000) in 24-hour clock.
- 24-hour clock identifies the time without the use of a.m. and p.m.
- 11:00a.m. is 1100 (11 hundred hour) in 24- hour format.



## World Time Zones and the Time in the Philippines

If you have been to a courier or airport, you would see clocks with different times as the picture shown at the left. Different times at different places in the world are caused by the movement of the Earth, 15 degrees longitude every hour. Since there are 24 hours in a day, there are 24 standard time zones. ( $24 \text{ hours} \times 15^\circ = 360^\circ$ )

Time zones are counted from prime Meridian or at  $0^\circ$  Longitude and each time zone is counted at  $15^\circ$  interval and extends  $7\frac{1}{2}^\circ$  to the left and right of a central meridian.

For example, if it is 5:07 a.m. in London/UK, it is also 5:07 a.m. in the places  $7\frac{1}{2}^\circ$  to the left of and right of London/UK. If it is 6:07 a.m. in Paris/France, it is also 6:07 a.m. in the places  $7\frac{1}{2}^\circ$  to the left and right of Paris/France. Suppose it is 5:07 a.m. in United Kingdom, what do you think is the time here in the Philippines?

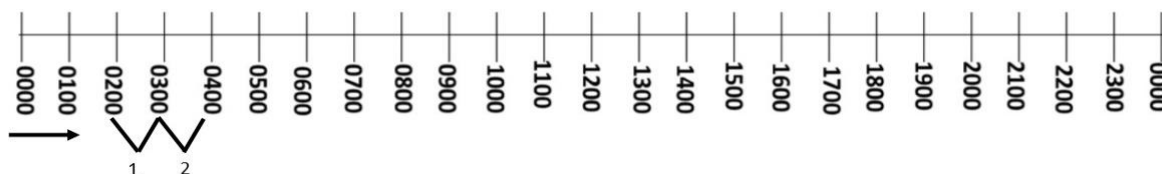
To see the relationship of time in certain places to the time in our country, let us look at the table below and note that (+) means ahead and (-) means behind.

	Difference from Philippine Standard Time (PST)	Example
<b>Manila, Philippines</b>	<b>PST</b>	<b>Saturday, 0300 Hour</b>
Buenos Aires, Argentina	<b>-11</b>	Friday, 1600 Hour
Canberra, Australia	<b>+2</b>	Saturday, 0500 Hour
Beijing, China	<b>SAME</b>	Saturday, 0300 Hour
Cairo, Egypt	<b>-6</b>	Friday, 2100 Hour
Athens, Greece	<b>-5</b>	Friday, 2200 Hour
New Delhi, India	<b>-2:30</b>	Saturday, 0030 Hour
Tokyo, Japan	<b>+1</b>	Saturday, 0400 Hour
Vientiane, Laos	<b>-1</b>	Saturday, 0200 Hour
Wellington, New Zealand	<b>+4</b>	Saturday, 0700 Hour
Warsaw, Poland	<b>-6</b>	Friday, 2100 Hour
Riyadh, Saudi Arabia	<b>-5</b>	Friday, 2200 Hour
Caracas, Venezuela	<b>-12:30</b>	Friday, 1430 Hour
Washington, USA	<b>-12</b>	Friday,

With the following given time in the Philippines, let us determine the equivalent time in the given country with the help of the linear clock. We will use the table above as our reference.

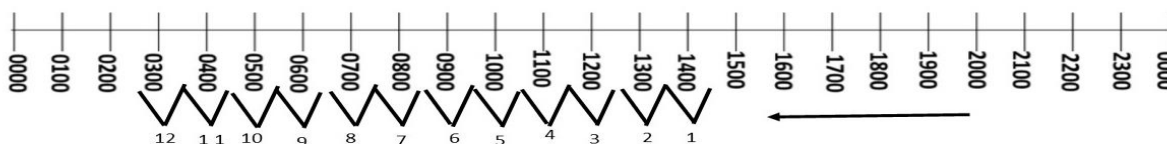
	If PST is...	What time is it in:	24-hour	12-hour
1	0200 hours	Canberra, Australia		
2	2:30p.m.	Washington, USA		
3	1030 hours	Athens, Greece		
4	7:30a.m.	Tokyo, Japan		

1. Canberra, Australia is +2 (2 hours ahead) and this means 2 lines going to the right in the linear clock from PST (0200 hours). Check the illustration below.



