

CHAPTER

25

Time

Vocabulary:

schedules

Chapter Outcomes:

- Accurately read and record time to the minute and solve practical problems involving time.
- Develop an understanding of time schedules.
- Solve problems involving time.

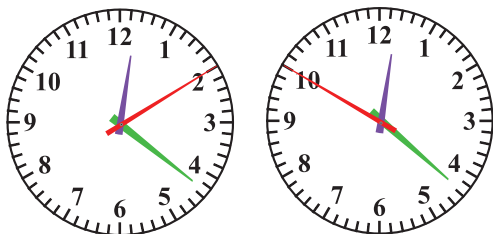


Imagine your daily activities – waking up in the morning, getting ready for school, travelling to different destinations and other events that make up your day. Now imagine all the people in your community, and in your country doing these same things. All these events follow time schedules and could be measured according to time. Time allows everyone to complete activities orderly.

Getting Ready for Chapter 25

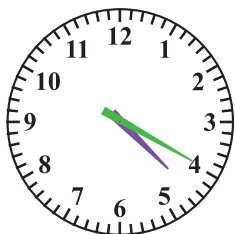
Write how many seconds have passed.

1.

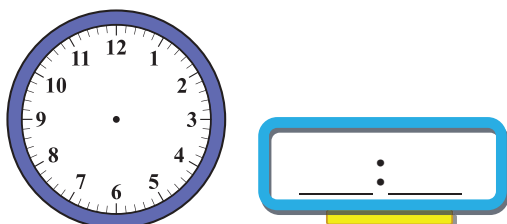


Write the time shown on the clock in digital notation.

2.



3. Jayden arrived home at 5 o'clock in the afternoon. He began his homework at 30 minutes later. Show the time that he began his homework on the clocks.



4. How many days are there from the first day of April to the last day of July?
5. Write your date of birth using the format: yyyy/mm/dd.

Units of Time

Teaching Point 1:

What are the units of time?

Units of Time

60 seconds = 1 minute

60 minutes = 1 hour

24 hours = 1 day

7 days = 1 week

2 weeks = 1 fortnight

4 weeks = 1 month

365 days = 1 year

52 weeks = 1 year

12 months = 1 year

366 days = 1 leap year

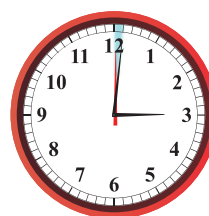
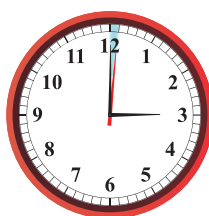
10 years = 1 decade

100 years = 1 century

1 000 years = 1 millennium

1 **second** elapsed

1 **minute** or 60 seconds elapsed



1 **hour** or 60 minutes elapsed

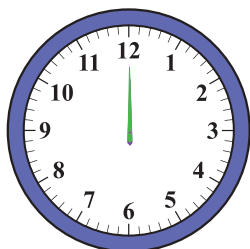


Read and Record Time on Digital and Analog Clocks

Teaching Point 1:

How can you tell and record time?

What time is it?



Analog Clock



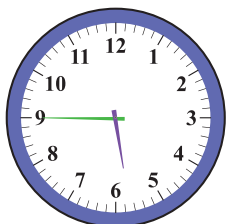
the hour minutes after the hour

Digital Clock

When we tell time on the 12-hour clock, we use am for time between 12 midnight and 12 noon, and pm for time between 12 noon and 12 midnight.

So, the time could be 12 am if it is midnight or 12 pm if it is noon.

State the time on the clock and write it in digital notation.

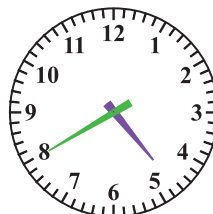


Quarter to 6 or 15 minutes to 6 is written as 5:45

Activity 1:

State the time shown on each clock. Write the time in digital notation on the digital clock.

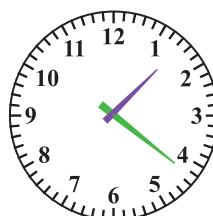
1.



