NEW CENTURY MATHS 11
MATHEMATICS STANDARD (PATHWAY 2)

FULLY WORKED SOLUTIONS

Chapter 11: World locations and times

SkillCheck

Question 1

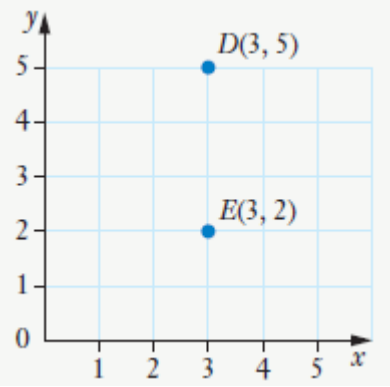
a Coordinates are written (x, y).
The coordinates of A are $(-3, 1)$.
The coordinates of B are $(2, 1)$.

b The length of AB is
$2 - (-3) = 5$ units.

c 4 units left of $x = 2$ is $x = 2 - 4 = -2$.
3 units up from $y = 1$ is $y = 1 + 3 = 4$.
The coordinates of C are $(-2, 4)$.

Question 2

a



b The length of DE is $5 - 2 = 3$ units.

Question 3

a From 4 a.m. to 12 midday is 12 – 4 = 8 h
From 12 midday to 1 p.m. is 1 h
Total = 8 + 1 = 9 h

b From 9 a.m. to 12 midday is 12 – 9 = 3 h
From 12 midday to 2 p.m. is 2 h
Total = 3 + 2 = 5 h

c From 12:30 a.m. to 12:30 p.m. is 12 h
From 12:30 p.m. to 5:30 p.m. is 5 h
Total = 12 + 5 = 7 h

d From 2:30 p.m. to 10:30 p.m is 10 – 2 = 8 h

Question 4

a From 3:00 p.m. to 3:17 p.m. is 17 min

b From 6:00 a.m. to 6:44 a.m. is 44 min

c From 10:35 a.m. to 11:00 a.m. is 25 min

d From 7:17 a.m. to 8:00 a.m. is 43 min

Question 5

a 7 p.m. + 7 h = 7 p.m. + 5 h + 2 h
= 12 midnight + 2 h
= 2 a.m.

b 2 p.m. – 8 h = 2 p.m. – 2 h – 6 h
= 12 midday – 6 h
= 6 a.m.

c 1:15 p.m. + 11 h 18 min = 12:15 a.m. + 18 min
= 12:33 a.m.

d 2:20 a.m. – 7 h 36 min = 2:20 a.m. – 2 h – 5 h – 36 min
= 12:20 a.m. – 5 h – 36 min
= 7:20 p.m. – 36 min
= 7:20 p.m. – 20 min – 16 min
= 7:00 p.m. – 16 min
= 6:44 p.m.

Exercise 11.01 Latitude and longitude

Question 1

a (0°, 100°E) is on the intersection of the Equator and the 100°E meridian of longitude. These coordinates describe point *D*.

b (40°S, 60°E) is on the intersection of the 40°S parallel of latitude and the 60°E meridian of longitude. These coordinates describe point *G*.

c (60°N, 60°E) is on the intersection of the 60°N parallel of latitude and the 60°E meridian of longitude. These coordinates describe point *A*.

d (0°, 60°E) is on the intersection of the Equator and the 60°E meridian of longitude. These coordinates describe point *C*.

e (15°S, 100°E) is on the intersection of the 15°S parallel of latitude and the 100°E meridian of longitude. These coordinates describe point *F*.

f (60°N, 100°E) is on the intersection of the 60°N parallel of latitude and the 100°E meridian of longitude. These coordinates describe point *B*.

g (15°S, 60°E) is on the intersection of the 15°S parallel of latitude and the 60°E meridian of longitude. These coordinates describe point *E*.

h (40°S, 100°E) is on the intersection of the 40°S parallel of latitude and the 100°E meridian of longitude. These coordinates describe point *H*.