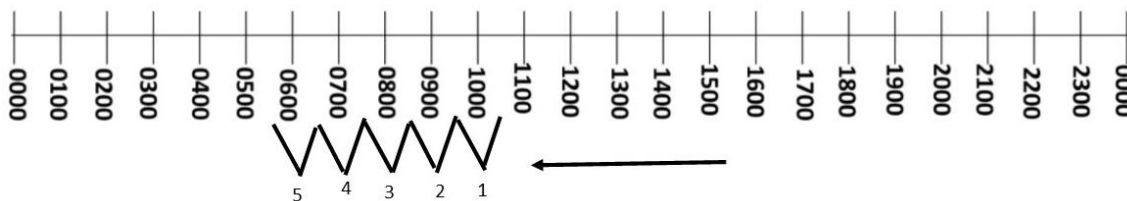
After counting 2 lines to the right from PST, we stopped at 0400. This means if it is 0200 hours (2:00 a.m.) in the Philippines, the time in Canberra, Australia is 0400 hours (24-hour) or 4:00a.m. (12-hour).

2. Washington, USA is -12 (12-hours behind) and this means 12 lines going to the left in the linear clock from PST (2:30p.m. or 1430 hours).



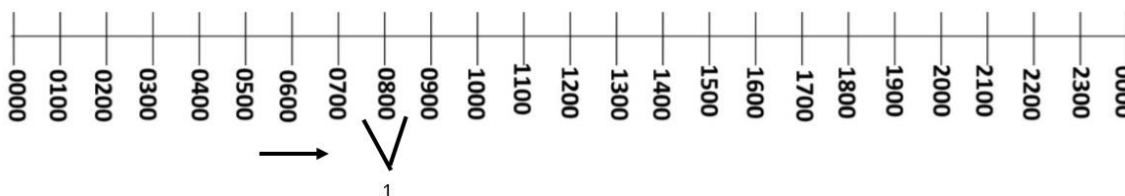
After counting 12 lines to the left from PST, we stopped at 0330. This means if it is 1430 hours (4:30p.m.) in the Philippines, the time in Washington, USA is 0230 hours (24-hour) or 2:30a.m. (12-hour).

3. Athens, Greece is -5 (5 hours behind) and this means 5 lines going to the left in the linear clock from PST (1030 hours).



After counting 5 lines to the left from PST, we stopped at 0630. This means if it is 1030 hours (10:30a.m.) in the Philippines, the time in Athens, Greece is 0630 hours (24-hour) or 6:30a.m. (12-hour).

4. Tokyo, Japan is +1 (1 hour ahead) and this means 1 line going to the right in the linear clock from PST (7:30 a.m. or 0730 hours).





After counting 1 line to the right from PST, we stopped at 0830. This means if it is 0730 hours (7:30a.m.) in the Philippines, the time in Tokyo, Japan is 0830 hours (24-hour) or 8:30a.m.(12-hour).

The time in Manila is 6 hours ahead of Rome. The flight from Manila takes 9 hours. If an airplane leaves Manila by 9:00 a.m., at what time will the plane arrive?

**Understand**

**a. What is asked?**

At what time will the airplane from Manila arrive in Rome (referring to Rome time)?

**b. What are the given facts**

The time in Manila is 6 hours ahead of Rome. The flight from Manila to Rome takes 9 hours. The plane left Manila at 9:00 a.m.

**Plan**

Add 9 hours to 9:00 a.m., then subtract 6 hours since Manila time is 6 hours ahead of Rome time.

**Solve:**

**We will just add 9 hours to 9:00  $9+9 = 18-12=6$**

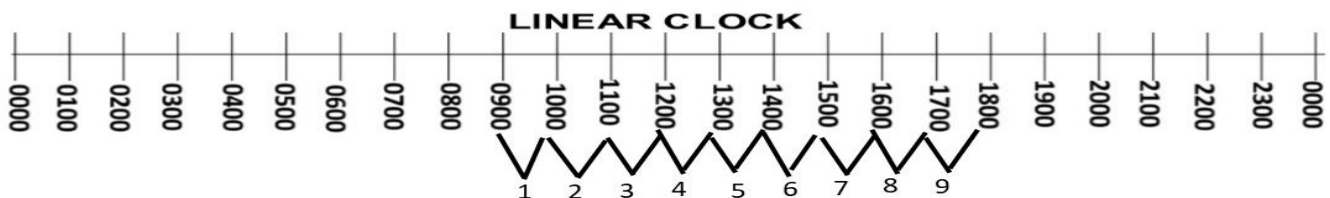
**There cannot be 18 hours in a 12-hour clock, so we subtract 12 from 18. Since we subtracted 12, it means that a.m. has passed already and it is already p.m. of the same day.**

