GCSE

wjec cbac

3310U30-1

S19-3310U30-1

MATHEMATICS – NUMERACY
UNIT 1: NON-CALCULATOR
INTERMEDIATE TIER

TUESDAY, 7 MAY 2019 – MORNING

1 hour 45 minutes

3310U301
01

ADDITIONAL MATERIALS

The use of a calculator is not permitted in this examination.
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 continuation page at the back of the booklet. Question numbers must be given for the work written on the continuation page.

Take π as 3·14.

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 **1**, 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.	**8**	
2.	**4**	
3.	**14**	
4.	**8**	
5.	**10**	
6.	**4**	
7.	**6**	
8.	**11**	
9.	**5**	
10.	**6**	
11.	**4**	
Total	**80**	

Formula List – Intermediate Tier

Area of trapezium $= \dfrac{1}{2}(a + b)h$
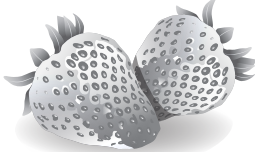
Volume of prism = area of cross-section × length

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1. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Sioned works in a grocery shop.
She has made a poster for the window of the shop.

Strawberries
£8.60 per kg

Raspberries
Today's special offer

.... per kg

Sioned has forgotten to write the price of raspberries on the poster.

Mr Thomas buys $\frac{1}{4}$ kg of strawberries and $1\frac{1}{2}$ kg of raspberries.

He pays with a £20 note.
He gets £2.55 change.

Calculate the price of 1 kg of raspberries.
You must show all your working. [6 + 2 OCW]

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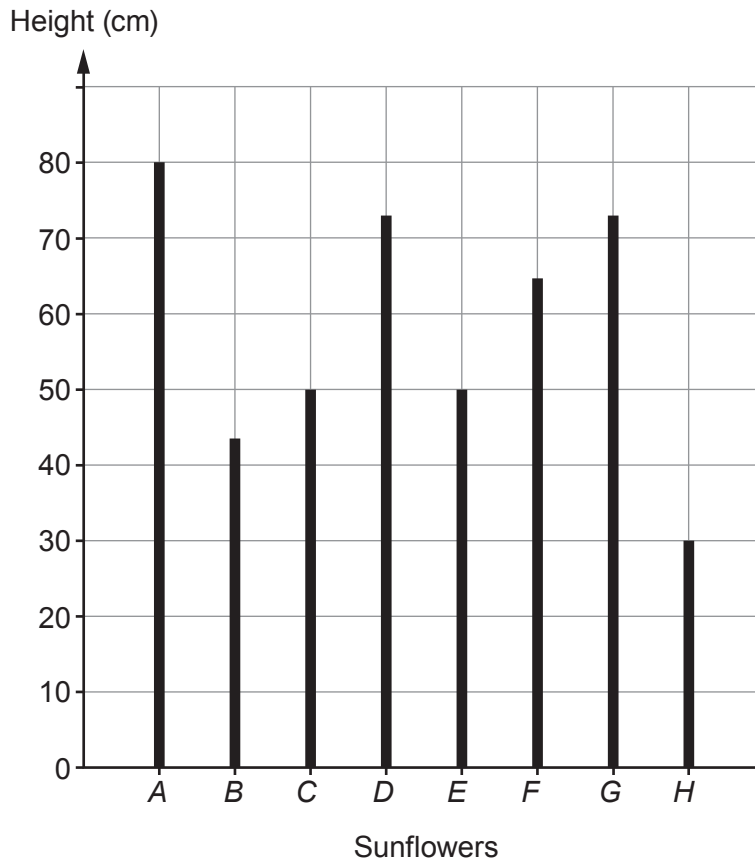
2. Sunflower seeds come in a packet.

Sunflower seeds

Plant in May

Grow to heights of up to 90 cm (36 inches)

Dieter planted 8 sunflower seeds in May.
He labelled the sunflowers *A*, *B*, *C*, *D*, *E*, *F*, *G* and *H*.

On 21st August, he measured the heights of all the sunflower plants in cm.

Dieter then drew a graph, as shown below.