2.



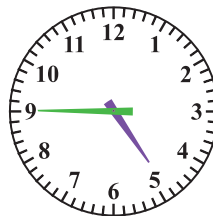
3.



4.



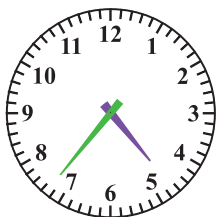
5.



6.



7.



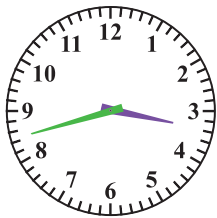
8.



9.



10.



Activity 2:

Write each time in digital notation.

1. nine minutes to nine
2. eighteen minutes to three
3. twenty-six minutes to eleven
4. fifteen minutes to five
5. eleven minutes past eight
6. twenty-five minutes to two
7. quarter to ten
8. half past six
9. seven minutes past one
10. fourteen minutes after five

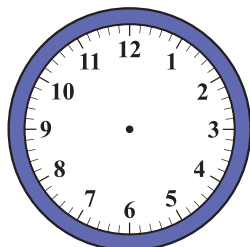
Activity 3:

Draw analog clocks to show the following times.

1. five o'clock
2. twenty-three minutes past eleven
3. four thirty
4. seven forty-eight
5. six fifty-five
6. three minutes to ten
7. ten minutes past seven
8. twelve twenty
9. four minutes past five
10. eleven fifty-three

Solve.

- 11.** Ravi awoke at quarter past 6. Draw in the hands on the clock below to show the time Ravi awoke.

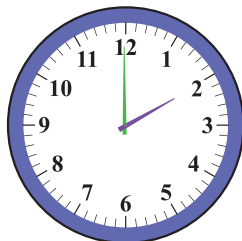


- 12.** School was dismissed at 2:48. Show this time on an analog clock.

The 24 Hour Clock

Teaching Point 1:

How can you use the 24-hour clock to tell time?



On a 12 hour clock each time is shown twice a day, for example, 2:00 am (morning) and 2:00 pm (afternoon).

The military, airlines, bus and trains use 24-hour times in their time schedules.

A 24-hour clock tells time without using am or pm. The clock begins at midnight and reads the same as a 12 hour clock until midday. It uses numbers from 0 to 24 to stand for hours in a day. The hours are counted from midnight to midnight.



The 24-Hour Clock

When we write 24-hour clock times we use four digits with or without a colon, for example, the time on the clock can be either 1010 hours (am) or 2210 hours (pm).

10:10 am is 1010 hours. We say "ten ten hours".

2:10 pm is 2210 hours. We say "twenty-two ten hours".

Times on a 24-Hour Clock

am	24-hour	pm	24-hour
1:00	0100 hours	1:00	1300 hours
2:00	0200 hours	2:00	1400 hours
3:00	0300 hours	3:00	1500 hours
4:00	0400 hours	4:00	1600 hours
5:00	0500 hours	5:00	1700 hours
6:00	0600 hours	6:00	1800 hours
7:00	0700 hours	7:00	1900 hours
8:00	0800 hours	8:00	2000 hours
9:00	0900 hours	9:00	2100 hours
10:00	1000 hours	10:00	2200 hours
11:00	1100 hours	11:00	2300 hours
12:00 noon	1200 hours	12:00 midnight	2400 hours

Write 3:45 pm in 24-hour time.

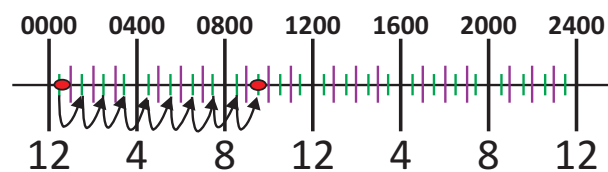
Method: Add 12 to pm times.

$$12 + 3:45 = 1545$$

So, 3:45 pm is 1545 hours in 24-hour time.

How long is it from 0030 hours to 0930 hours?

