GCSE

wjec cbac

3300U40-1

A21-3300U40-1

WEDNESDAY, 10 NOVEMBER 2021 – MORNING

MATHEMATICS
UNIT 2: CALCULATOR-ALLOWED
INTERMEDIATE TIER

1 hour 35 minutes

ADDITIONAL MATERIALS

A calculator will be required for 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 additional page at the back of the booklet. Question numbers must be given for all 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 **3**, 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.	4	
2.	3	
3.	6	
4.	2	
5.	4	
6.	4	
7.	5	
8.	5	
9.	3	
10.	3	
11.	4	
12.	4	
13.	5	
14.	3	
15.	9	
16.	3	
17.	3	
Total	70	

Formula List – Intermediate Tier

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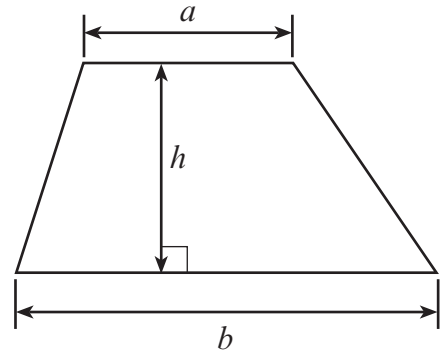
Volume of prism = area of cross-section × length

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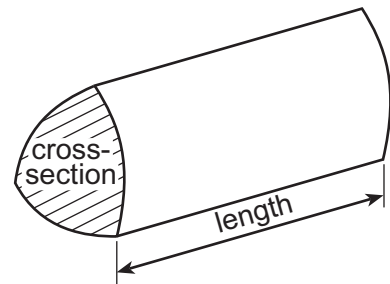
1. *(a)* Solve $7x - 3 = 11$. [2]

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(b) Find the value of $3f + 2g$ when $f = 5{\cdot}8$ and $g = -3{\cdot}7$. [2]

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2. *(a)* One of these fractions can be written as a recurring decimal.
Circle this fraction. [1]

$$\frac{117}{234} \qquad \frac{5}{8} \qquad \frac{13}{65} \qquad \frac{24}{54} \qquad \frac{3}{16}$$

(b) Which one of the following numbers is a factor of 92?
Circle your answer. [1]

31   23   29   36   6

(c) Which one of the following numbers is a multiple of 17?
Circle your answer. [1]

1953   1653   2053   1853   1753

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

A company produces 440 boxes of paper clips each day.
Each box contains between 320 and 330 paper clips.

Calculate the approximate total number of paper clips produced in 200 days.
Give your answer to the nearest ten million.
You must show all your working. [4 + 2 OCW]

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4. Thirty numbers are recorded in the grouped frequency table below.

Group	1 to 20	21 to 40	41 to 60	61 to 80	81 to 100
Frequency	3	8	7	6	6

It is decided that the same thirty numbers should be recorded in a table with larger group widths.

This new table is shown below, but only one frequency has been given.

Group	1 to 30	31 to 60	61 to 90
Frequency			12

(a) What is the smallest possible frequency of the 1 to 30 group? [1]

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(b) What is the greatest possible frequency of the 31 to 60 group? [1]

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5. *(a)* A camera was switched on at

21:45 on 20th March, 2021.

It was left continuously filming until the battery ran out.

The battery lasted for exactly 2 days and 10 hours.

At what time and on which date did the battery run out? [2]

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Battery ran out at .... : .... on .... March 2021.

(b) Helen says,

15 miles is nearly 25 kilometres.
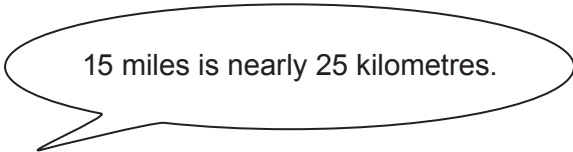
Is she correct?
You must show all your working. [2]

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Turn over.

6. *ABCD* and *PQRS* are both squares.
AB = 9 cm.
Shaded area = 32 cm^2.

Calculate the length of *PQ*. [4]

Diagram not drawn to scale

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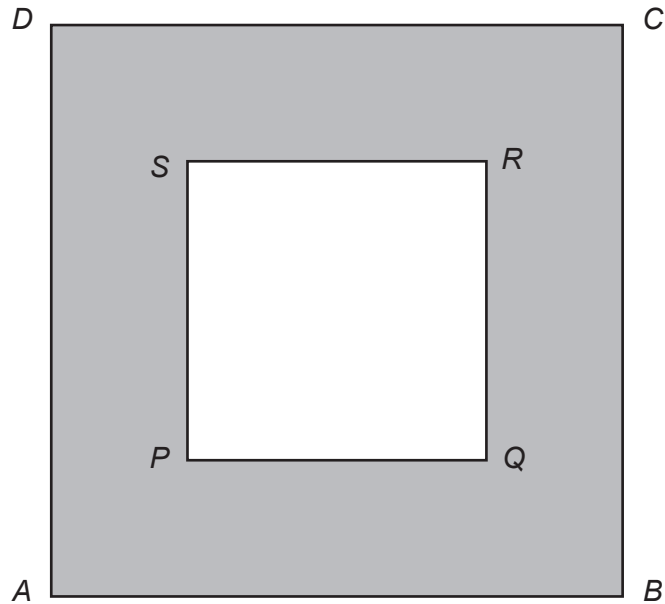
7. *(a)* Calculate $\dfrac{13\cdot8 \times 0\cdot7}{9\cdot5 - 2\cdot8}$.