Height (cm)

Sunflowers

(3310U30-1)

(a) Use the graph to answer each of the following questions.

(i) What fraction of the height of the tallest sunflower is the height of the shortest sunflower?
Circle your answer. [1]

$$\frac{3}{10} \qquad \frac{3}{7} \qquad \frac{3}{5} \qquad \frac{3}{8} \qquad \frac{3}{80}$$

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(ii) What is the ratio of the number of sunflowers with heights less than 55 cm to the number of sunflowers with heights greater than 55 cm?
Circle your answer. [1]

5 : 3   3 : 5   1 : 3   3 : 1   1 : 1

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(b) Dieter's friend, Glyn, also planted sunflower seeds.
Glyn's tallest sunflower grew to a height of 24 inches.
Is this taller or shorter than Dieter's tallest sunflower?
You must show all your working to support your answer. [2]

Taller than Dieter's tallest sunflower ☐

Shorter than Dieter's tallest sunflower ☐

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3. Aled and Gareth went on holiday to France.

(a) The total cost of the holiday was £660.

- Aled's mother paid $\frac{1}{3}$ of the total cost.

- Aled and Gareth shared the remaining cost in the ratio 1 : 9.

(i) Calculate how much each person paid towards the cost of the holiday. [4]

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Aled's mother paid £ ....

Aled paid £ ....

Gareth paid £ ....

(ii) Explain how you could use your answers to check that they are correct. [1]

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(b) Gareth's luggage weighed 21·13 kg.
This was over the maximum of 20 kg allowed.

Gareth removed items from his luggage so that its mass was:
- as close to 20 kg as possible,
- **not greater** than 20 kg.

From the following list of items, which **two** items did Gareth remove?
You must show all your working.   [3]

Coat	Headphones	Jumper	Book	Hat
820 g	300 g	320 g	340 g	200 g

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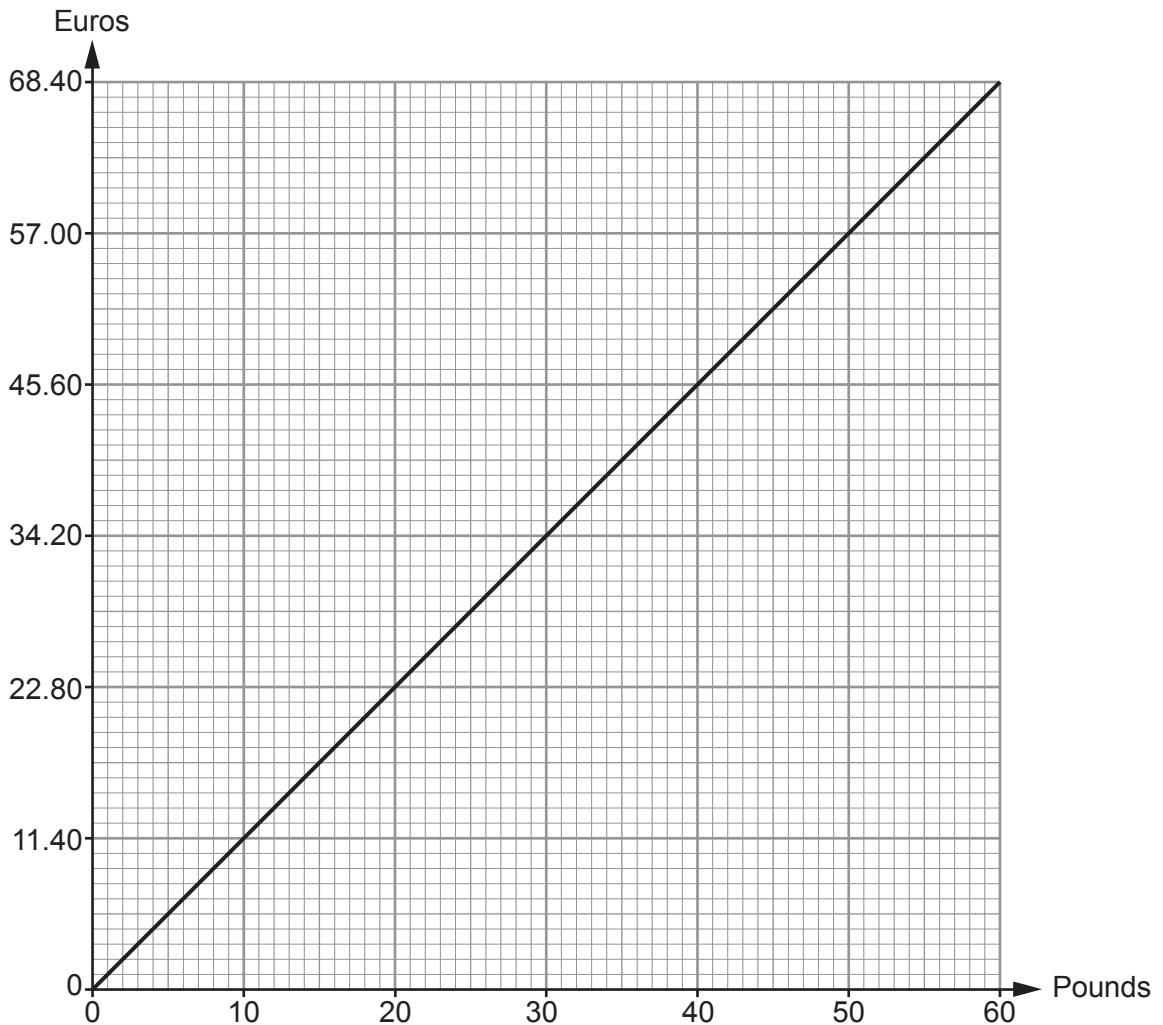*(c)* Before going on holiday, Aled made a conversion graph to help him understand prices in euros.

