Time, Timetables & Speed

Questions involving time are often badly answered in GCSE exams.

This is because students use non-calculator addition and subtraction methods learned for use with the decimal number system (H, T, U, etc) with time. This follows a different number system (60 sec in 1 minute, 60 min in 1 hour, 24 hours in 1 day, etc), so methods involving 'carrying' and 'borrowing' don't work in the same way.

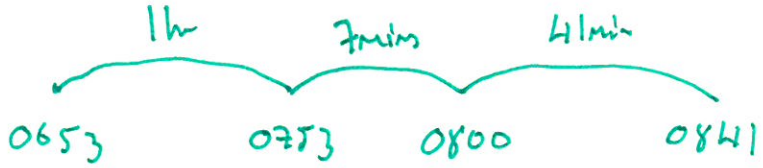
- For example, in decimal
  - I buy two items costing £6.53 and £1.48, how much have I spent?

$$\begin{array}{r} 6.53 \\ +\ 1.48 \\ \hline £8.01 \\ \hline \end{array}$$

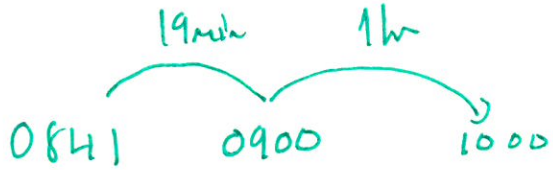
  - How much change do I get from £10

$$\begin{array}{r} \cancel{9}\ \cancel{10} \\ \cancel{£}\cancel{1}\cancel{0}.\cancel{0}0 \\ -\ 8.01 \\ \hline 1.99 \\ \hline \end{array}$$

- But in time
  - If it is 0653 now, what time will it be in 1 hour and 48 minutes?



  - and how much time will then elapse until 1000?



1hr 19mins

When working with time questions, drawing a time line is often helpful.

If the question allows you to use a calculator, learn to use the time button 

So for the previous question the button presses would be:

6 °‘‘ **53** °‘‘ **+ 1** °‘‘ **~~23~~ 48** °‘‘ **=** 8°41' 0841

and

10 °‘‘ **0** °‘‘ **- 8** °‘‘ **~~16~~ 41** °‘‘ **=** 1°19' 1hr 19min

GCSE Maths Paper 2 PPQ (Calc OK)

(a) What is the difference between the following times?

'07:30 on 1st November 2017' and '13:20 on 3rd November 2017'

Give your answer in days, hours and minutes. [2]

0730 1/11 0730 2/11 0730 3/11

2 days

.....2..... days .....5..... hours .....50..... minutes

(b) Divide 16 hours 20 minutes by 5.

Give your answer in hours and minutes. [2]

.....3..... hours .....16..... minutes

GCSE Numeracy Paper 2 PPQ (Calc OK)

Bus timetable from Orme Station to Outlet Village

Only 55 minutes from Orme Station direct to Outlet Village.

Buses leave the station
- every 12 minutes from 8 a.m. until 12 noon
- every 24 minutes from 12 noon until 10 p.m.

(a) At what time does the first bus after 09:00 leave Orme Station?
Circle your answer. [1]

09:05 09:12 09:18 09:24 09:30

(b) Gwil looks at the timetable shown above.
He decides to take the latest possible bus to be at Outlet Village by 15:00.

At what time will Gwil arrive at Outlet Village?
You must show all your working. [2]

1200

12 24

1248

13 12

13 36

1400 → 1455

14 24

Timetables

Often appear on a non-calculator paper. Use a timeline and if the journey has more than one stage DO NOT ASSUME they move directly from one stage to another without time passing waiting for the next departure.

GCSE Maths Paper 1 PPQ (non-Calc)

Below are parts of two train time-tables.

Swansea to Bristol Parkway

Swansea	10:28	10:55	11:28	11:55
Neath	10:39	11:05	11:39	12:05
Port Talbot	10:47	11:12	11:47	12:12
Bridgend	10:59	11:25	11:59	12:25
Cardiff	11:22	11:47	12:22	12:47
Newport	11:39	12:08	12:39	13:08
Bristol Parkway	11:59	12:30	12:59	13:30

Bristol Parkway to Sheffield

Bristol Parkway	11:40	12:40	13:40	14:40
Cheltenham	12:10	13:12	14:10	15:11
Birmingham	13:03	13:58	14:56	15:59
Derby	13:42	14:40	15:39	16:40
Sheffield	14:17	15:18	16:17	17:19

(a) Sophie gets on the 10:55 from Swansea at Bridgend and gets off at Newport. How long should her journey take?

11:25 11:30 12:00 12:08

5 min 30 min 8 min 43 mins

[2]

(b) David lives in Port Talbot and needs to get to Birmingham by half past three in the afternoon.

