Surname		Centre Number	Candidate Number
First name(s)			0

GCSE

3310U40-1

wjec cbac

TUESDAY, 7 JUNE 2022 – MORNING

MATHEMATICS – NUMERACY
UNIT 2: CALCULATOR-ALLOWED
INTERMEDIATE TIER

1 hour 35 minutes

ADDITIONAL MATERIALS

A calculator will be required for this paper.

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the additional page at the back of the booklet. Question numbers must be given for the work written on the additional page.

Take π as 3·14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

In question **2**(a), the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

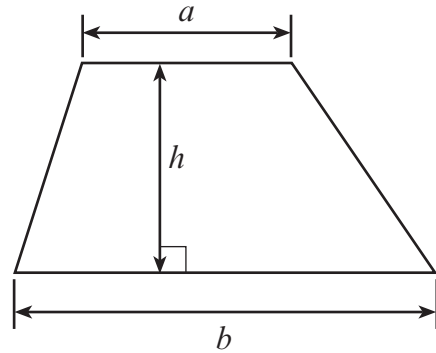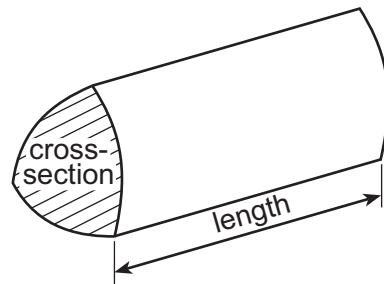|	For Examiner's use only	
Question	**Maximum Mark**	**Mark Awarded**
1.	5	
2.	8	
3.	7	
4.	9	
5.	5	
6.	10	
7.	13	
8.	5	
9.	4	
10.	4	
Total	70	

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Formula List – Intermediate Tier

Area of trapezium $= \dfrac{1}{2}(a + b)h$

Volume of prism = area of cross-section × length

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1. The travel graph below shows a journey Luke made on Saturday along a straight road.

Distance from home (km)
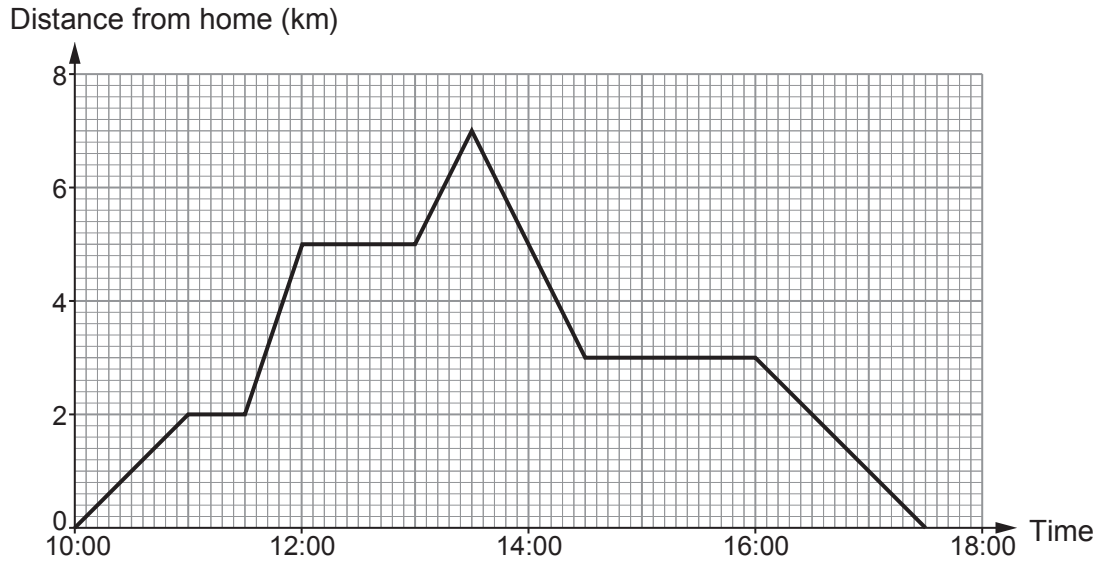
(a) How far away from home was Luke at 17:00? [1]

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.... km

(b) For what length of time was Luke away from home on this journey?
Circle your answer. [1]

$17\frac{1}{2}$ hours $7\frac{1}{2}$ hours $4\frac{1}{2}$ hours $4\frac{3}{4}$ hours $7\frac{1}{4}$ hours

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(c) During his journey, Luke visited a friend's house.
He stopped for an hour and then continued his journey.
How far from Luke's home does his friend live? [1]

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.... km

(d) How many kilometres did Luke travel between 13:00 and 14:30? [2]

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Turn over.