Method 1: Use a time-line.



Count on from 0030 to 0930

It is 9 hours.

Method 2: Use subtraction.

hours minutes

09 30

-00 30

09 00

It is 9 hours.

Activity 1:

Convert these times to 24-hour times.

1. 4:00 am	2. 1:00 am
3. 3:09 pm	4. 7:10 pm
5. 6:15 pm	6. 4:00 am
7. 12:00 am	8. 4:00 pm
9. 10:30 pm	10. 12:10 am
11. 8:25 am	12. 5:03 pm
13. 12:25 am	14. 12:00 pm

Activity 2:

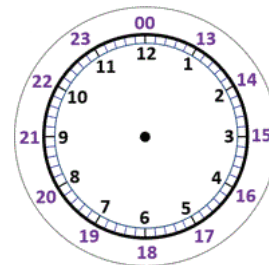
Convert these times from 24-hour time to am and pm times.

1. 0312 hours	2. 1007 hours
3. 1200 hours	4. 0920 hours
5. 1750 hours	6. 2359 hours
7. 0030 hours	8. 0100 hours
9. 1900 hours	10. 1201 hours
11. 0645 hours	12. 1845 hours
13. 0230 hours	14. 0050 hours

Activity 3:

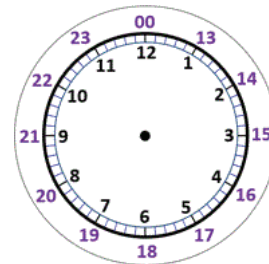
Draw the hands on the clock faces to match the 24-hour times.

1.



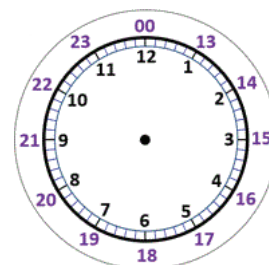
0400 hours

2.



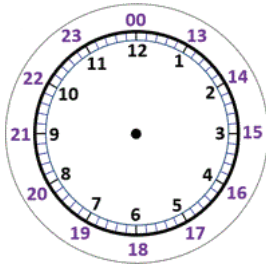
0305 hours

3.



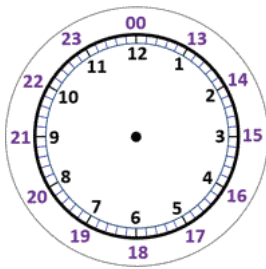
1400 hours

4.



1250 hours

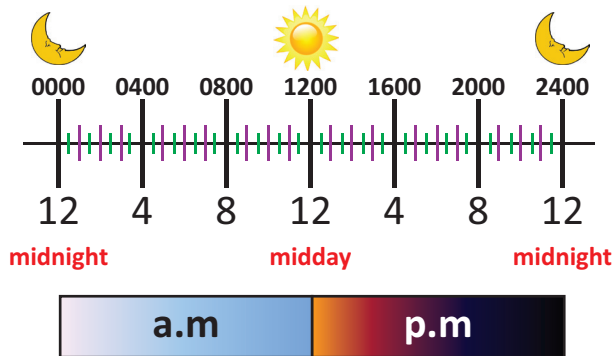
5.



2304 hours

Activity 4:

Use the timeline below to help you find how many hours between the times.



- | | |
|------------------|------------------|
| 1. 0400 and 0800 | 2. 0500 and 1100 |
| 3. 0630 and 1530 | 4. 1000 and 2200 |
| 5. 1615 and 2115 | 6. 1945 and 2345 |

Use the Caribbean Airline flight schedule to answer the following questions.

Aircraft	Days	Departure Time	Arrival Time
BWA520	Friday	0012	0450
BWA527	Friday	0135	0700
BWA551	Friday	0010	0551
BWA601	Thursday	2257	0425

- Convert the times in the flight schedule from 24-hour times to 12-hour times.
- Which aircraft departs during the afternoon?
- Mr. Mohammed wants to travel before 1:00 am on Friday. Which aircraft should he use?
- How long does the BWA527 take to get to its destination on Friday?
- Which flight takes the longest time to arrive at its destination?