**The plane will arrive at 6:00 p.m. PST, and since PST is 6 hours ahead of Rome, 6:00 p.m.— 6 hours = 12 noon in Rome.**

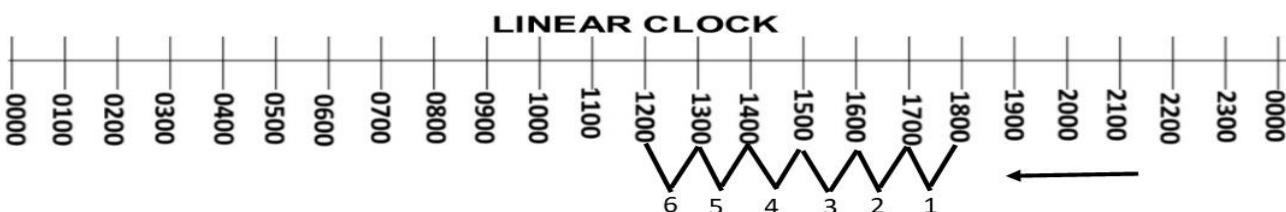
**Therefore, 6:00 p.m. in Manila is 12:00 noon in Rome.**

**Source:** Angelina P. Lumbre, et al., 21<sup>st</sup> Century MATHletes, edited by Mercurio T.Elenzano and Chin Uy, PhD, Vibal Group, Inc., 2016, p. 287

Another way of solving the problem is by using the linear clock. 9:00 p.m. is 2100 hour in 24-hour format. 9 hours travel means 9 lines to the right. Since PST is 6 hours ahead, it means 6 lines going to the left.



Picture above shows that plane will arrive in Rome at 1800 hour or 6:00 p.m. PST. Since Manila is 6 hours ahead of Rome, we will move 6 lines to the left in the linear clock to find the time in Rome. Check the number line below.





Based on the picture above, after moving 6 lines to the left, we stopped at 1200 hour or 12:00 noon in 12-hour format. Therefore, 6:00 p.m. in Manila is 12:00 noon in Rome.



## What's More

### Activity 2: Identify me!

**Directions:** Write 12 on the space provided if the time is in 12-hour format and write 24 on same space if the time is in 24-hour format.

1. \_\_\_\_\_ 0230 hours
2. \_\_\_\_\_ 2:00 p.m.
3. \_\_\_\_\_ 3:35 a.m.
4. \_\_\_\_\_ 2:22 p.m.
5. \_\_\_\_\_ 0750 hours

### Activity 3: Time to match!

**Directions:** Match the equivalent 24-hour format in the right. Write the letter of the correct answer of the space provided after each number.

		12-hour format			24-hour format
1		6:40 a.m.		A	0525 hours
2		9:05 p.m.		B	0640 hours
3		3:35 p.m.		C	0905 hours
4		12:00 a.m.		D	0335 hours
5		5:25 a.m.		E	0000 hour

### Activity 4: Fill me if you can

**Directions:** With the following given time in the Philippines, determine the equivalent time in the given country. Express your answer both in 12 and 24-hour format.

	If PST is	What time is it in:	24-hour	12-hour
<b>1</b>	0130 hours	Buenos Aires, Argentina		
<b>2</b>	6:25 a.m.	Canberra, Australia		
<b>3</b>	Quarter past 12:00 p.m.	Caracas, Venezuela		
<b>4</b>	Half past 10:00 p.m.	Washington, USA		
<b>5</b>	Quarter before 1900 hours	Athens, Greece		



## What I Have Learned

### Activity 5: Time to choose

**Directions:** Solve the following problems. Encircle the letter of the correct answer.

Jhon started his cleaning job at 4:30 p.m. He finished at 9:05 p.m.

1. How long (in minutes) did it take him to do his job?  
 A. 275 minutes      B. 4:35 hours      C. 270 minutes      D. 55 minutes

Toni does her morning jogging routine for 45 minutes. This morning, she started at 4:30 a.m.

2. What time will she finish?  
 A. 5:25 a.m.      B. 5:15 a.m.      C. 5:45 a.m.      D. 4:45 a.m.

The ferry from Cebu left on Monday at 10:30 p.m. and arrived in Bohol at 12:35 a.m. the next day.

3. How long was the trip?  
 A. 3 hours      B. 2 hours and 5 minutes      C. 3 hours and 5 minutes      D. 4 hours

Bambie started cutting letters for stage decorations at 8:45 a.m. She finished at 9:45 p.m.