2. (a) *In this part of the question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Lewis has been told by his doctor to eat 2400 calories per day.

He has been told to eat 35% of these calories at breakfast.

Lewis's breakfast on Tuesday had a total of 860 calories.

By how many calories did his breakfast on Tuesday exceed the amount he should have eaten?
You must show all your working. [3 + 2 OCW]

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(b) The following information is stated on the packet of breakfast cereal.

Values for 100 g of cereal					
Energy	Fat	Carbohydrates	Protein	Fibre	Salt
358 calories	3·7 g	69 g	15 g	12 g	0·3 g

(i) Express, in its simplest terms, the ratio Carbohydrates : Protein. [1]

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(ii) A serving of cereal has a mass of 30 g.
Calculate the mass of carbohydrates in a serving of this cereal. [2]

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(3310U40-1)

3. After taking her meter reading, Alys always works out her electricity bill.
She has created a table to fill in, as shown below.

Period	Previous meter reading	Present meter reading	Number of units of electricity used
January, February and March 2022	4380	4900	....

Charge for electricity: .... units at **21p per unit**	£ ....
Standing charge: 3 months at **£7.00 per month**	£ ....
Total charges:	£ ....
VAT at 5%:	£ ....

Amount to pay £ ....

Complete Alys's table to calculate her electricity bill. [7]

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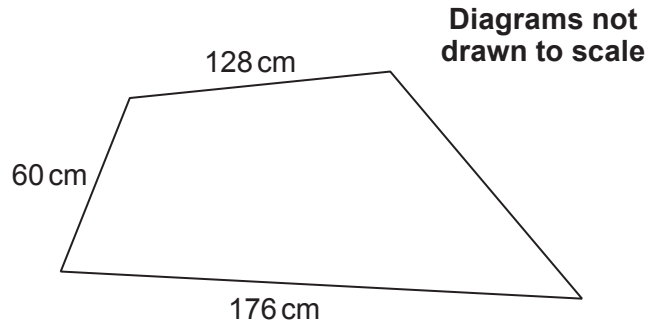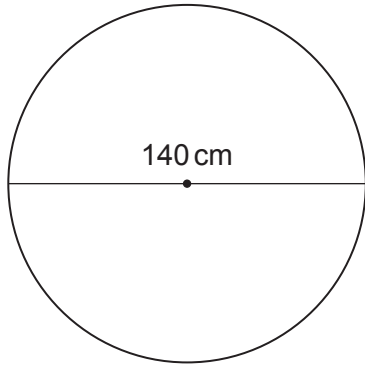
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Turn over.

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4. (a) Esme has a pond and a flowerbed in her garden.
The pond is circular and the flowerbed is in the shape of a quadrilateral, as shown below.

Diagrams not drawn to scale

128 cm

60 cm

140 cm

176 cm

The diameter of the pond is 140 cm.
The perimeter of the pond and the perimeter of the flowerbed are equal.

Esme needs to know the lengths of all the sides of her flowerbed.
Complete the following statement for Esme.

"The lengths of the sides of the flowerbed are 176 cm, 128 cm, 60 cm

and .... cm."

You must show all your working. [4]

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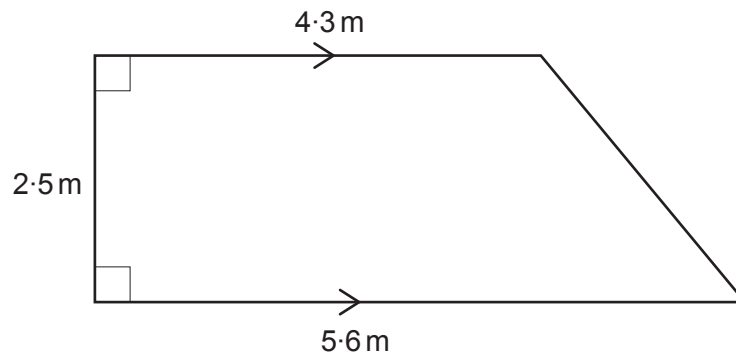
(b)   Bill has a vegetable plot in his garden.
It is in the shape of a trapezium, as shown below.

4·3 m

Diagram not drawn to scale

2·5 m

5·6 m

Fertiliser is sold in small bags.
Each bag contains enough fertiliser to treat an area of $0·9\,m^2$.
A bag of fertiliser costs £1.15.