Solve.

- The sun sets at 1930 hours and rises again at 0630 hours.
 - How many hours of darkness are there?
 - How many hours of daylight are there?
- A bus leaves Sangre Grande at 0945 hours and arrives at Matelot at 1246 hours. How long does the journey last?

Convert Units of Time

Teaching Point 1:

How can you convert units of time?

How many minutes in 3 hours?

1 hour $\rightarrow$ 60 minutes

3 hours $\rightarrow 60 \times 3 = 180$ minutes

To convert a larger unit to a smaller unit, find out how many of the smaller units equal one of the larger units, and MULTIPLY.

Convert 360 seconds to minutes.

60 seconds $\rightarrow$ 1 minute

360 seconds $\rightarrow 360 \div 60 = 3$ minutes

To convert a smaller unit to a larger unit, find out how many of the smaller units equal one of the larger units, and DIVIDE.

Activity 1:

Complete the following.

- 12 minutes = ____ seconds
- 120 minutes = ____ hours
- 42 days = ____ weeks
- 480 seconds = ____ minutes
- $2\frac{1}{2}$ hours = ____ minutes
- 96 hours = ____ days
- 270 minutes = ____ hours

- 5.5 hours = ____ minutes
- 2.5 minutes = ____ seconds
- 6.25 years = ____ months

Activity 2:

Compare the units of time using $<$, $>$ or $=$.

- 3 years 36 months
- 2 days 23 hours
- 250 weeks 5 years
- 12 minutes 720 seconds
- 4 days 50 hours
- $8\frac{1}{4}$ minutes 500 seconds
- $2\frac{1}{2}$ years 27 months
- 3.5 years 41 months
- 45 days 6 weeks
- $5\frac{3}{7}$ weeks 38 days

Activity 3:

Solve.

- David spent 5 weeks in the country. Carla spent 42 days. Who spent a longer time in the country?
- Track and field practice lasts 3 hours. The coach wants to spend an equal number of minutes on each of 3

different races. How many minutes will the team spend on each race?

3. Keisha's brother just turned 3 years old. What is her brother's age in months?
4. Mr. James drove 3 hours. Mrs. Ali drove 195 minutes. Miss Peters drove 25 minutes longer than Mrs. Ali. How much longer did Miss Peters drive than Mr. James?
5. Aviya's little brother is 7 weeks old. She is exactly 2 years and 10 days older than he is. How old is Aviya in days? Assume that a year is 365 days.
6. Nalini spent $\frac{3}{4}$ hour studying, 40 minutes eating lunch and $\frac{2}{3}$ hour playing with her friends.
 - (a) At which activity did Nalini spend the most amount of time?
 - (b) How much time did she spend on all three activities?

Computation of Units of Time

Teaching Point 1:

How can you calculate units of time?

Addition

hours	minutes	seconds	
1	45	37	Regroup 73 sec
			73 sec $\div$ 60 = 1 min
			13 sec
+ 2	29	36	
4	15	13	Regroup 75 min
			75 min $\div$ 60 = 1 hr
			15 min

Subtraction

hours	minutes	seconds	
3	45	24	$60 + 24 = 84$
- 1	30	36	24 sec < 36 sec
2	14	48	Regroup 1 min
			60 sec + 24 sec = 84 sec

Multiplication

hours	minutes	seconds	
1	12	15	Regroup 90 sec
			90 sec $\div$ 60 = 1 min
			30 sec
$\times$		6	
7	13	30	Regroup 73 min
			73 min $\div$ 60 = 1 hr
			13 min

Division

hours	minutes	seconds	
5	6	20	$60 + 6 = 66$ $120 + 20 = 140$
4	16	35	$5 \div 4 = 1$ remainder 1
1	16	35	Regroup 1 hr
			60 min
			60 + 6 = 66 min
			66 $\div$ 4 = 16
			remainder 2
			Regroup 2 min
			120 + 20 = 140 sec

Activity 1:

Calculate the following.