Question 2

a Moscow (55°N, 37°E): Locate 55°N on the vertical axis and 37°E on the horizontal axis.
These coordinates describe point *G*.

b Edinburgh (56°N, 3°W): Locate 56°N on the vertical axis and 3°W on the horizontal axis.
These coordinates describe point *C*.

c Athens (38°N, 23°E): Locate 38°N on the vertical axis and 23°E on the horizontal axis.
These coordinates describe point *D*.

d San Francisco (38°N, 122°W): Locate 38°N on the vertical axis and 122°W on the horizontal axis.
These coordinates describe point *E*.

e Perth (32°S, 116°E): Locate 32°S on the vertical axis and 116°E on the horizontal axis.
These coordinates describe point *A*.

f Beijing (40°N, 116°E): Locate 40°N on the vertical axis and 116°E on the horizontal axis.
These coordinates describe point *F*.

g Alexandria (31°N, 30°E): Locate 31°N on the vertical axis and 30°E on the horizontal axis.
These coordinates describe point *H*.

h Tokyo (35°N, 139°E): Locate 35°N on the vertical axis and 139°E on the horizontal axis.
These coordinates describe point *I*.

i St Petersburg (60°N, 30°E): Locate 60°N on the vertical axis and 30°E on the horizontal axis.
These coordinates describe point *B*.

j Johannesburg (26°S, 28°E): Locate 26°S on the vertical axis and 28°E on the horizontal axis.
These coordinates describe point *J*.

k Lima (12°S, 77°W): Locate 12°S on the vertical axis and 77°W on the horizontal axis.
These coordinates describe point *K*.

l Hong Kong (22°N, 114°E): Locate 22°N on the vertical axis and 114°E on the horizontal axis.
These coordinates describe point *L*.

Question 3

a V lies on the Equator and the 75°W meridian of longitude, so V has coordinates (0°, 75°W).

b T lies on the 45°N parallel of latitude and the 40°W meridian of longitude, so T has coordinates (45°N, 40°W).

c U lies on the Equator and the 110°W meridian of longitude, so U has coordinates (0°, 110°W).

d Z lies on the 30°S parallel of latitude and the 40°W meridian of longitude, so Z has coordinates (30°S, 40°W).

e R lies on the 45°N parallel of latitude and the 110°W meridian of longitude, so R has coordinates (45°N, 110°W).

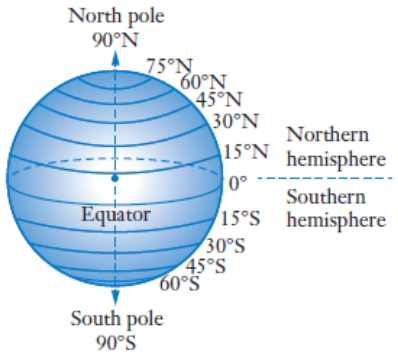
f W lies on the Equator and the 40°W meridian of longitude, so W has coordinates (0°, 40°W).

g X lies on the 30°S parallel of latitude and the 110°W meridian of longitude, so X has coordinates (30°S, 110°W).

h S lies on the 45°N parallel of latitude and the 75°W meridian of longitude, so S has coordinates (45°N, 75°W).

Question 4

The South Pole can be found at the 90°S parallel of latitude.



Question 5

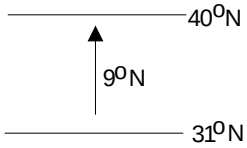
a The 30°N parallel is a parallel of latitude, so it is a small circle.

b The prime meridian is a meridian of longitude, so it is a great circle.

c The 145°W meridian is a meridian of longitude, so it is a great circle.

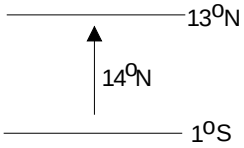
Question 6

a The latitude of Shanghai is 31°N and the latitude of New York is 40°N.



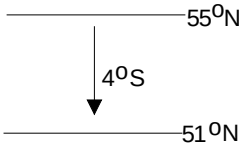
New York is 9° north of Shanghai.

b The latitude of Nairobi is 1°S and the latitude of Bangkok is 13°N.



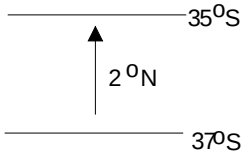
Bangkok is 14° north of Nairobi.

c The latitude of Moscow is 55°N and the latitude of London is 51°N.



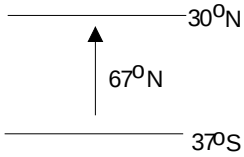
London is 4° south of Moscow.

d The latitude of Auckland is 37°S and the latitude of Canberra is 35°S.



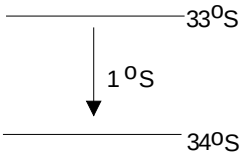
Canberra is 2° north of Auckland.

e The latitude of Melbourne is 37°S and the latitude of Cairo is 30°N.



