

## Goals

Goals for this fortnight:

- use units of time, conversions between units, fractional, digital and decimal representations
- represent time using 12-hour and 24-hour clocks
- calculate time intervals, such as time between, time ahead, time behind
- interpret timetables, such as bus, train and ferry timetables
- use several timetables and electronic technologies to plan the most time-efficient routes
- interpret complex timetables, such as tide charts, sunrise charts and moon phases



## Theoretical Components

### STEP 1

#### Resources:

*PDF file:* Week 11 and 12 Notes and Exercises

#### This Fortnight:

We will be learning:

- Time lines
- Units of time
- Telling the time
- Time calculations
- Time zones
- Timetables

## Practical Components

### STEP 2

Read through Week 11 and 12 Notes and Exercises for instructions on what to do.

There are 7 Exercises in this booklet. Read any worked examples before you begin.

**Remember to regularly check Google Classroom for messages.**

## Portfolio Task

### STEP 3

Complete the task at the end of the brief and submit your weekly work. 😊

Other

**Remember to check Google Classroom or [hawkermaths.com](http://hawkermaths.com) for each week's learning brief**



NEW YORK



LONDON



BERLIN



MOSCOW



PARIS



NEW DELHI



MEXICO



DUBAI



BEIJING



TOKYO



SYDNEY



RIO DE JANEIRO

## ESSENTIAL MATHEMATICS 2

### WEEK 11 AND 12 – TIME

#### How are we ever going to use this?

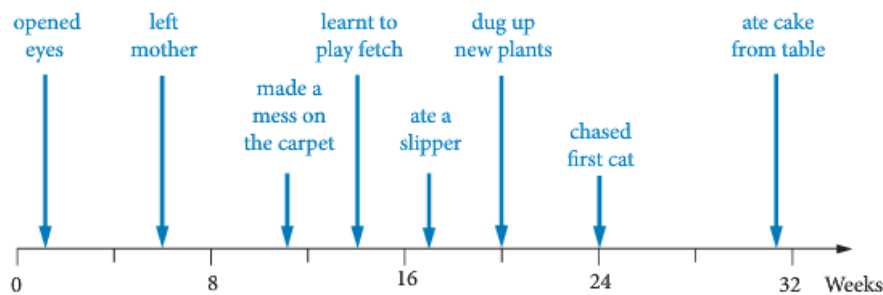
- When looking up timetables and making plans for travel
- When checking television programs or performance times
- Any time you need to calculate anything to do with time!

### TIMELINES

Timelines record events in the order in which they happen, along a regular scale.

#### Example:

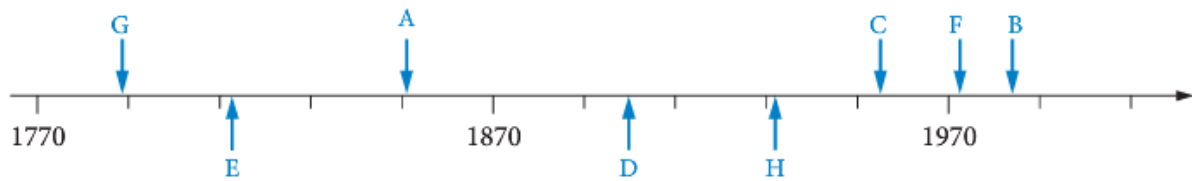
This is a timeline for a puppy's first 32 weeks.



On this timeline, the distance from 0 to 8 is divided into 2 parts, so each division is 4 weeks. Thus we can estimate that the pup left its mother at 6 weeks old and that it ate cake from the table at 31 weeks.

## Exercise 1

1. This timeline shows events from the first 200 years of white settlement in Australia.



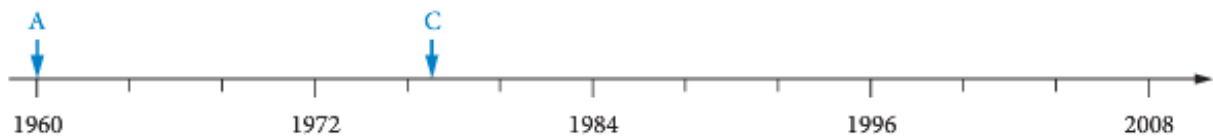
- a. How many years does each interval (unit) on the timeline represent? This is called the **scale** of the time line.