1. $\begin{array}{r} \text{min} \quad \text{sec} \\ 5 \quad 50 \\ + 9 \quad 40 \\ \hline \end{array}$	2. $\begin{array}{r} \text{hr} \quad \text{min} \\ 7 \quad 25 \\ + 3 \quad 45 \\ \hline \end{array}$
3. $\begin{array}{r} \text{days} \quad \text{hours} \\ 4 \quad 18 \\ + 3 \quad 16 \\ \hline \end{array}$	4. $\begin{array}{r} \text{weeks} \quad \text{days} \\ 2 \quad 5 \\ + 6 \quad 4 \\ \hline \end{array}$
5. $\begin{array}{r} \text{hr} \quad \text{min} \quad \text{sec} \\ 7 \quad 20 \quad 55 \\ + 5 \quad 49 \quad 15 \\ \hline \end{array}$	6. $\begin{array}{r} \text{hr} \quad \text{min} \\ 7 \quad 30 \\ - 2 \quad 45 \\ \hline \end{array}$
7. $\begin{array}{r} \text{days} \quad \text{hours} \\ 10 \quad 10 \\ + 3 \quad 15 \\ \hline \end{array}$	8. $\begin{array}{r} \text{hr} \quad \text{min} \quad \text{sec} \\ 8 \quad 20 \quad 42 \\ - 4 \quad 30 \quad 50 \\ \hline \end{array}$
9. $\begin{array}{r} \text{weeks} \quad \text{days} \\ 12 \quad 4 \\ - 8 \quad 6 \\ \hline \end{array}$	10. $\begin{array}{r} \text{wk} \quad \text{dy} \quad \text{hr} \quad \text{min} \\ 9 \quad 6 \quad 20 \quad 10 \\ - 2 \quad 6 \quad 23 \quad 25 \\ \hline \end{array}$
11. $\begin{array}{r} \text{hr} \quad \text{min} \\ 4 \quad 15 \\ \times \quad 6 \\ \hline \end{array}$	12. $\begin{array}{r} \text{min} \quad \text{sec} \\ 8 \quad 22 \\ \times \quad 4 \\ \hline \end{array}$
13. $\begin{array}{r} \text{hr} \quad \text{min} \quad \text{sec} \\ 1 \quad 20 \quad 30 \\ \times \quad \quad 3 \\ \hline \end{array}$	14. $\begin{array}{r} \text{weeks} \quad \text{days} \\ 4 \quad 2 \\ \times \quad 5 \\ \hline \end{array}$
15. $\begin{array}{r} \text{wk} \quad \text{dy} \quad \text{hr} \\ 2 \quad 3 \quad 12 \\ \times \quad \quad 6 \\ \hline \end{array}$	16. $\begin{array}{r} \text{hr} \quad \text{min} \\ 4 \overline{) 9 \quad 8} \\ \hline \end{array}$

17. $\begin{array}{r} \text{min} \quad \text{sec} \\ 6 \overline{) 33 \quad 12} \\ \hline \end{array}$	18. $\begin{array}{r} \text{wk} \quad \text{dy} \\ 5 \overline{) 4 \quad 2} \\ \hline \end{array}$
19. $\begin{array}{r} \text{hr} \quad \text{min} \quad \text{sec} \\ 7 \overline{) 8 \quad 6 \quad 2} \\ \hline \end{array}$	20. $\begin{array}{r} \text{hr} \quad \text{min} \quad \text{sec} \\ 8 \overline{) 5 \quad 22 \quad 16} \\ \hline \end{array}$

Activity 2:

Solve.

- Mikhail took the T&T Express to go to Tobago. He waited 45 minutes before boarding the boat. Then he waited 1 hour and 30 minutes for the boat to leave the dock. How long did he wait in all?
- Naveen plays for 2 hours and 23 minutes. Samar plays for 3 hours and 6 minutes. How much longer did Samar play than Naveen?
- Mr. Mohan is building a wall. He takes 5 minutes to lay one brick. How many bricks would he lay in 3 hours and 25 minutes?
- Allan walks 5 laps around the stadium without stopping. Each lap takes 25 minutes 45 seconds. How much time does he take?
- Four children altogether took 10 hours and 24 minutes to complete a task. If they each took the same amount of time, how much time did each child take?

