Oxford Cambridge and RSA

Thursday 25 May 2023 – Afternoon

Level 3 Certificate Core Maths A (MEI)

H868/02 Critical Maths

Insert

Time allowed: 2 hours

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INFORMATION
- This Insert contains the pre-release material that you have already seen.
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A: Cold Weather Payments

When the weather in the UK is very cold, people who are in receipt of certain types of benefit are eligible for an extra payment.

When the weather is cold enough, this Cold Weather Payment is automatically added to their other benefit without them having to apply for it.

Cold Weather Payments are only made between the start of November and the end of March.

In September 2021, the rules for the Cold Weather Payment were given on https://www.gov.uk/cold-weather-payment as follows.

- You'll get a payment if the average temperature in your area is recorded as, or forecast to be, zero degrees celsius or below over 7 consecutive days.

- You'll get £25 for each 7-day period of very cold weather between 1 November and 31 March.

The website provides a Cold Weather Payment checker which can be used to check when the weather was cold enough to trigger Cold Weather Payments in a particular part of the country.

Checking for the postcode area CB1 for the 2020–21 winter shows that a payment was made for the 7-day period from 6 February 2021 to 12 February 2021 inclusive.
The weather station providing the data was located at Andrewsfield.

Hourly air temperature data from the Andrewsfield weather station for the 7-day period from 6 February 2021 to 12 February 2021 are shown in **Fig. A.1** and **Fig. A.2**.

The labels on the horizontal axis in **Fig. A.2** are for the reading at midnight at the start of each day.

The mean temperature for the 7-day period was –0.62 °C.

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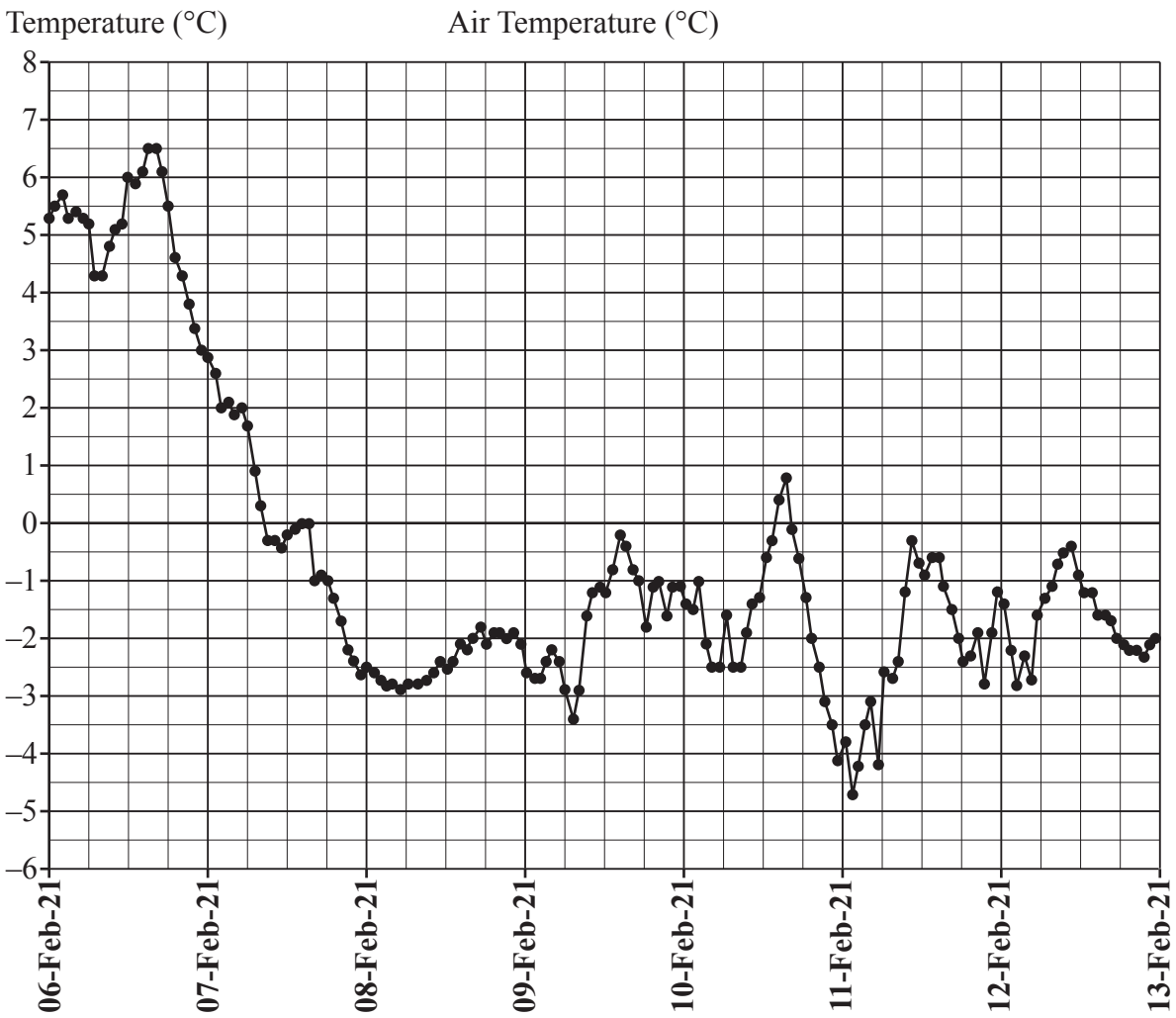
Fig. A.1