- b. Match the letters of the timeline with these events:

1851	Gold was discovered at Warrandyte, Victoria
1932	Sydney Harbour Bridge was opened
1974	Darwin was devastated by Cyclone Tracy
1956	Melbourne hosted the Olympic Games
1813	The explorers, Blaxland, Wentworth and Lawson crossed the Blue Mountains
1788	The First Fleet arrived in Port Jackson
1982	Brisbane hosted the Commonwealth Games
1901	The Federation of the Australian States to form the Commonwealth of Australia

2. The table below shows the names of Australia's Governors-General and the year they each took office, from 1960 to 2003.

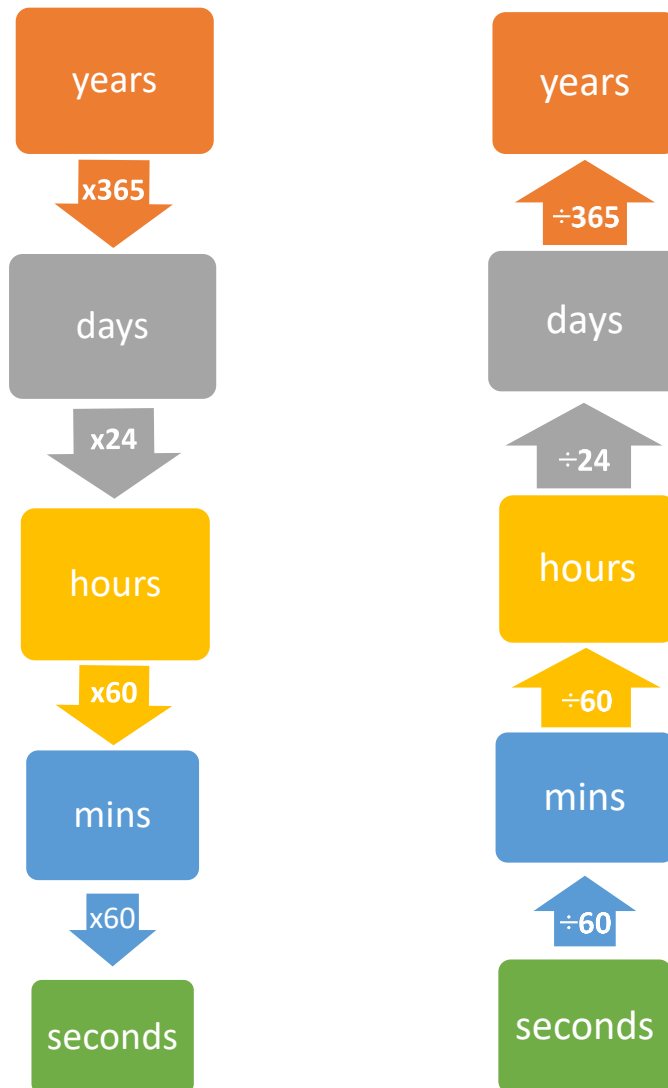
	Name	Year
A	Viscount Dunrossil	1960
B	Lord Casey	1965
C	Sir Zelman Cowen	1977
D	Viscount De L'Isle	1961
E	Right Reverend Dr Peter Hollingworth	2001
F	Sir William Deane	1996
G	Sir Paul Hasluck	1969
H	Sir John Kerr	1974
I	William Hayden	1989
J	Sir Ninian Stephen	1982
K	Major-General Michael Jeffery	2003



- What is the scale for this timeline?
- Complete the timeline to show when each of the Governors-General took office (two have been done).
- Which Governor-General was in office for the longest period of time?
- Which Governor-General was in office for the shortest period of time?

## UNITS OF TIME

Time is usually one of the hardest things to convert. This is due to time being base 60 and not decimal using 10's, 100's or 1000's. But a simple chart can help us move between seconds, mins, hours, days etc. If your one of the many people who find this difficult, break it down to small steps.



### Also

1 week = 7 days  
1 fortnight = 2 weeks = 14 days

## Exercise 2

1.