Cairo is 67° north of Melbourne.

f The latitude of Newcastle is 33°S and the latitude of West Wyalong is 34°S.



West Wyalong is 1° south of Newcastle.

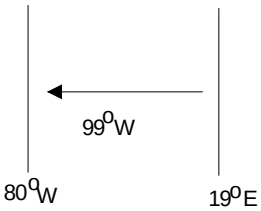
Question 7

a Deniliquin and Hay both have longitude 145°E.
Deniliquin is 1°S of Hay, so: Latitude = 34°S + 1°S = 35°S
Deniliquin has coordinates (35°S, 145°E).
The correct answer is **B**.

b Lord Howe Island and Forster both have latitude 32°S.
Lord Howe Island is 6° east of Forster, so: Longitude = 152°E + 6°E = 158°E
Lord Howe Island's coordinates are (32°S, 158°E).
The correct answer is **C**.

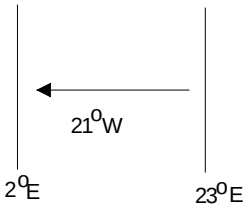
Question 8

a The longitude of Budapest is 19°E and the longitude of Miami is 80°W.



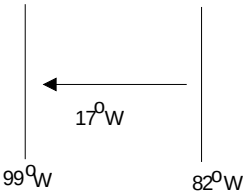
Miami is 99° west of Budapest.

b The longitude of Athens is 23°E and the longitude of Paris is 2°E.



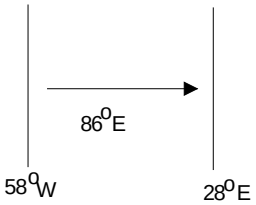
Paris is 21° west of Athens.

c The longitude of Havana is 82°W and the longitude of Mexico City is 99°W.



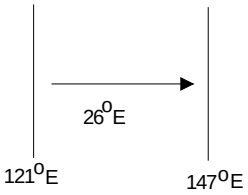
Mexico City is 17° west of Havana.

d The longitude of Buenos Aires is 58°W and the longitude of Johannesburg is 28°E.



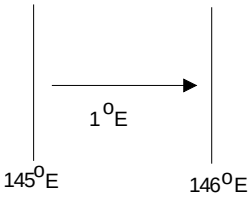
Johannesburg is 86° east of Buenos Aires.

e The longitude of Manila is 121°E and the longitude of Port Moresby is 147°E.



Port Moresby is 26° east of Manila.

f The longitude of Finley is 145°E and the longitude of Bourke is 146°E.



Bourke is 1° east of Finley.

Question 9

Broken Hill has latitude 32°S, the same as Dubbo.

Broken Hill is 7° west of Dubbo, so: Longitude = 148°E – 7° = 141°E

Broken Hill has coordinates (32°S, 141°E).

Question 10

Ipswich is 2° north of Maree, so: Latitude = 29°S – 2° = 27°S

Ipswich is 2° east of Maree, so: Longitude = 150°E + 2° = 152°E

Ipswich has coordinates (27°S, 152°E).

Question 11

Ballarat is 2° south of Batemans Bay, so: Latitude = 35°S + 2° = 37°S

Ballarat is 6° west of Batemans Bay, so: Longitude = 150°E – 6° = 144°E

Ballarat has coordinates (37°S, 144°E).

The correct answer is **D**.

Question 12

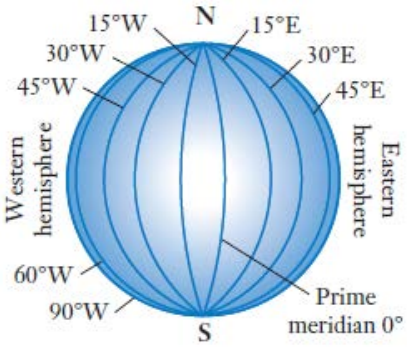
Refer to an atlas or map.

a Sydney and Tamworth lie on the same line of longitude.

b Athens and Sicily lie on the same line of latitude.

Question 13

Every meridian of longitude passes through the North and South Poles so it is possible to stand on every meridian of longitude at either the North Pole or the South Pole.