(i) What is the latest train he can catch from Port Talbot to do this?

12:12

[1]

(ii) How long should he have to wait at Bristol Parkway?

10 min

[1]

The following are parts of rail timetables between Swindon and Coventry and between Coventry and Durham.

Swindon		14:29	15:29	16:29	17:29	18:29
Reading	arrive	15:00	16:00	17:00	17:55	19:01
	depart	15:11	16:11	17:11	18:11	19:11
Coventry		16:22	17:23	18:22	19:22	20:25

Coventry		16:27	16:49	17:27	17:49	18:49
Birmingham	arrive	16:48	17:16	17:48	18:17	19:17
	depart	17:03	17:30	18:03	18:30	19:30
Durham		20:22	20:30	21:25	21:39	22:30

(a) Denise catches the 15:29 train from Swindon to Coventry.
How long does the journey take?

15:29 15:30 1600 1700 1723

1min 30mins 1hr 23mins

1hr 54min

[2]

(b) John arrives at Reading station at 14.55.
He travels on the next train to Coventry for a meeting which, including the walk to and from the station, takes a total of 1 hour 20 minutes.
He then catches the next train to Durham.
When does he arrive at Durham?

Arrives @ Coventry 1622

back @ station +1hr 20min = 1742

Catches 17:49

Gets into Durham @ 21:39

[4]

Time Zones

GCSE Numeracy Paper 1 PPQ (non-Calc)

When it is 21:30 on a Tuesday in London, it is 02:30 on a Wednesday in Dhaka, Bangladesh.

It takes 10 hours 30 minutes to fly from Dhaka to London.
A flight leaves Dhaka on Thursday at 13:00 local Dhaka time.

On what day and at what time should this flight arrive in London?
Give your answer in local London time. [4]

TIME DIFFERENCE : 21:30 22:00 0000 0200 0230

30min 2hrs 2hrs 30min

DHAKA is 5hrs AHEAD of LONDON

So plane lands 1300 + 1030 = 2330 DHAKA TIME

- 5hrs = 1830 London

Arrival in London:

Day Thurs Time 1830

6. The timetable for a flight from London to Beijing is shown.

Departure from London	5 August	20:25
Arrival in Beijing	6 August	13:10

When it is 1pm in London, it is 8pm in Beijing.

How long should the journey take?
Give your answer in hours and minutes.

Show your working.

TIME DIFFERENCE 7 hours.

So 1310 Beijing time = 0610 London time

9 hours 45 minutes

(3)

20:25 → 20:30 (+5 mins) → 2100 (+30 mins) → 0000 (3 hrs.) → 0600 (6 hrs.) → 0610 (10 mins)

Average Speed and Decimal Time

Another aspect where things go wrong!

For example

- Write 4 hours 15 minutes as a decimal value

4.15 X 4.25 ✓

If this is asked on a Paper 2, once again the time button is your friend!

The button presses would be

4 [o,,,] **15** [o,,,] **=** 4.25

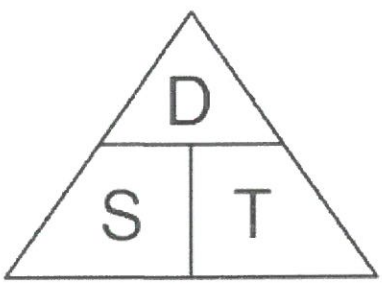
Then pressing [o,,,] **again will turn the time to decimal and back again as you repeatedly press the button.**

Average speed = Total Distance of journey ÷ total decimal time of journey

Which can also be remembered as:

Speed = mph = M/h

$= \frac{M}{h}$



GCSE Numeracy Paper 2 PPQ (Calc OK)

(a) What is 3 hours 12 minutes in hours?
Circle your answer. [1]

3·102 hours 3·12 hours 3·15 hours 3·2 hours 3·25 hours

(b) The first 40 miles of a journey took 1 hour 15 minutes.
The remaining 80 miles were completed in 2 hours 15 minutes.
Calculate the average speed, in mph, of the 120-mile journey. [3]

Av Speed = $\frac{\text{dist}}{\text{time}} = \frac{120}{3\text{hr } 30\text{min}} = 34.3$ mph

GCSE Numeracy Paper 2 PPQ (Calc OK)

Glenda plans to drive from Flint to Cardiff.
On a long journey, her average speed is usually 42 mph.
Last time she drove from Flint to Cardiff it took her $3\frac{1}{2}$ hours.

(a) Use this information to calculate the distance between Flint and Cardiff. [2]

Dist = speed × time
= 42 × 3.5
= 147 miles

..... miles

(b) Give a possible reason why your answer in (a) is only an estimate of the distance between Flint and Cardiff. [1]

poor weather, may have stopped, started & finished in different parts of Flint & Cardiff