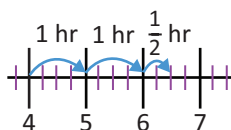
Elapsed Time

Teaching Point 1:

How can you find elapsed time?

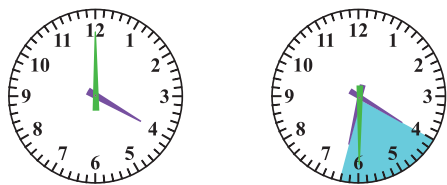
Mother began to cook dinner at 4:00 pm. She finished cooking at 6:30 pm. How much time did she take to make dinner?

Method 1: Use a timeline.



She took $2\frac{1}{2}$ hours to make dinner.

Method 2: Use a clock.



From 4:00 pm to 6:00 pm → 2 hours
From 6:00 pm to 6:30 pm → 30 minutes

She took $2\frac{1}{2}$ hours to make dinner.

Method 3: Use subtraction.

hours	minutes
6	30
- 4	00
2	30

She took $2\frac{1}{2}$ hours to make dinner.

Elapsed time is the amount of time that passes between the beginning and end of an event.

Activity 1:

Find out how many minutes have passed.

- 12:15 pm to 1:10 pm
- 11:25 am to 1:45 pm
- 1400 hours to 1520 hours
- 1145 hours to 1210 hours

Find out how many hours and minutes have passed.

- 11:30 am to 4:25 pm
- 3:45 pm to 12 midnight
- 11:45 am to 2:00 pm (next day)
- 0920 hours to 1300 hours
- 1150 hours to 0400 hours (next day)

Tell what time it will be.

- 2 hours after 7:25 am
- 35 minutes after 0945 hours
- 3 hours and 25 minutes after 12:50 pm
- 1 hour and 45 minutes after 2250 hours.

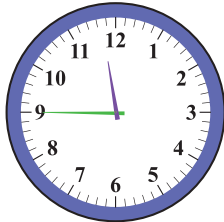
Activity 2:

Solve.

- Sarah took 45 minutes to travel from home to her school. If she arrived at

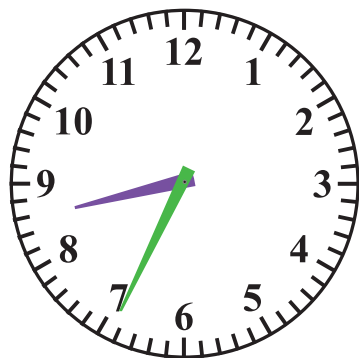
her school at 7.30 a.m., at what time did she leave home?

2. Jaden begins watching a movie at the time shown on the clock below.



The movie ends 1 hour and 40 minutes later. What time did the movie end?

3. Aleena is 9 years 8 months today. What would be Aleena's age in 11 months time?
4. The clock shown below is 20 minutes slow.



To which number should the longer hand point to show the correct time?

5. Kenisha travelled from Toco to Port-of-Spain. The journey took 186 minutes. How many HOURS did her journey take?
6. Hanifah began cleaning her room at 2:17 p.m. She took a 10-minute break after cleaning for one hour. She continued to clean for half an hour after the break. At what time did she finish cleaning her room?

Interpret Time Schedules

Teaching Point 1:

How can you interpret time schedules?

When reading time schedules, make sure you know what type of information is in each column or row.

Deluxe Coach Service			
Bus Number	Depart SDO	Arrive POS	Route
D1	5:00 AM	6:20 AM	D21V
D2	5:15 AM	6:35 AM	D21V
D12	12:00 PM	1:20 PM	D21V
D2	1:00 PM	2:20 PM	D21V

- (a) What time does the first bus leave SDO in the afternoon?
- (b) How long does it take to get to its destination?