- a. How many days in 7.5 years?
- b. How many hours in 12 days?
- c. How many seconds in 1 hour?
- d. How many seconds in 3 hours and 13 minutes?
- e. How many days in 96 hours?
- f. Convert 135 minutes to hours and minutes.

2. Hannah is training for a marathon. She runs every day. On weekdays she runs for  $1\frac{1}{2}$  hours in the morning and  $2\frac{1}{4}$  hours in the evening. On weekends, she runs for 4 hours each day. For how long does Hannah run each week? Give your answer in hours and minutes.

3. In a charity relay, 7 people ran an equal amount of time in a 24 hour relay. Joanne was one of the runners. To work out how long she ran for, she did the following calculation:

$$24 \div 7 \quad \text{The calculator gave the answer as } 3.4285\dots$$

- a. Explain why the answer is not 3 hours 42 minutes.
- b. Calculate the correct answer.

## TELLING THE TIME

The two ways of telling the time are:

- 12-hour time which uses **am** and **pm** and the hours 1 to 12.
- 24-hour time which uses the hours 0 to 23 and no **am** or **pm**.

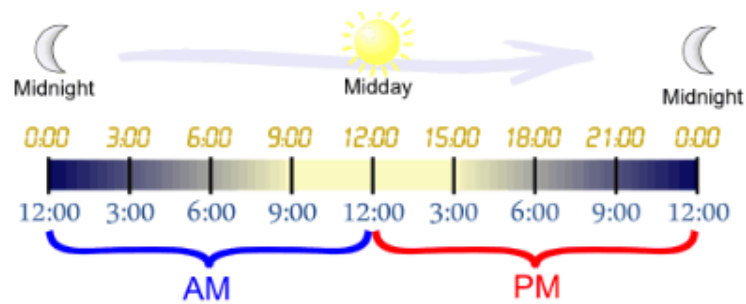


Two types of clocks are:

- Analog – this uses a clock face with the numbers 1 to 12 on it.
- Digital display – these clocks can use either 12 or 24-hour time.



The following images show the relationship between 12-hour and 24-hour time.



	AM	PM
	<b>Ante Meridiem*</b>	<b>Post Meridiem*</b>
	<i>Latin for "before midday"</i>	<i>Latin for "after midday"</i>
When:	Midnight to Noon	Noon to Midnight
24 Hour Clock:	0:00 to 11:59	12:00 to 23:59

0:00	12 Midnight
1:00	1:00 AM
2:00	2:00 AM
3:00	3:00 AM
4:00	4:00 AM
5:00	5:00 AM
6:00	6:00 AM
7:00	7:00 AM
8:00	8:00 AM
9:00	9:00 AM
10:00	10:00 AM
11:00	11:00 AM

12:00	12 Noon
13:00	1:00 PM
14:00	2:00 PM
15:00	3:00 PM
16:00	4:00 PM
17:00	5:00 PM
18:00	6:00 PM
19:00	7:00 PM
20:00	8:00 PM
21:00	9:00 PM
22:00	10:00 PM
23:00	11:00 PM



### Exercise 3

1. Express in 24-hour time.

- a. 10:45 am                      b. 5:34 pm                      c. 3:58 am                      d. 8:37 pm

2. Write as 12-hour time.

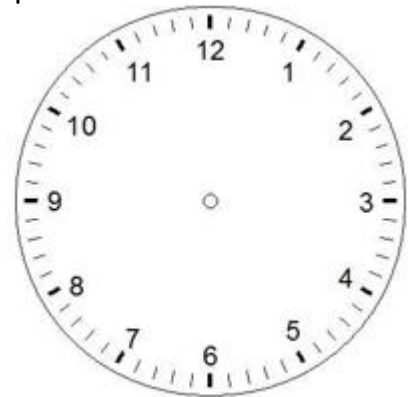
- a. 0945                      b. 1420                      c. 2333                      d. 1045

3. Draw clock hands on the analog clock faces for each of the times below.

a. 8:15 am



b. 10:40 pm



4. Jim is a fireman. He is on duty from 2200 to 0600. He attends a small fire at 2245 and another fire at 0220.

- a. How long is Jim on duty?                      b. How long is it between the two fires?

c. There is an injury at the second fire and a patient is taken to hospital and arrives at 45 minutes after the fire was reported. At what time does the patient arrive at the hospital?