Exercise 11.02 Time

Question 1

a 8:45 a.m.

b $17-12=5$
$\therefore$ 5:50 p.m.

c 12:19 a.m.

d 11:05 a.m.

e $16-12=4$
$\therefore$ 4:28 p.m.

f 9:15 a.m.

g 2:40 a.m.

h $20-12=8$
$\therefore$ 8 p.m.

i 6:25 a.m.

j $18-12=6$
$\therefore$ 6:53 p.m.

Question 2

a $7+12=19$
$\therefore$ 1935

b 1142

c $11+12=23$
$\therefore$ 2359

d 0017

e 1230

f 0340

g 0710

h $9+12=21$
$\therefore$ 2154

i $10+12=22$
$\therefore$ 2218

j 0159

Question 3

$23-12=11$
$\therefore$ 11:17 p.m.

Question 4

a 07:30

b 01:15

c $5+12=17$
$\therefore$ 17:10

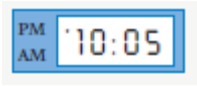
Question 5

$4+12=16$
$\therefore$ 1621

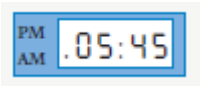
Question 6

a $22 - 12 = 10$

$\therefore$ 10:05 p.m.

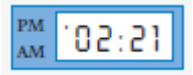


b 5:45 a.m.



c $14 - 12 = 2$

$\therefore$ 2:21 p.m.



Question 7

11:42 a.m. to 2:13 p.m. = 18 min + 2 h 13 min
= 2 h 31 min

$\therefore$ A

Question 8

a 6:15 p.m. to 8:10 p.m. = 45 min + 1 h 10 min
= 1 h 55 min

b 11:16 a.m. to 12: 06 p.m. = 44 min + 6 min
= 50 min

c 4:10 a.m. to 8:55 a.m. = 50 min + 3 h 55 min
= 3 h 105 min
= 4 h 45 min

d 11:25 p.m. to 3:20 a.m. = 35 min + 3 h 20 min
= 3 h 55 min

e 7:25 a.m. to 1:10 p.m. = 35 min + 4 h + 1 h 10 min
= 5 h 45 min

f 9:20 p.m. to 8:15 a.m. = 40 min + 2 h + 8 +15 min
= 10 h 55 min

Question 9

3:17 p.m. to 5:09 p.m. = 43 min + 1 h + 9 min
= 1 h 52 min

Question 10

a 2 p.m. + 6 h = 8 p.m.

b 10 a.m. – 3 h = 7 a.m.

c 7:15 p.m. – 20 min = 6:55 p.m.

d 10:45 a.m. + 2 h 32 min = 12:45 p.m. + 32 min
= 1:17 pm

e 10:35 p.m. + 3 h 29 min = 1:35 a.m. + 29 min
= 2:04 a.m.

f 9:32 a.m. – 5 h 40 min = 4:32 a.m. – 40 min
= 3:52 a.m.

Question 11

Manal 8:20 a.m. + 5 h 23 min = 1:43 p.m.

Tom 8:20 a.m. + 5 h 24 min = 1:44 p.m.

Gianni 8:20 a.m. + 5 h 42 min = 2:02 p.m.

Eddie 8:20 a.m. + 5 h 44 min = 2:04 p.m.

Sarah 8:20 a.m. + 5 h 59 min = 2:19 p.m.

Robert 8:20 a.m. + 6 h 1 min = 2:21 p.m.

Question 12

9:50 a.m. to 7.20 p.m. = 10 min + 2 h +7 h + 20 min
= 9 h 30 min

Question 13

8:25 a.m. to 3:10 p.m. = 35 min + 3 h + 3 h + 10 min
= 6 h 45 min

Question 14

7:35 p.m. – 1 h 20 min = 6:15 p.m.

Exercise 11.03 Timetables

Question 1

a 2:30 p.m. to 9:30 p.m. = 7 hours

b 6 h 30 min

c 8:20 p.m.

d 8:54 a.m. + 4 h 11 min = 12:54 p.m. + 11 min
= 1:05 p.m.
∴ He stops at Liverpool.

e 11:45 a.m. to 12:10 p.m. = 25 min

f Sydney to Liverpool: 2:30 p.m. to 3:45 p.m. = 30 min + 45 min
= 1 h 15 min
Liverpool to Sydney: 1:05 p.m. to 2:05 p.m. = 1 h
The shorter time for the return trip may be due to it being earlier in the afternoon, when there is less traffic on the road.