Hourly air temperature (°C)

Time	06-Feb-21	07-Feb-21	08-Feb-21	09-Feb-21	10-Feb-21	11-Feb-21	12-Feb-21
00:00	5.3	2.9	–2.5	–2.6	–1.4	–3.8	–1.4
01:00	5.5	2.6	–2.6	–2.7	–1.5	–4.7	–2.2
02:00	5.7	2	–2.7	–2.7	–1	–4.2	–2.8
03:00	5.3	2.1	–2.8	–2.4	–2.1	–3.5	–2.3
04:00	5.4	1.9	–2.8	–2.2	–2.5	–3.1	–2.7
05:00	5.3	2	–2.9	–2.4	–2.5	–4.2	–1.6
06:00	5.2	1.7	–2.8	–2.9	–1.6	–2.6	–1.3
07:00	4.3	0.9	–2.8	–3.4	–2.5	–2.7	–1.1
08:00	4.3	0.3	–2.8	–2.9	–2.5	–2.4	–0.7
09:00	4.8	–0.3	–2.7	–1.6	–1.9	–1.2	–0.5
10:00	5.1	–0.3	–2.6	–1.2	–1.4	–0.3	–0.4
11:00	5.2	–0.4	–2.4	–1.1	–1.3	–0.7	–0.9
12:00	6	–0.2	–2.5	–1.2	–0.6	–0.9	–1.2
13:00	5.9	–0.1	–2.4	–0.8	–0.3	–0.6	–1.2
14:00	6.1	0	–2.1	–0.2	0.4	–0.6	–1.6
15:00	6.5	0	–2.2	–0.4	0.8	–1.1	–1.6
16:00	6.5	–1	–2	–0.8	–0.1	–1.5	–1.7
17:00	6.1	–0.9	–1.8	–1	–0.6	–2	–2
18:00	5.5	–1	–2.1	–1.8	–1.3	–2.4	–2.1
19:00	4.6	–1.3	–1.9	–1.1	–2	–2.3	–2.2
20:00	4.3	–1.7	–1.9	–1	–2.5	–1.9	–2.2
21:00	3.8	–2.2	–2	–1.6	–3.1	–2.8	–2.3
22:00	3.4	–2.4	–1.9	–1.1	–3.5	–1.9	–2.1
23:00	3	–2.6	–2.1	–1.1	–4.1	–1.2	–2
Mean for the 7-day period = –0.62							

Fig. A.2



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B: Using a 100 square to represent percentages

Percentages are easily represented on a 100 square, 10 squares across and 10 squares high. Each small square represents 1%.
For a whole number percentage, the relevant number of squares is shaded.

This type of statistical diagram is called a waffle diagram.

It is easier for people to tell what percentage is being represented if the squares are all together.
One way of doing this is to shade rows from the bottom, filling up the 100 square.
For example, to show that 49% of the UK's energy comes from renewable sources, the 100 square shown in **Fig. B.1** could be used.
There are four rows of 10 squares each and 9 additional squares, making 49 squares in all to represent 49%. **Fig. B.2** shows the individual squares counted.

Fig. B.1

UK energy
49% renewables

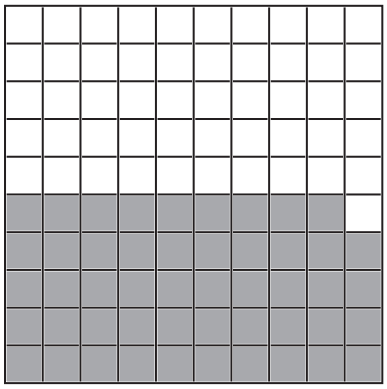
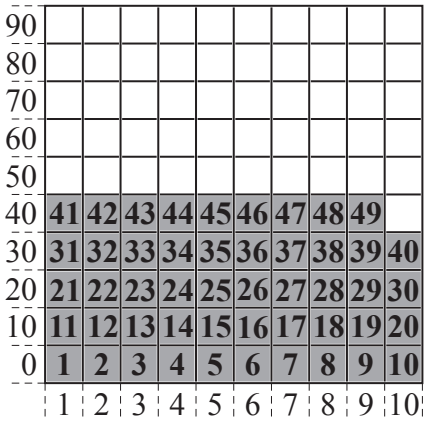


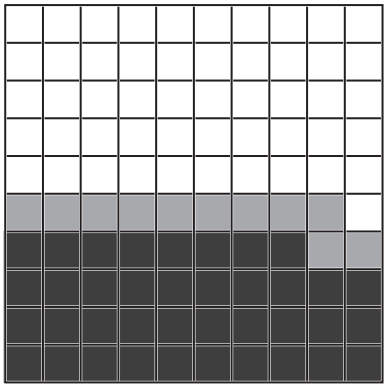
Fig. B.2



To show that part of the renewable energy is wind power, the relevant number of the 49 squares can be shaded differently, as shown in **Fig. B.3**.

Fig. B.3

UK energy
49.0% renewables
38.6% wind



Notice that the percentages in **Fig. B.3** are also shown and that they are given to one decimal place.
Both percentages are out of the total energy produced in the UK.

To make the diagram easy to read, part squares are **not** shaded.
So, for example, in **Fig. B.3**, only the whole number part (38%) of the percentage for wind (38.6%) is shaded.

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