4. How many hours did she work on letter cutting?  
 A. 10 hours      B. 11 hours      C. 12 hours      D. 13 hours

Amy plans to visit her grandmother who lives in a nearby town. She leaves her town at 5:30 a.m. Monday. The journey takes 21 hours and 25 minutes.

5. What time and day will Amy see her grandmother?  
 A. 2:55 a.m., Tuesday      C. 2:50 a.m., Tuesday  
 B. 2:55 p.m., Tuesday      D. 2:50 p.m., Tuesday



## What I Can Do

### Activity 6: Time to draw

**Directions:** Draw a short and a long hand to show the time on the table.

1.	0230 hours	6.	2:30 p.m.
2.	0500 hours	7.	12:30 a.m.
3.	1830 hours	8.	1:00 p.m.
4.	2330 hours	9.	7:45 p.m.
5.	1700 hours	10.	2:15 a.m.





## Assessment

**Directions:** Read and understand each items. Refer to page 6 for items that needs PST time difference. Encircle the letter of the correct answer.

- How do you read 0200 H?
  - Zero two hundred hour a.m.
  - Zero two hundred hours
  - Zero two hundred hours
  - Zero two hundred p.m.
- What is the rule in changing 9:30 p.m. to 24-hour format?
  - Add 12 to 9 then copy 30.
  - Add 0 to 9 then copy 30.
  - Add 12 to 9 then add 2 zeroes.
  - Add 12 to 9 then add 0 to 930.
- What time is it in the afternoon, if the hour hand of a clock points at 2 and the minute hand points at 12?
  - 12:02 p.m.
  - 2:12 a.m.
  - 2:00 p.m.
  - 2:00 a.m.

For item number 4, refer to the illustration below.

DEPARTURE	Flight Number	ARRIVAL
	Flight CP-L112	
	Flight PA-A2009	
	Flight AP-A11	

- How much longer does Flight PA-A2009 fly compare to Flight AP-A11?
  - 4 hours
  - 5 hours 20 minutes
  - 4 hours 20 minutes
  - 5 hours 30 minutes

Wellington, New Zealand is 4 hours ahead of Philippines.

- What day and time is it in Wellington, New Zealand, if it is 11:00 p.m. Friday in the Philippines?
  - Friday, 3:00 a.m.
  - Saturday, 3:00 p.m.
  - Saturday, 3:00a.m.
  - Friday, 3:00 p.m.

Washington, USA is 12 hours behind of Philippines.

- What is the best thing to do, if we convert 10:00 p.m. PST to Washington, USA time, using the linear clock?
  - Move 10 lines to the right since it is 10:00 p.m.
  - Move 10 lines to the left since the PST starts at 10:00 p.m.
  - Move 12 lines to the left starting from the PST (1000 hours).
  - Move 12 lines to the right starting from the PST (1000 hours).

You take a flight that leaves Philippines at 10:35 p.m. that is going to Cairo, Egypt.

- What time will you arrive at Cairo, Egypt time if the flight takes 13 hours 45 minutes?
  - 12:20 p.m.
  - 12:20 a.m.
  - 6:20 p.m.
  - 6:20 a.m.

Jovy lives in New Delhi, India and plans to visit Philippines. The trip to Philippines is 7 hour and 30 minutes. She wants to land at NAIA at exactly 8:00 a.m.

8. What time in New Delhi, India will she leave?  
A. 10:00 p.m.                      C. 10:30 p.m.  
B. 11:30 p.m.                      D. 9:00 p.m.

Biena is an online English teacher in the Philippines and her students are in Canberra, Australia.

9. What time should she go online if her first session starts at 7:00 a.m. in Canberra, Australia?  
A. 0800 hours    B. 0900 hours              C. 1000 hours              D. 0500 hours

Jonathan is going to attend a jamboree in Athens, Greece. His flight is scheduled to leave Philippines at 7:30 p.m. Monday and is expected to land at Athens, Greece after 15 hours 30 minutes of flying.

10. What time and day will he be able to arrive in Athens, Greece?  
A. 6:00 a.m., Tuesday                      C. 6:30 a.m., Tuesday  
B. 11:00 a.m., Tuesday                      D. 11:30 a.m., Tuesday

### Reference/s:

Angelina P. Lumbre, et al., 21<sup>st</sup> Century MATHletes, edited by Mercurio T. Elenzano and Chin Uy, PhD, Vibal Group, Inc., 2016  
Sararoom Design, Stock vector ID: 120105520  
Samsung S7, Samsung Experience Home.jpg

#### Electronic Reference:

math.salamanders.com, "Elapsed Time Clock Worksheet", 2010-2020,  
<https://www.math-salamanders.com/elapsed-time-worksheet.htm>

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