Use Aled's conversion graph to answer the following questions.

(i) A camera costs £90.
How much is this in euros? [2]

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Camera costs .... euros

(ii) A meal costs £25.
How much is this in euros? [2]

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Meal costs .... euros

(d) Gareth looked at exchange rates for buying euros.
He recorded the exchange rates for the previous 60 days, as shown below.

£1 = b euros	Frequency
$1.00 \leqslant b < 1.04$	2
$1.04 \leqslant b < 1.08$	8
$1.08 \leqslant b < 1.12$	16
$1.12 \leqslant b < 1.16$	33
$1.16 \leqslant b < 1.20$	1

Gareth started to draw a frequency diagram to show this information.
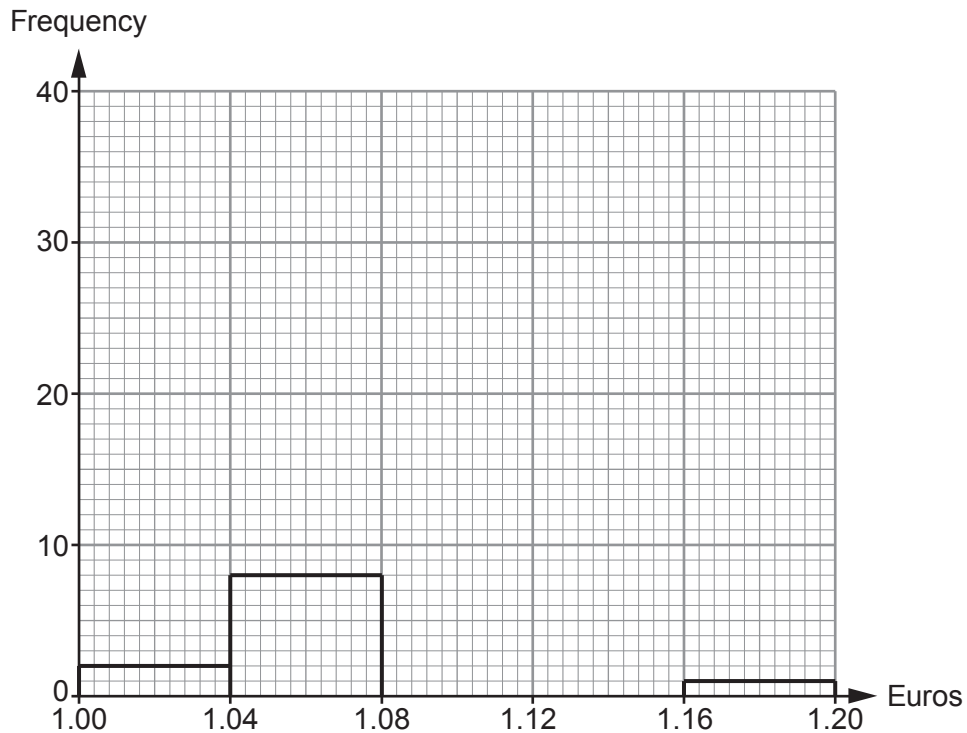
(i) Complete the frequency diagram. [1]