## TIME CALCULATIONS

### Example:

What is the difference in time between 8:35 am and 3:15 pm?

### Solution:

From 8:35 a.m. to 9:00 a.m.

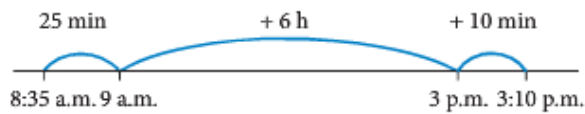
25 minutes

From 9:00 a.m. to 3:00 p.m.

6 hours

From 3:00 p.m. to 3:10 p.m.

10 minutes



Add together.

Total time difference

$$= 6 \text{ h} + 25 \text{ min} + 10 \text{ min}$$

$$= 6 \text{ h } 35 \text{ min}$$

### Exercise 4

1. How much time has elapsed between:

a. 1:44 am and 3:45 pm

b. 6:00 am and 1:00 pm

c. 9:45 pm and 8:22 am

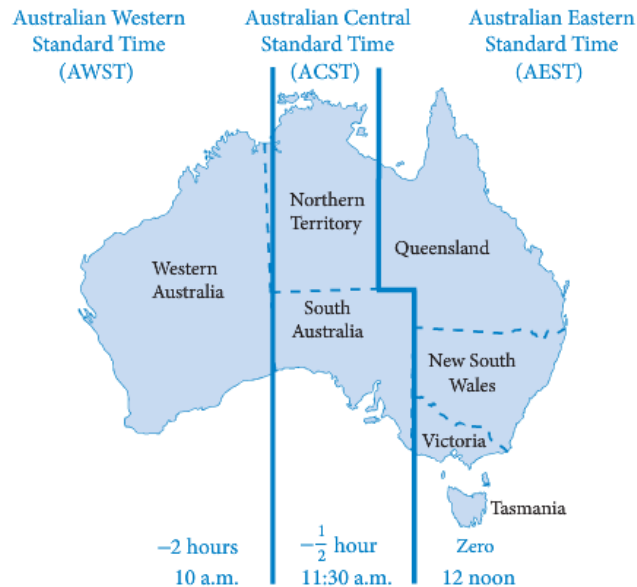
d. 0800 and 1100

2. Julie must take her tablets  $1\frac{1}{2}$  hours after she finishes lunch. She finished her lunch at 1:45 pm. What time should Julie take her tablets?

3. . How old are you today in years, months and days?

## TIMES ACROSS AUSTRALIA

In Australia there are three time zones.



Compared to your location if you travel East you add time, if you travel West you subtract time.

### Examples:

- If you are in Canberra at 5:00 pm then it is 3:00 pm in Perth (minus 2 hours).
- If you are in Adelaide at 10:00 am then it is 10:30 am in Canberra (moving East plus  $\frac{1}{2}$  hour and it is 8:30 am in Perth (moving West minus  $1\frac{1}{2}$  hours).

### Exercise 5

1. State whether each location is ahead of, behind, or the same time as Adelaide (google the city if you do not know where it is).
  - a. Sydney
  - b. Darwin
  - c. Canberra
  - d. Geraldton (WA)

2. What time is it in each of the following places when it is 11:00 am in Canberra?

a. Brisbane

b. Adelaide

c. Darwin

d. Melbourne

3. If you are based in Canberra, between what hours would you have to call your customer in Perth to ensure it is during office hours?

## DAYLIGHT SAVINGS TIME

### Daylight Saving Time has begun...



1 Oct  
Forward 1 hour

#### 1 Oct 2023 - Daylight Saving Time Starts

When local standard time is about to reach

Sunday, 1 October 2023, **2:00:00 am** clocks are turned **forward** 1 hour to  
Sunday, 1 October 2023, **3:00:00 am** local daylight time instead.

Sunrise and sunset will be about 1 hour later on 1 Oct 2023 than the day before. There will be more light in the evening.