Question 2

a 06:35 to 06:55 = 20 min

b Need to arrive on 10:25 bus.
∴ So need to be on the bus that leaves Apollo bay at 9:32 a.m.

c Just choose one of the Skenes Creek:
9:35 a.m. + 50 min = 10:25 a.m.
This is when the bus arrives in Lorne. So, she stops at Lorne.

d 3 p.m.

e Kennett river

Question 3

a one (NC130 at 0905 (9:05 a.m.))

b NC114 0630 (6:30 a.m.), NC118 at 1105 (11:05 a.m.), NC134 1550 (3:50 p.m.)

c To arrive in Sydney by 12 noon Sunday, you need to leave on the last flight on Saturday.
This is flight NC134 at 15:50 p.m.

d Last flight Friday into Merimbula is NC139, which arrives at 2025 (8:25 p.m.).

e 15:50 to 17:40 = 3:50 p.m. to 5:40 p.m.
= 10 min + 1 h + 40 min
= 1 h 50 min

Question 4

a 10:05 a.m. to 11:30 a.m. = 55 min + 30 min
= 1 h 25 min
$\therefore$ It leaves at 1005 (10:05 a.m.) and goes for 1 h 25 min.

b NA114 at 1040 (10:40 a.m.).

c Leaves at 11:05 a.m., so need to be there by 10:05 a.m.

d Must fly into airport by 12:30 p.m. – 35 min = 11:55 a.m.
$\therefore$ flight that gets in 1130.
So, latest flight is NA038, which leaves Sydney at 1005 (10:05 a.m.).

e NA503: 1 h 25 min
NA511: 1 h 25 min
NA038: 1 h 25 min
NA114: 1 h 30 min
NA514: 1 h 25 min
NA051: 1 h 25 min
$\therefore$ Flight NA114 takes 5 minutes longer.
It could be because it is a smaller plane or takes a different flight path.

Question 5

a **i** He will need to catch the train that arrives in Sydney at 8:12 a.m.
∴ Catch train at 5:32 a.m.

ii 5:32 a.m. to 8:12 a.m. = 28 min +2 h +12 min
= 2 h 40 min

b 7:27 a.m. to 10:12 a.m. = 33 min + 2 h 12 min
= 2 h 45 min

8:17 a.m. to 10:54 a.m. = 43 min + 1 h 54 min
= 1 hr 97 min
= 2 h 37 min

∴ Difference is the 8:17 a.m. train trip is 8 minutes shorter.

c 8:03 a.m. to 9:08 a.m. = 1 h 5 min

d As bookings are essential, he needs to book a ticket and he will board at 2:22 p.m.

e Answers may vary.
Best to catch the 5:13 p.m. or the 7:35 p.m. as they don't stop at all of the stations and so they are faster.

Exercise 11.04 International time zones

Question 1

a India is 4.5 h behind AEST.
4:00 p.m. – 4 h 30 min = 11:30 a.m.
When it is 4:00 p.m. Saturday in Sydney, it is 11:30 a.m. Saturday in India.

b Russia (west) is 7 h behind AEST.
4:00 p.m. – 7 h = 9:00 a.m.
When it is 4:00 p.m. Saturday in Sydney, it is 9:00 a.m. Saturday in Russia (west).

c Greece is 8 h behind AEST.
4:00 p.m. – 8 h = 8:00 a.m.
When it is 4:00 p.m. Saturday in Sydney, it is 8:00 a.m. Saturday in Greece.

d Tonga is 3 h ahead of AEST.
4:00 p.m. + 3 h = 7:00 p.m.
When it is 4:00 p.m. Saturday in Sydney, it is 7:00 p.m. Saturday in Tonga.

Question 2

a Greenland is 3 h behind UTC.
10:00 a.m.– 3 h = 7:00 a.m.
When it is 10:00 a.m. Tuesday in London, it is 7:00 a.m. Tuesday in Greenland.

b Bosnia-Herzegovina is 1 h ahead of UTC.
10:00 a.m. + 1 h = 11:00 a.m.
When it is 10:00 a.m. Tuesday in London, it is 11:00 a.m. Tuesday in Bosnia-Herzegovina.

c Myanmar is 6.5 h ahead of UTC.
10:00 a.m. + 6 h 30 min = 4:30 p.m.
When it is 10:00 a.m. Tuesday in London, it is 4:30 p.m. Tuesday in Myanmar.

d New Caledonia is 11 h ahead of UTC.
10:00 a.m. + 11 h = 9:00 p.m.
When it is 10:00 a.m. Tuesday in London, it is 9:00 p.m. Tuesday in New Caledonia.