(ii) Which is the modal group?
Circle your answer. [1]

60        $1.08 \leqslant b < 1.12$ 33 $1.12 \leqslant b < 1.16$ 16

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4. The distance a car will travel using 1 gallon of fuel is called its fuel economy.
The fuel economy of a number of cars with different engine sizes is shown below.

Fuel economy (miles per gallon)
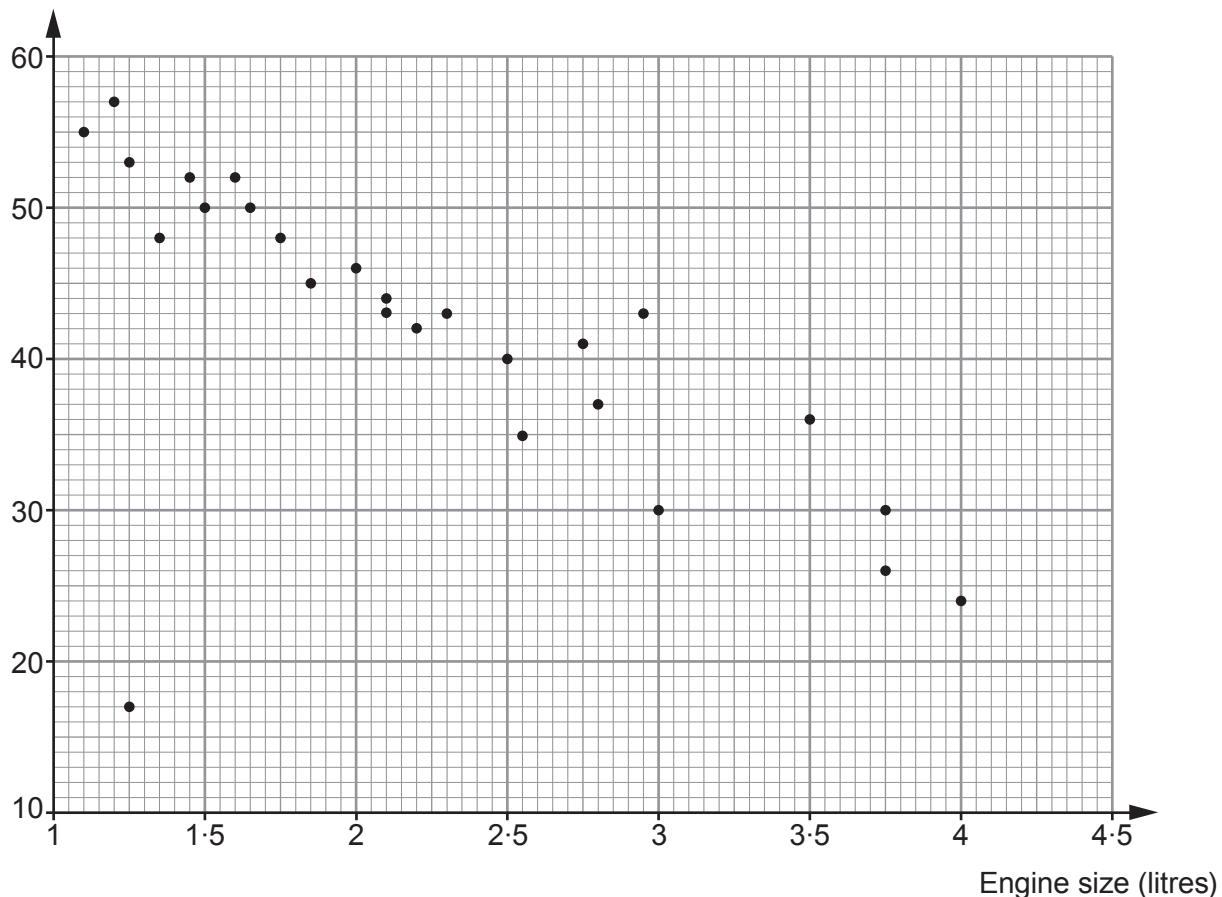
Engine size (litres)