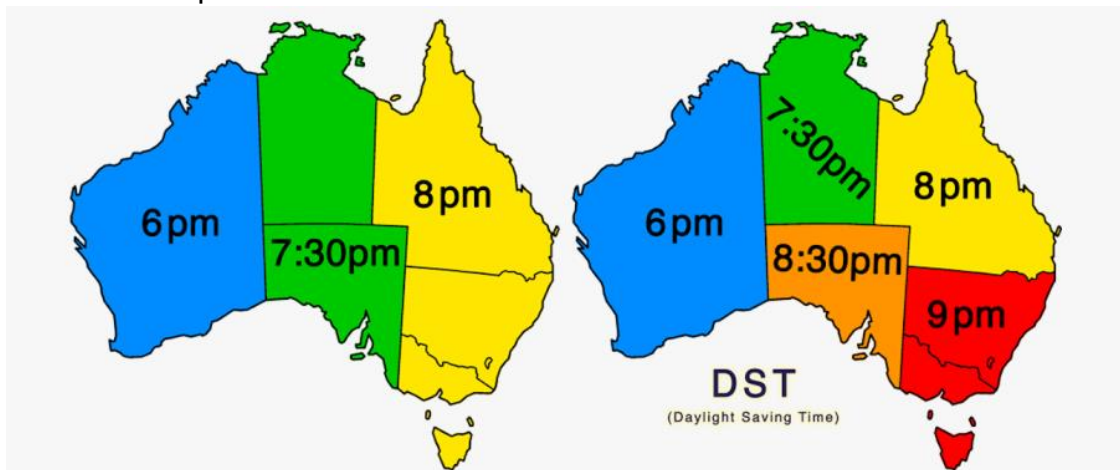
Also called *Spring Forward*, *Summer Time*, and *Daylight Savings Time*.

More info:

Australia & New Zealand End DST

Source: <https://www.timeanddate.com/time/change/australia>

Consider the maps below:



## Exercise 6

1. What time is it in each of the following places when it is 11:00 am (Daylight Saving Time) in Canberra?

a. Brisbane (QLD)

b. Adelaide (SA)

c. Darwin (NT)

d. Melbourne (Vic)

2. Have you ever wondered why we have Daylight Saving Time (DST) in the warmer months of the year?

*Research and Discussion (try to give at least two responses to each of these questions)*

a. What are the reasons for implementing Daylight Saving Time?

b. What are the impacts of Daylight Saving Time to you personally?

## TIMETABLES

Many people travel by train, bus or ferry every day. To do this you must be able to read a timetable.

### Example:

Warrina arrived at the Airport International station at 7:08 am. What is the earliest time she can arrive at Central on an airtrain?

### Solution:

This is part of the airtrain timetable that is available on the Internet.

Monday to Friday – From Airport to City and Gold Coast					
Stations	AM				
Airport Domestic	6:16	6:39	7:07	7:26	7:55
Airport International	6:19	6:42	7:10	7:39	7:58
Eagle Junction	6:27	6:50	7:18	7:37	8:06
Bowen Hills	6:33	6:56	7:24	7:43	8:12
Brunswick Street	6:35	6:58	7:26	7:45	8:14
Central Arrive	6:38	7:01	7:28	7:48	8:17
Central Depart	6:40	7:03	7:30	7:53*	8:24
Roma Street	6:43	7:05	7:32	7:55	8:26
South Brisbane	6:47	7:09		7:59	8:30
SouthBank	6:49	7:11		8:00	8:31

This is the train she will catch

This is when she arrives at Central

The first airtrain to arrive at Airport International after 7:08 am will arrive at 7:10 am. This airtrain arrives at Central at 7:28 am.

## Exercise 7

Use the timetable above to answer the following questions.

1. On Monday, what time does the 7:07 am train from the Airport Domestic station arrive at Roma Street station?
2. On weekdays, how long does it take the 8:12 am airtrain from Bowen Hills station to travel to SouthBank station?
3. Jacquelyn lives in Eagle Junction and works in South Brisbane. She starts work at 8:30 am. What is the latest airtrain she can catch from Eagle station to arrive at work on time?

4.

This chart shows information about tides (time and height) and sunrise/sunset times for Cairns over two weeks in October.