How much will it cost Bill to buy enough bags of fertiliser to treat his vegetable plot?
You must show all your working.   [5]

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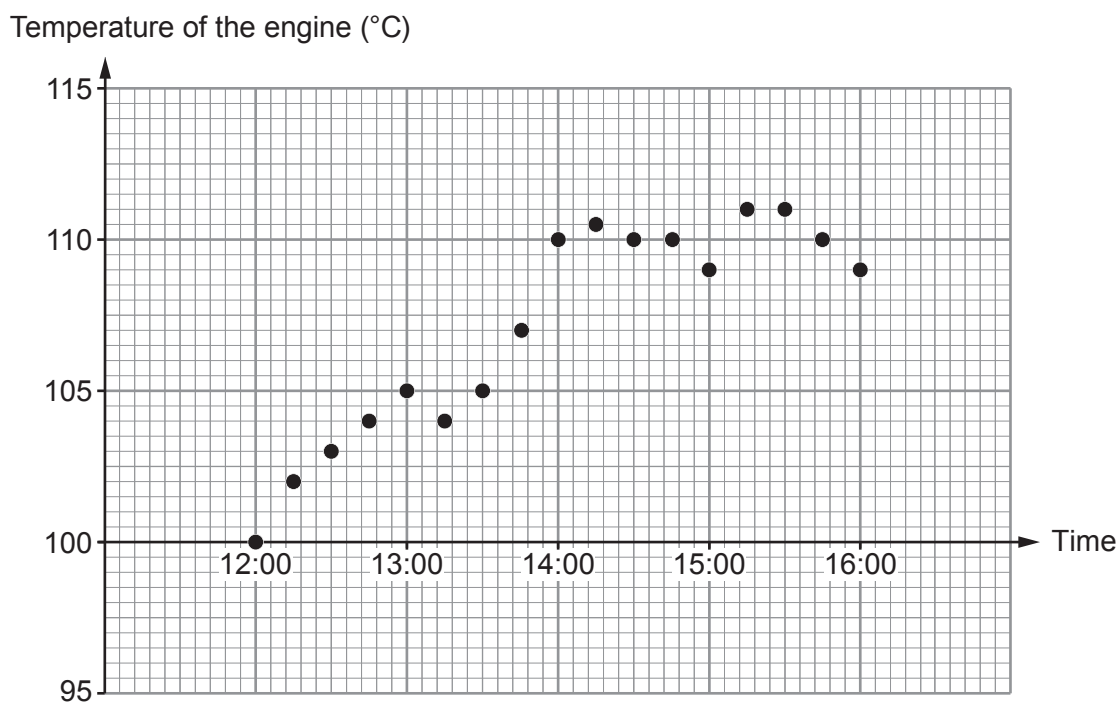© WJEC CBAC Ltd.   (3310U40-1)   **Turn over.**

5. An engine normally runs at 100°C.
When the engine runs at 110°C or more, a warning light comes on.

A section of the temperature chart for the engine, from 12:00 to 16:00, is shown below.

Temperature of the engine (°C)

(a) How often was the temperature of the engine recorded?
Circle your answer. [1]

Every 5 minutes   Every 12 minutes   Every 15 minutes

Every $2\frac{1}{2}$ minutes   Every 30 minutes

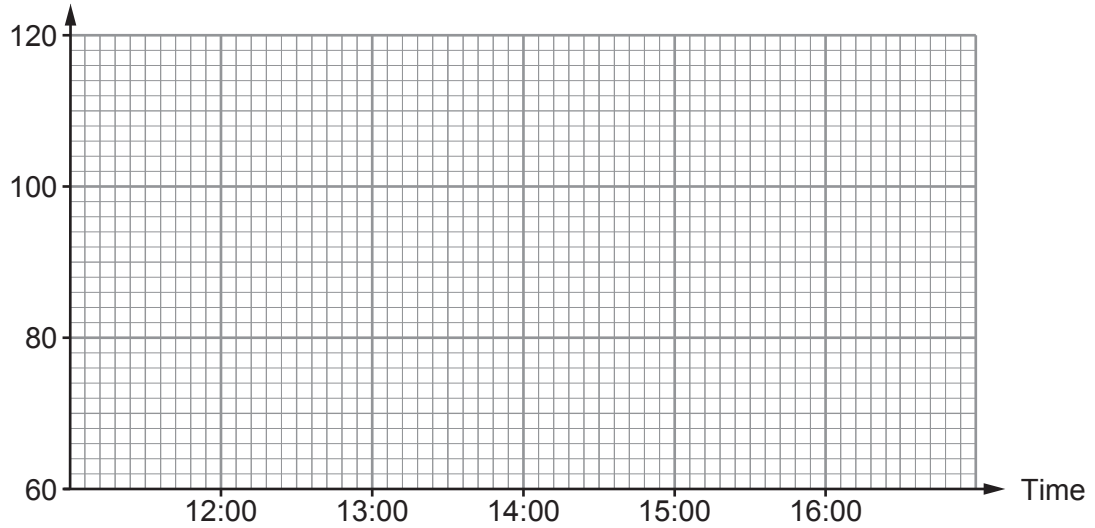(b) At what time was it first recorded that the warning light had come on? [1]

