

Exercise walk-through

E1.15

Time

IGCSE Mathematics

You must be able to

- write a time in 24-hour clock form and back again
- find the length of a journey that crosses one or more hours
- convert a decimal number of hours into hours and minutes, and use it in $\text{speed} = \text{distance} \div \text{time}$

1

The method

Method — Time counts in sixties, not in tens

- **24-hour clock:** always four digits, never a.m. or p.m. 7.45 p.m. is 19 45.
- **Duration:** count on in stages. From 09 52 to 10 00 is 8 minutes, then to 12 00 is 2 hours, then 18 minutes more — 2 h 26 min.
- **Decimal hours:** 2.25 hours is 2 h 15 min, because $0.25 \times 60 = 15$. It is **not** 2 h 25 min.
- **Speed:** 1 h 48 min = 1.8 h, so 135 km in that time is $135 \div 1.8 = 75$ km/h.

Answer shapes (marked by **method marks** — M1 for a correct method, A1 for the correct answer): converting minutes into a decimal of an hour, or counting the duration in stages, is the method mark.

Method — Time counts in sixties, not in tens

Answer shapes (marked by method marks — M1 for a correct method, A1 for the correct answer): converting...

The same instant, written two ways

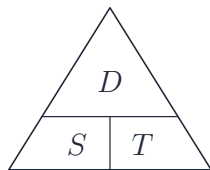
12-hour	9.00 a.m.	12.00 noon	1.00 p.m.	4.30 p.m.	7.15 p.m.	11.50 p.m.
	same	same	+12	+12	+12	+12
24-hour	09 00	12 00	13 00	16 30	19 15	23 50

A 24-hour time always has four digits and never a.m. or p.m. Midnight is **00 00** and midday is **12 00** – only afternoon and evening times gain the 12.

The 12-hour and 24-hour clocks lined up, with +12 only after midday

Method — Time counts in sixties, not in tens

Answer shapes (marked by method marks — M1 for a correct method, A1 for the correct answer): converting...



cover the one
you want

$$S = \frac{D}{T} \quad (\text{cover } S: D \text{ over } T)$$

$$D = S \times T \quad (\text{cover } D: S \text{ next to } T)$$

$$T = \frac{D}{S} \quad (\text{cover } T: D \text{ over } S)$$

$$\text{cyclist: } 45 \text{ km in } 3 \text{ h } 45 \text{ min} = 3.75 \text{ h} \Rightarrow S = \frac{45}{3.75} = 12 \text{ km/h}$$

The speed, distance and time triangle

2

Practice

Practice 2.1 ■ 1 mark

Write 7.45 p.m. as a 24-hour clock time.

Solution 2.1

Method: Time counts in sixties, not in tens — p.4

Worked steps

- p.m. after midday, so add 12 to the hour

19 45

B1

Practice 2.2 ■ 2 marks

A film starts at 18 40 and lasts 2 hours 35 minutes. Find the time it finishes.

Solution 2.2

Method: Time counts in sixties, not in tens — p.4

Worked steps

■ $18\ 40 + 2\ \text{h} = 20\ 40$, then $+35\ \text{min}$ crosses the hour M1

$= 21\ 15$

A1

Practice 2.3 ■ 2 marks

A train leaves at 09 52 and arrives at 12 18. Find the journey time.

Solution 2.3

Worked steps

■ 09 52 to 12 00 is 2 h 8 min, then 18 minutes more M1

= **2 h 26 min**

A1

Practice 2.4 ■ 1 mark

Convert 2.25 hours into hours and minutes.

Solution 2.4

Method: Time counts in sixties, not in tens — p.4

Worked steps

■ $0.25 \times 60 = 15$ minutes

$= 2 \text{ h } 15 \text{ min}$

B1

3

Exam-style

Exam-style 3.1 ■ 3 marks

Part of a bus timetable is shown.

	Depart A	Arrive B	Depart B	Arrive C
Bus	08 47	09 23	09 31	10 09

Exam-style 3.1 (a) ■ 1 mark

Find the time the bus takes to travel from A to B.

Solution 3.1 (a)

Worked steps

- 08 47 to 09 23 is 13 minutes to the hour and 23 after

= **36** minutes

B1

Exam-style 3.1 (b) ■ 2 marks

Find the total time from leaving A to arriving at C.

Solution 3.1 (b)

Worked steps

■ 08 47 to 10 09 (M1)

= 1 h 22 min

(A1)

■ the 8-minute wait at B is part of the total, so do not subtract it

Exam-style 3.2 ■ 3 marks

A journey of 135 km takes 1 hour 48 minutes. Calculate the average speed in km/h.

Solution 3.2

Method: Time counts in sixties, not in tens — p.4

Worked steps

■ convert the time: $48 \text{ min} = 48 \div 60 = 0.8 \text{ h}$, so the time is 1.8 h **M1**

■ speed = distance $\div$ time = $135 \div 1.8$ **M1**

$$= 75 \text{ km/h}$$

A1