Date	High tides				Low tides				Sunrise/sunset	
	a.m.	m	p.m.	m	a.m.	m	p.m.	m	a.m.	p.m.
October										
Sun 13	4:59	2.02	5:36	2.76	10:50	0.85	11:54	0.77	5:49	6:16
Mon 14	5:53	2.24	6:22	2.85	11:43	0.72			5:49	6:16
Tue 15	6:40	2.45	7:04	2.88	12:30	0.60	12:30	0.63	5:48	6:16
Wed 16	7:24	2.60	7:40	2.84	1:05	0.48	1:12	0.60	5:47	6:17
Thu 17	8:03	2.70	8:11	2.73	1:39	0.41	1:51	0.64	5:46	6:17
Fri 18	8:39	2.74	8:38	2.58	2:13	0.39	2:30	0.74	5:46	6:17
Sat 19	9:13	2.71	9:04	2.40	2:46	0.43	3:08	0.89	5:45	6:17
Sun 20	9:48	2.63	9:31	2.19	3:18	0.53	3:46	1.08	5:45	6:18
Mon 21	10:25	2.50	9:57	1.96	3:50	0.68	4:26	1.29	5:44	6:18
Tue 22	11:05	2.33	10:12	1.75	4:21	0.87	5:10	1.49	5:43	6:18
Wed 23	11:55	2.17			4:49	1.06			5:43	6:19
Thu 24	2:48	2.09			5:19	1.24			5:42	6:19
Fri 25	4:15	1.44	3:57	2.17	1:28	1.35	6:08	1.41	5:42	6:19
Sat 26	4:42	2.26			12:12	1.28	11:56	1.18	5:41	6:20

The following time adjustments may be made for other places near Cairns.

Flinders Island	22 min after Cairns	Cape Flattery	10 min before Cairns
Morris Island	14 min after Cairns	Cape Grenville	51 minutes after Cairns
Cruiser Pass	7 min before Cairns	Michaelmas Cay	11 min before Cairns
Euston Reef	27 min before Cairns	Swallows Landing	2 min after Cairns

a. Find the time of the two high tides on 17 October in:

- i. Cairns                                      ii. Morris Island                                      iii. Euston Reef

b. Boats can't be launched within 1 hour of low tide because the water is too shallow. Kylie wants to launch her boat at Michaelmas Cay on the afternoon of October 19. After what time can she launch the boat?

## Week 11/12 Portfolio Task

Imagine you have a job interview at the Canberra Centre on Thursday at 4pm. You are to catch a bus from Hawker College to the Canberra Centre.

Look up the bus timetable at <https://www.transport.act.gov.au/home>

1. Which buses go past Hawker College?
2. Do they travel straight to the Canberra Centre or will you need to transfer to another bus?
3. What time will you have to catch the bus from Hawker College to get to your interview on time?  
Detail which route/s you have chosen and their estimated departure and arrival times.



## MARKING RUBRIC

CRITERIA	EXPECTATIONS	POSS	MULT	GIVEN	TOTAL
<b>Practical</b>	Student completes practical work, including exercises of the brief to an acceptable standard set by the teacher.	2	3		/6
<b>Portfolio Task</b>	Student completes the portfolio task of the week to an acceptable standard set by the teacher.	2	2		/4
<b>Reasoning and Communications</b>	Student responses are <b>accurate</b> and appropriate in presentation of mathematical ideas, with <b>clear</b> and logical <b>working out</b> shown.	4	-		/4
<b>Concepts and Techniques</b>	Student submitted work selects and applies <b>appropriate</b> mathematical modelling and <b>problem solving techniques</b> to solve practical problems, and demonstrates <b>proficiency</b> in the use of <b>mathematical facts, techniques</b> and <b>formulae</b>	4	-		/4
	<b>Submission Guidelines</b>				
<b>Timeliness</b>	Student submits the exercises and portfolio tasks by the set deadline. See scoring guidelines for specific details.	2	-		/2
		<b>FINAL</b>			<b>/20</b>

### Student Reflection: 😊

How did you go with this week's work?

What was interesting?

What did you find easy?

What do you need to work on?