Question 3

a The time in New Zealand is UTC+12.
The time in Malaysia is UTC+8.
Time difference = 12 – 8 = 4 h

b The time in Brazil(east) is UTC–3.
The time in Chile is UTC–4.
Time difference = –3 – (–4) = 1 h

c The time in Iceland is UTC time (= 0).
The time in the Philippines is UTC+8.
Time difference = 8 h

d The time in Algeria is UTC+1.
The time in Salt Lake City is UTC–7.
Time difference = 1 – (–7) = 8 h

Question 4

a Dallas is 16 h behind AEST.
8:30 p.m. – 16 h = 4:30 a.m.
The Australian Open Tennis is seen at 4:30 a.m. in Dallas, USA.

b Japan is 1 h behind AEST.
8:30 p.m. – 1 h = 7:30 p.m.
The Australian Open Tennis is seen at 7:30 p.m. in Japan.

c Sweden is 9 h behind AEST.
8:30 p.m. – 9 h = 11:30 a.m.
The Australian Open Tennis is seen at 11:30 a.m. in Sweden.

Question 5

Heath departs Sydney at 1:30 p.m. Friday.

1:30 p.m. + 8 h 30 min = 10:00 p.m.

Heath arrives in Hawaii at 10:00 p.m. Friday AEST.

Hawaii is 20 h behind AEST.

10:00 p.m. – 20 h = 2:00 a.m.

Heath arrives in Hawaii at 2:00 a.m. Friday, Hawaiian local time.

The correct answer is **C**.

Question 6

a The time in Melbourne, AEST, is the same as the time in Sydney, AEST.
The time in Melbourne is 6:00 p.m.

b The time in Hobart, AEST, is the same as the time in Sydney, AEST. The time in Hobart is 6:00 p.m.

c The time in Alice Springs, ACST, is 30 minutes behind Sydney, AEST.
The time in Alice Springs is 5:30 p.m.

d The time in Perth, AWST, is 2 hours behind Sydney, AEST. The time in Perth is 4:00 p.m.

e The time in Adelaide, ACST, is 30 minutes behind Sydney, AEST. The time in Adelaide is 5:30 p.m.

f The time in Surfers Paradise, AEST, is the same as the time in Sydney, AEST.
The time in Surfers Paradise is 6:00 p.m.

Question 7

a Melbourne is in the same time zone as Sydney and participates in daylight saving.
The time in Melbourne is 10:30 a.m.

b Hobart is in the same time zone as Sydney and participates in daylight saving.
The time in Hobart is 10:30 a.m.

c The time in Alice Springs is 30 minutes behind Sydney. So the time in Alice Springs is:
10:30 a.m. – 30 min = 10:00 a.m. daylight saving time.
But Alice Springs does not participate in daylight saving, so the time in Alice Springs is:
10:00 a.m. – 1 h = 9:00 a.m.

d The time in Perth is 30 minutes behind Sydney. So the time in Perth is:
10:30 a.m. – 2 h = 8:30 a.m. daylight saving time.
Perth does not participate in daylight saving, so the time in Perth is:
8:30 a.m. – 1 h = 7:30 a.m.

e The time in Adelaide is 30 minutes behind Sydney. Adelaide participates in daylight saving.
The time in Adelaide is 10:30 a.m. – 30 min = 10:00 a.m.

f Surfers Paradise is in the same time zone as Sydney, so the time is 10:30 a.m. daylight saving time.
But Queensland does not participate in daylight saving, so the time in Surfers Paradise is:
10:30 a.m. – 1 h = 9:30 a.m.

Question 8

a 12:00 noon in Perth is 12:00 + 2 hours = 2:00 p.m. AEST.
Chile is 14 h behind AEST.
2:00 p.m. – 14 h = 12:00 midnight.
The time in Chile is 12:00 midnight.

b The time difference is 12 h.
12 × 15° = 180°, so Perth and Chile are on directly opposite sides of the globe.

Question 9

Shaunna arrives in Cape Town at 10:00 a.m. + 12 h = 10:00 p.m. Adelaide time.
Cape Town is 9.5 – 2 = 7.5 h behind Adelaide.
10:00 p.m. – 7h 30 min = 2:30 p.m.
The arrival time in Cape Town is 2:30 p.m.