Use the scatter diagram to answer the following questions.

(a) State the fuel economy of the car with the largest engine size. [1]

Fuel economy .... miles per gallon

(b) State the engine size of the car with a fuel economy of 42 miles per gallon. [1]

Engine size .... litres

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(c) (i) Calculate the mean fuel economy of the 5 cars with the **smallest** engine sizes. [3]

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Mean fuel economy is .... miles per gallon

(ii) Why is this not a suitable average for cars with engine sizes of less than 1·5 litres?
[1]

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(d) Draw, by eye, a line of best fit on the scatter diagram. [1]

(e) Siân says,

> The scatter diagram is more reliable to estimate the fuel economy
> of cars with engine sizes less than 2·5 litres.

Do you think Siân is correct?

Yes ☐   No ☐   Don't Know ☐

You must give a reason for your answer. [1]

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5. *Rupert Shoes* sells shoes online.

(a) The designer has drawn a sketch of a new label to stick on the shoeboxes.

10 cm

8·2 cm

Rupert Shoes

8 cm

12 cm
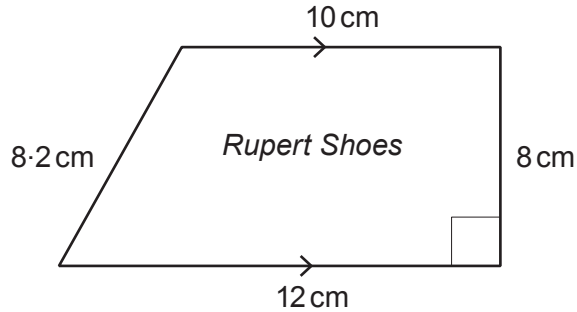
Diagram not drawn to scale

She takes the sketch to the printers.
The table shows the costs for printing 100 labels.

Area of label, to the nearest cm^2	Cost to print 100 labels
Up to 80 cm^2	£1.15
81 cm^2 to 85 cm^2	£1.25
86 cm^2 to 89 cm^2	£1.50
90 cm^2 or more	£1.75

How much will it cost to have 500 of the designer's label printed?
You must show all your working. [4]

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(b) Pairs of shoes are packed in shoeboxes.
The dimensions of the shoebox used are given on the diagram below.
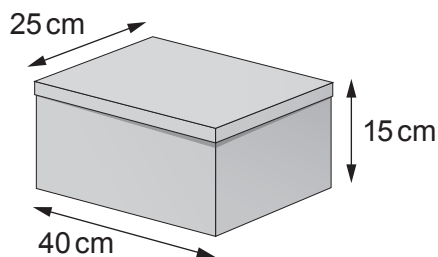

25 cm

15 cm

40 cm

Diagram not drawn to scale

(i) What is the area of the smallest face of the shoebox?
Circle your answer. [1]

40 cm²   225 cm²   375 cm²   800 cm²   1000 cm²

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(ii) A customer orders 2 pairs of shoes.

The package for sending the shoes to the customer is made by:
- placing one box on top of the other, and
- taping the two boxes together.

This is shown in the diagram.