(c) What was the range of the recorded temperatures of the engine between 12:00 and 16:00? [1]

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(d) (i) Use the graph paper below to plot the recorded temperature of the engine at 12:00, 13:00, 14:00, 15:00 and 16:00 only. [1]

Temperature of the engine (°C)

(ii) Why is the graph you have drawn misleading? [1]

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6. (a) Last year, Janita recorded the number of miles she travelled each week in her car. She summarised the information in a frequency table, as shown below.

Number of miles, x	Frequency
$20 \leqslant x < 60$	4
$60 \leqslant x < 80$	8
$80 \leqslant x < 100$	11
$100 \leqslant x < 150$	12
$150 \leqslant x < 200$	17

(i) In which group does the median weekly number of miles lie? Circle your answer. [1]

$20 \leqslant x < 60$ $80 \leqslant x < 100$ $150 \leqslant x < 200$

$60 \leqslant x < 80$ $100 \leqslant x < 150$

(ii) Calculate an estimate of the mean number of miles Janita travelled each week in her car. [4]

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(b)   Last month:
- Janita travelled 440 miles in her car
- the cost of fuel was £1.30 per litre.

Janita's car averages 11 miles per litre of fuel.

Next month, she needs to budget for an increased travel cost.

Janita says,

> The number of miles I travel will increase by 12%.
> The cost of fuel will increase by 10% next month.

Calculate how much Janita should budget for her car travel costs for next month. You must show all your working. [5]

(3310U40-1)   **Turn over.**

Examiner only

7. Mito is a city in Japan.

(a) Complete the following statement. [1]

"The bearing of Tokyo from Mito is ....°."

....

(b) The road distance from Mito to Tokyo is 114 km.
Anzu travelled by car from Mito to Tokyo in 1 hour 27 minutes.

Calculate the average speed of Anzu's journey.
Give your answer in km/h. [3]

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(c) Tilly is travelling to Mito.
She wants to exchange no more than £800 into Japanese yen.

The exchange rate is £1 = 135.72 Japanese yen.

On the day Tilly exchanges her money, the exchange shop only has 1000 Japanese yen notes and 5000 Japanese yen notes available.

Calculate:
- the maximum number of Japanese yen Tilly can buy
- how much, to the nearest penny, this will cost her.

You must show all your working. [5]

(d) Mito has a population of 270 400.

25% of Mito's population is aged 65 or over.
The ratio of the number of people aged 0 to 14 to the number of people aged 15 to 64 is 9 : 41.

Calculate the number of people aged 0 to 14. [4]

(3310U40-1)

Turn over.

8. A motorcyclist leans into a corner on a motorcycle.
The angle of lean is the angle between the vertical and the motorcycle.

When the motorcycle is upright, the centre of the handlebars is 110 cm above the ground.
The diagrams below illustrate a front view of a motorbike as its rider goes into a corner.

The motorcycle is vertical to begin with. It then leans 30 cm horizontally into the corner.
The motorcycle then leans a further 30 cm into the corner, with a total horizontal lean distance of 60 cm.

Diagrams not drawn to scale

Before the corner   Lean of 30 cm into the corner   Lean of 60 cm into the corner

Show that the angle of lean more than doubles as the motorcycle leans from 30 cm horizontally to 60 cm horizontally.
You must show all your working. [5]

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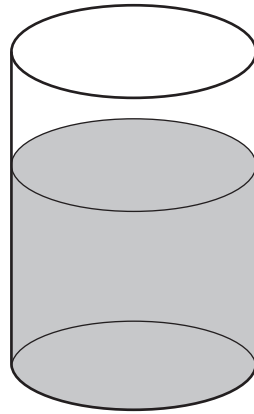
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9. A cylindrical water tank has a radius of 36 cm.
There are 80 litres of water in the tank.

Calculate the height of the water in the tank in centimetres. [4]

Diagram not drawn to scale

Height of water

The height of the water in the tank is .... cm

(3310U40-1)

Turn over.

10. Last year, Khalida paid 2400 dollars income tax.
The tax bands were as follows.

Band	Taxable income	Tax rate
Personal allowance	Up to 5000 dollars	0%
Basic rate	5000 dollars to 25 000 dollars	20%

Calculate Khalida's income before the deduction of tax. [4]

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Khalida's income was .... dollars

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