Question 10

Tasmania is 10 h ahead of UTC.
4:30 p.m. + 10 h = 2:30 a.m.
When it is daylight saving in the UK, it is not daylight saving in Australia.
2:30 a.m. – 1 h = 1:30 a.m.
The correct answer is **A**.

Question 11

New Delhi is 4.5 h behind Sydney, so Sydney is 4.5 h ahead of Delhi.
6:30 p.m. + 4 h 30 min = 11:00 p.m.
So the plane leaves New Delhi at 11:00 p.m. Sydney time.
The plane arrives the next day at 12 midnight Sydney time, which is 13 hours later than the departure time, so the flight took 13 hours.

Question 12

a New York is 15 h behind Sydney, so Sydney is 15 h ahead of New York.
6:30 p.m. Monday + 15 h = 9:30 a.m. Tuesday.
The Superbowl is seen in Sydney at 9:30 a.m. on Tuesday.

b Berlin is 6 h ahead of New York.
6:30 p.m. Monday + 6 h = 12:30 a.m. Tuesday.
The Superbowl is seen in Berlin at 12:30 a.m. on Tuesday.

c Dublin is 5 h ahead of New York.
6:30 p.m. Monday + 5 h = 11:30 p.m. Monday.
The Superbowl is seen in Dublin at 11:30 p.m. on Monday.

Question 13

a The plane arrives in Brisbane at 2:30 p.m. + 2 h 40 min = 5:10 p.m. Adelaide time.
Adelaide is 30 minutes behind Brisbane: 5:10 p.m. + 30 min = 5:40 p.m.
The plane arrived in Brisbane at 5:40 p.m. local Brisbane time.

b The plane leaves Brisbane at 5:40 p.m. + 35 min = 6:15 p.m.
The plane arrives in Mt Isa at 6:15 p.m. + 2 h 45 min = 9:00 p.m. local Mt Isa time.

Question 14

Laire arrives in Sydney at 9:50 a.m. + 40 min = 10:30 a.m.
Laire leaves Sydney at 10:30 a.m. + 1 h = 11:30 a.m.
Laire arrives in Perth at 11:30 a.m. + 4 h 25 min = 3:55 p.m. Sydney time.
Perth is 2 hours behind Sydney.
3:55 p.m. – 2 h = 1:55 p.m.
The plane lands in Perth at 1:55 p.m. local Perth time.

Question 15

Paula arrives in Sydney at 4:20 p.m. + 2 h 45 min = 7:05 p.m. Wellington time.
Sydney is 2 h behind Wellington.
7:05 p.m. – 2 h = 5:05 p.m.
It is not daylight saving time in Sydney in September.
5:05 p.m.– 1 h = 4:05 p.m.
The plane arrives in Sydney at 4:05 p.m. local Sydney time.

Question 16

The plane arrives in Paris at 1:00 p.m. Thursday + 20 h = 9:00 a.m. Friday, Sydney time.
Paris is 9 h behind Sydney.
9:00 a.m. – 9 h = 12:00 midnight.
Daylight saving is operating in Paris.
12:00 + 1 h = 1:00 a.m. Friday.
The plane arrives in Paris at 1:00 a.m. Friday local Paris time.

Question 17

a Travelling from east to west across the International Date Line, Monday becomes Tuesday.

b The plane arrives in Tokyo at 12 noon + 6 h = 6:00 p.m. Monday, Hawaii time.
Tokyo (UTC+9) is 19 h ahead of Hawaii (UTC−10).
6:00 p.m. Monday + 19 h = 1:00 p.m. Tuesday.
However, the International Date Line has been crossed from east to west so the plane arrives in Tokyo at 1:00 p.m. Wednesday.

Question 18

a Buenos Aires (UTC−3) is 13 hours behind Melbourne (UTC+10).
7:30 p.m. in Melbourne is 7:30 p.m. − 13 h = 6:30 a.m. in Buenos Aires.
The plane left Buenos Aires at 7:30 p.m. Buenos Aires time and arrived in Melbourne at 6:30 a.m. Buenos Aires time. So the flight took 11 hours.

b Flying from Buenos Aires to Melbourne, Liz arrives in Melbourne the next day at 7:30 p.m.