The cost for sending the package is calculated using the formula below. All dimensions are measured in cm.
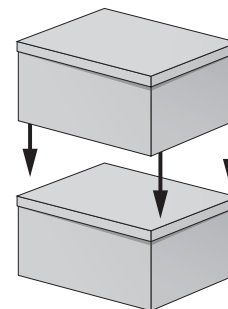
$$\text{Cost in £} = \frac{1}{5} \times (S + F) \times 0{\cdot}02$$

S = value of the sum of the 3 dimensions of the package
F = value of the area of one of the **largest** faces of the package

How much does it cost *Rupert Shoes* to send the package?
Give your answer in pounds.
You must show all your working. [5]

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Turn over.

6. A builder has drawn a plan for building 3 office blocks on a plot of land. They are numbered 1, 2 and 3, as shown below.

The scale of the plan is **1 cm represents 20 m**.
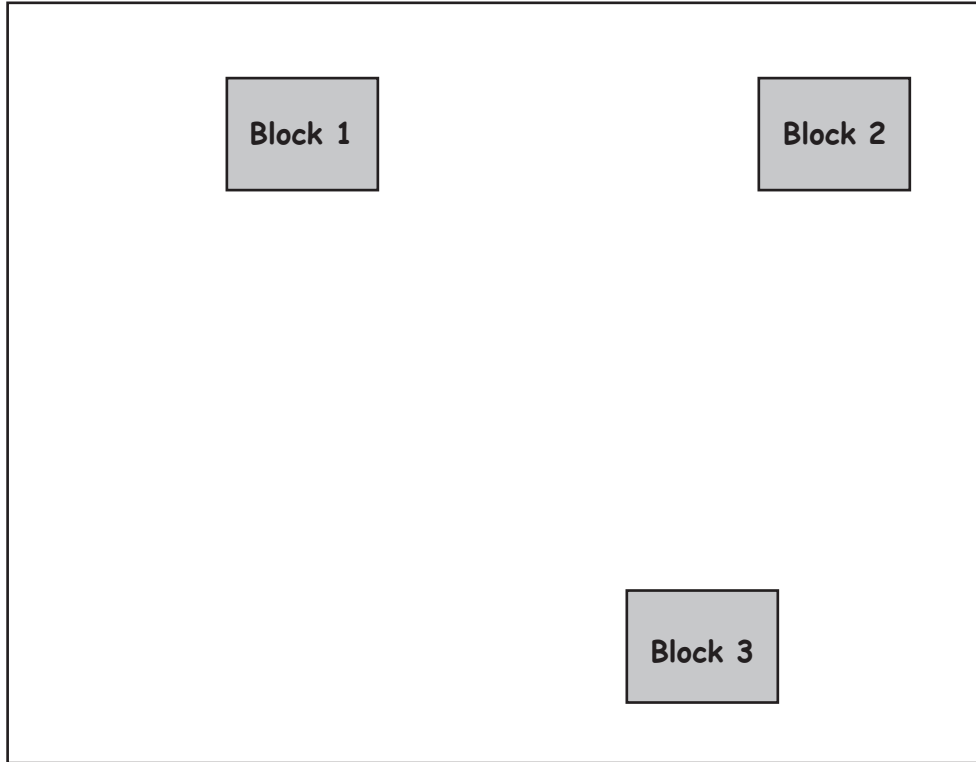
(a) The builder is planning to plant a tree so that it is:
- the same distance from Block 1 as it is from Block 2,
- 80 metres from the top left hand corner of Block 3.

Mark the position for the planting of the tree. [3]

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(b) What is the shortest possible distance between Block 2 and Block 3? [1]

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.... metres

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7. *(a)* *Sam's Garden Centre* buys trees to sell.

Sam bought 200 trees.
Each tree cost Sam £25.

22% of the trees were not sold.
Sam sold all the other trees for £40 each.

How much profit did Sam make?

You must show all your working. [5]

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(b) The trees are planted in identical pots. They each have a uniform cross-section in the shape of a regular hexagon.

Show that these pots will tessellate. [1]

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120°

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8. A helicopter pilot is planning a route from Milford Haven to Ruabon and then on to Swansea.

   (a) To plan the flights, the pilot needs to find the bearings from a map.

   (i) Find the bearing of Ruabon from Milford Haven. [1]

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   (ii) Find the bearing of Swansea from Ruabon. [1]

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(b)   The plan for the flight is shown below.