Read the column heading.

- Read departure column for SDO.
- Look for the earliest departure time for the **afternoon** (PM) → 12:00 pm.

So, the first bus leaves SDO at 12:00 pm in the afternoon.

Read the information in the rows.

From 12:00 pm to 1:20 pm → 1 hr 20 min

So, the time taken is 1 hr 20 min.

Activity 1:

Questions 1 to 3 are based on the Interisland Ferry time schedule below.

Schedule for Inter-Island Ferry Service between Port of Spain and Tobago					
Date	Vessel	Depart From	Depart Time	Arrive At	Arrival Time
11 Jun 2017	TTEXPR	TBG	9:30 AM	POS	1:30 PM
11 Jun 2017	WATAX	TBG	4:00 PM	POS	7:00 PM
11 Jun 2017	TTEXPR	POS	3:00 PM	POS	7:00 PM
12 Jun 2017	WATAX	POS	6:00 AM	TBG	9:00 AM

- How long does the trip take on the TTEXPR from Tobago to Port of Spain on the 11th June in the morning period?
- Which vessel travels faster between the two islands? How much faster is that vessel?
- Jamie boards the TTEXPR at the scheduled time on 11th June to go to Port of Spain. If the boat was delayed 2 hours before leaving Tobago, at what time would Jamie get to Port of Spain?
- Below is Grace's incomplete timetable. Complete it using the information that follows.

TIME	ACTIVITIES
8:00 AM to 9:45 AM	Do Chores
	Study
	Lunch
1:00 PM to 2:00 PM	Watch Television
	Football Practice
7:00 PM	Dinner

- Grace takes $2\frac{1}{2}$ hours to study. She begins to study 10 minutes after she finishes her chores.
- She takes 5 minutes to pack away her books before eating lunch. She takes 30 minutes to eat her lunch.
- Football practice begins at 2:15 pm and lasts for 3 hours and 25 minutes.

Use the four months of the 2017 calendar below to help you answer the following questions.

January						
Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February						
Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

May						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

June						
Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

- On every 5th Monday in a month, the students of Miss Bradshaw's class has a free period. How many free periods will the class receive in the four months shown?
- Keisha was supposed to return a book to the library on the 24th February. The charge on overdue books is \$0.25 per day. She returned the book 10 days later.

- (a) On what day and date did she return the book?
- (b) How much money did she pay in overdue fees?
7. The month of March ends on Friday. What is the date of the last Saturday in the month of April?

Chapter Review

Answer the questions.

1. $5\frac{3}{4}$ hours = minutes. What is the missing value in the box?
2. Write the time shown on the clock in digital notation.



3. Write 0019 in 12-hour time.
4. It takes Ricardo 20 minutes to walk 1 kilometre. How many kilometres can he walk in 2 hours?
5. Avinash is 3 years younger than Dimitri. Two years ago, Dimitri was 10 years old. How old is Avinash now?
6. The National Games started at 9.45 a.m. and ended at 3.30 p.m. How long was the event?
7. Alex took 2 hours 15 minutes to complete his homework. If he started doing his homework at 4.30 p.m., at what time did he complete his homework?

8. Four friends took turns playing games on a computer. They played from 2:00 pm to 4:30 pm. If each of them had the same amount of playing time, how much time did each friend have?
9. Every leap year has 366 days. Here are some leap years: 2000, 2004, 2008. What will be the next leap year after 2017?
10. Mark was born on the 1 January 2006. What will be his age in years and months on 1 September 2017?
11. The opening hours for a shop is shown in the notice below.

Opening Hours

9:00 am to 12:30 pm

1:45 pm to 6:30 pm

What is the total time in hours and minutes that the shop opens each day?

12. Use the information in the TV program guide shown below to answer the question.

Time	Program
6:00 am	Morning Chat
8:00 am	Learning Street
9:00 am	News
9:15 am	Government Program
10:30	Advertisement

- (a) If the programs are continuous with no breaks in between, what program airs at 10:00 am?
- (b) How much longer is the Government Program than Learning Street?