Sample HSC problem

a $48° + 34° = 82°$

b 9:45 a.m. Tues to 4:10 a.m. Wed = 15 min + 2 h + 12 h + 4 h +10 min
= 18 h 25 min

c Sydney is 17 hours ahead of Seattle time.
∴ 4:10 a.m. Wed + 17 h = 4:10 p.m. Wed + 5 h
= 9:10 p.m. Wednesday

Test yourself 11

Question 1

A = $(0°,\ 70°\text{W})$

B = $(0°,\ 70° - 30° = 40°\text{W}) = (0°,\ 40°\text{W})$

C = $(55°\text{S},\ 70°\text{W})$

D = $(55°\text{S},\ 40°\text{W})$

Question 2

a $147°\text{E}$

b $90 - 36 = 54°$

c $147°\text{E} - 122°\text{E} = 25°$

Question 3

$37°\text{N} + 15° = 52°\text{N}$
$127°\text{E} - 122° = 5°\text{E}$
$\therefore$ The coordinates of Amsterdam are $(52°\text{N},\ 5°\text{E})$.

Question 4

a $14 - 12 = 2$
$\therefore$ 2:36 p.m.

b 5:05 a.m.

c $22 - 12 = 10$
$\therefore$ 10:18 p.m.

d 12:27 a.m.

Question 5

a 0523

b $4 + 12 = 16$
$\therefore$ 1632

c $9 + 12 = 21$
$\therefore$ 2105

d 1255

Question 6

a 6:21 a.m. + 2 h 34 min = 8:21 a.m. + 34 min
= 8:55 a.m.

b midday – 5 h 8 min = 7 a.m. – 8 min
= 6:52 a.m.

c 3:15 a.m. + 7 h 12 min = 10:15 a.m. + 12 min
= 10:27 a.m. OR 1027

d 3:32 p.m. – 4 h 27 min = 11:32 a.m. – 27 min
= 11:05 a.m. OR 1105

Question 7

a 9 a.m. to 10:30 a.m. = 1 h 30 min

b Bus leaves every 45 minutes. Each trip takes 1 h 30 min.
This means that a bus could take every 2nd trip. So, 2 buses would be all that is needed.

c The next bus they could catch would be the 12:20 p.m. at old windmill.
This arrives at Southbank at 1 p.m.

d 45 minutes – as a bus leaves every 45 minutes!!

e Answers may vary. One example is:

1. Catch 10:45 a.m. bus at Riverside to Suncorp. (at least 1 hr ✓)
2. Catch 12:32 p.m. from Suncorp to Southbank. (time to do ferris wheel ✓)
3. Catch 2:30 p.m. from Southbank to Maritime Museum. (time to do shopping ✓)
4. Catch 4:04 p.m. from Maritime Museum to City Lookout. (Meet friends at 4:30 p.m. ✓)

Question 8

a London is 9 h ahead of Anchorage.
8:00 a.m. + 9 h = 5:00 p.m.
When it is 8:00 a.m. in London, it is 5:00 p.m. in Anchorage.

b Anchorage is 11 h behind Lusaka.
6:30 p.m. – 11 h = 7:30 a.m.
When it is 6:30 p.m. in Lusaka, it is 7:30 a.m. in Anchorage.

Question 9

a Brisbane is 2 h ahead of Perth.
4:00 p.m. + 2 h = 6:00 p.m.
When it is 4:00 p.m. in Perth, it is 6:00 p.m. in Brisbane.

b Brisbane is 30 minutes ahead of Adelaide.
6:00 a.m. + 30 min = 6:30 a.m.
When it is 6:00 a.m. in Adelaide, it is 6:30 a.m. in Brisbane.

c The time in Brisbane is the same as the time in Hobart.
When it is 2:30 a.m. in Hobart, it is 2:30 a.m. in Brisbane.

Question 10

a Travelling east across the International Date Line, Thursday becomes Wednesday.

b 6:00 p.m. + 8 h = 2:00 a.m. Friday, Darwin time.
Niue Island is 20.5 h behind Darwin.
2:00 a.m. – 20 h 30 min = 5:30 a.m. Thursday
However, crossing the International Date Line makes this 5:30 a.m. Wednesday.
It is 5:30 a.m. Wednesday on Niue Island when the plane arrives.

Question 11

Perth is 16 h ahead of Los Angeles.
12 noon + 16 h = 4:00 a.m. Monday
It is not daylight saving in Perth.
4:00 a.m. – 1 h = 3:00 a.m. Monday
Kerrie should ring her sister at 3:00 a.m. Monday.