Journey	Average speed	Time
Milford Haven to Ruabon	90 mph	1 hour 20 minutes
Ruabon to Swansea	80 mph	1 hour 15 minutes

(i)   Calculate the total distance of the flight.
Give your answer in miles.
You must show all your working. [4]

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Total distance is .... miles

(ii)   On average, the helicopter uses 0·4 gallons of fuel per minute.

Remember: 1 gallon = 4·55 litres

Use this information to calculate how many litres of fuel the helicopter would be expected to use for the flight planned in *(b)*(i).
You must show all your working. [5]

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Fuel = ... litres

(3310U30-1)   **Turn over.**

9. You are given that:
1 gigalitre = $1\,000\,000\,m^3$
1 megalitre = 1 million litres

Lake Vyrnwy is a reservoir in mid Wales.

(a) Lake Vyrnwy can release between 25 and 45 megalitres of water per day from the dam.

The lake also supplies water through underground pipes to another reservoir at a rate of $230\,000\,m^3$ per day.

(i) How many litres are there in 25 megalitres?
Circle your answer. [1]

25×10^8 25×10^{-6} 25×10^7 $2{\cdot}5 \times 10^6$ $2{\cdot}5 \times 10^7$

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(ii) Which is the best estimate for the volume of water passing through the underground pipes **per hour**?
Circle your answer. [1]

$8500\,m^3$ $9600\,m^3$ $10\,040\,m^3$ $10\,400\,m^3$ $11\,000\,m^3$

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(3310U30-1)

(b) Lake Vyrnwy has a surface area of approximately $4\,540\,000\,m^2$.
Lake Vyrnwy contains 59·7 gigalitres of water.

Calculate an estimate of the average depth of the lake.
Give your answer in metres.

[3]

Estimate of average depth is .... m

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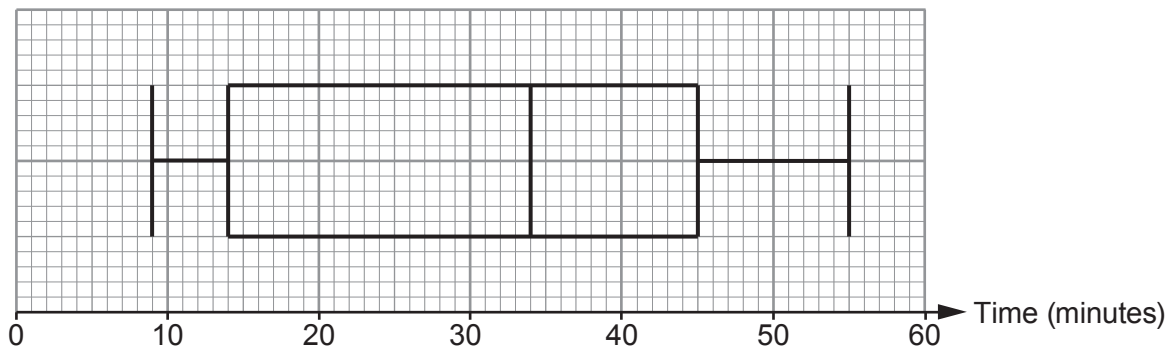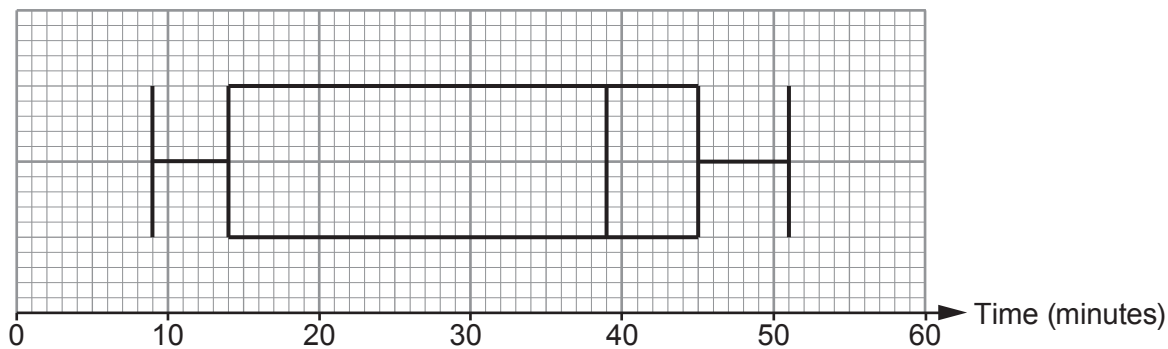**Turn over.**

10. *(a)* Maesystrad, Rhewlteg and Glanmawr are three colleges.
Each college recorded the times Year 12 students took to travel to college.
The results are displayed in the box-and-whisker plots below.

Maesystrad

Rhewlteg

Glanmawr
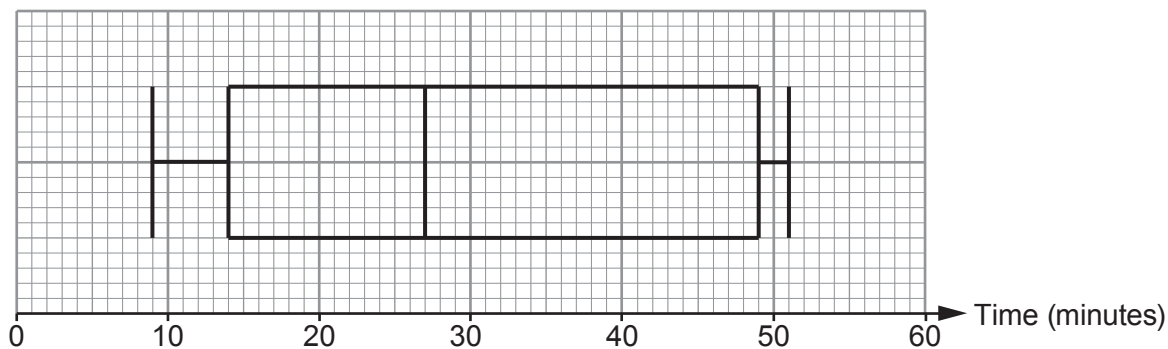
(i) Which of the three colleges has the greatest range of times?
What is the range of times for this college? [1]

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College .... Range .... minutes

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(ii) On average, in which college did Year 12 students have the longest travel times? You must give a reason for your answer. [1]

College: ....

Reason: ....

....

(iii) Which college has the greatest difference between the median and the lower quartile?
What is this difference? [1]

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College .... Difference .... minutes

(iv) Which of the three colleges has the greatest number of Year 12 students?
Give a reason for your answer. [1]

Maesystrad ☐ Rhewlteg ☐ Glanmawr ☐ Don't know ☐

Reason: ....

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(b) At another college, Wynne College, there are 240 students in Year 12.

The interquartile range of the times taken for these students to travel to college is 32 minutes.

(i) How many of these students have travel times within this interquartile range? [1]

....

.... students

(ii) 75% of the Year 12 students at Wynne College take less than 55 minutes to travel to college.
Complete the following statement.

'25% of the Year 12 students at Wynne College take less than

.... minutes to travel to college.' [1]

....

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(3310U30-1) **Turn over.**

11. The table below shows the approximate land area and population for 5 countries in 2014.

Country	Approximate land area, km^2	Approximate population
Argentina	2 800 000	40 000 000
Austria	84 000	8 400 000
Canada	10 000 000	34 000 000
Pakistan	800 000	170 000 000
United Kingdom	240 000	62 000 000

(a) Which of the 5 countries had a population density of approximately 100 people per km^2?
Circle your answer. [1]

Argentina   Austria   Canada   Pakistan   United Kingdom

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(b) Which of these countries had the greatest population density?
Circle your answer. [1]

Argentina   Austria   Canada   Pakistan   United Kingdom

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(c) Which of these countries had a population density that is approximately 4 times the population density of Canada?
You must show all your working. [2]

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Question number	Additional page, if required. Write the question number(s) in the left-hand margin.	Examiner only

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