Give your answer correct to 3 decimal places. [2]

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(b) Evaluate

$$(17\tfrac{1}{2}\% \text{ of } 1600) - (\text{the square root of } 8000).$$

Give your answer correct to the nearest whole number. [3]

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Turn over.

8. Geraint is running a game in a school fair.
A large number of balls are placed in a box.
Each of the balls is one of three colours: bronze, silver or gold.

In the game, a ball is chosen at random from the box.
The table below shows the probability of choosing a bronze ball and the probability of choosing a silver ball.

Colour	Bronze	Silver	Gold
Probability	0·68	0·22	

In the game, each person pays £2 to choose a ball at random from the box.
The ball is then returned to the box.

The person wins £3 if a silver ball is chosen.
The person wins £8 if a gold ball is chosen.
There is no prize for choosing a bronze ball.

100 people each play the game once.

How much profit would you expect Geraint to make?
You must show all your working. [5]

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9. The nth term of a sequence is given by $1{\cdot}7n - 3$.

   (a) Write down the first three terms of this sequence.   [2]

      1st term = ...   2nd term = ...   3rd term = ...

   (b) Which **term** will be the first whole number in this sequence?   [1]

      First whole number is the ....th term.

10. A rectangle has sides of length $2(3a - 7)\,\text{cm}$ and $(5a + 4)\,\text{cm}$.
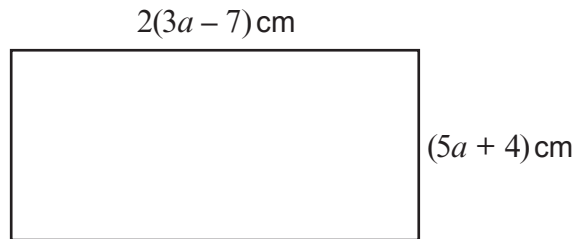
$$2(3a - 7)\,\text{cm}$$

$$(5a + 4)\,\text{cm}$$

Diagram not drawn to scale

Form an expression, in terms of a, for the perimeter of this rectangle.
You must simplify your expression.   [3]

(3300U40-1)   **Turn over.**

11. A company has two sites.
One is in North Wales and the other is in South Wales.

The pie charts below show the distribution of its 96 part-time staff and its 150 full-time staff.
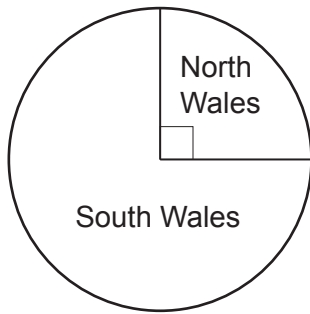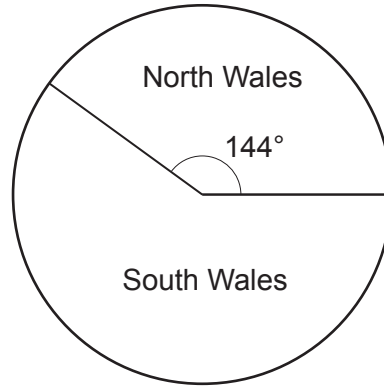
96 part-time staff   150 full-time staff

A person is chosen at random from the company's 246 staff members.
What is the probability that this person works at the site in North Wales?   [4]

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12. A solution of the equation

$$x^3 + 3x = 20$$

lies between 2 and 3.

Use the method of trial and improvement to find this solution correct to 1 decimal place. You must show all your working. [4]

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13. Show that the triangle below is **not** a right-angled triangle. [5]

Diagram not drawn to scale

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14. Calculate the length of the side *AB* in the triangle shown below. [3]

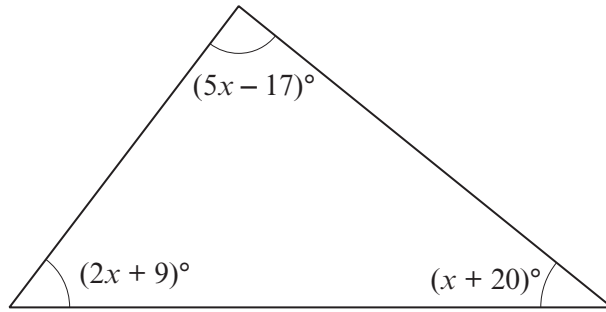*Diagram not drawn to scale*

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Turn over.
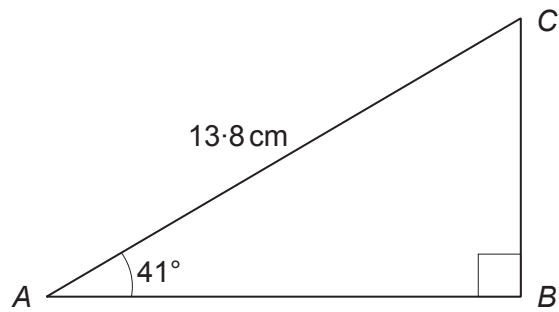
15. *(a)* (i) Expand $x(x^2 + 7)$. [2]

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(ii) Expand and simplify $(x - 5)(3x - 4)$. [2]

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(b) Sarah buys and sells antique clocks.
On Monday, Sarah had n clocks.
At the end of the day on Tuesday, she had 5 times as many clocks as she had on Monday.
On Wednesday, she sold 27 clocks.

(i) At the end of the day on Wednesday, Sarah had fewer clocks than she had on Monday.
Write an inequality, in terms of n, that shows this information. [2]

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(ii) Solve your inequality to find the greatest number of clocks that Sarah could have had on the Monday. [3]

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16. *(a)* A number, when increased by 4%, is equal to N.
Which of the following calculations would give you the original number?
Circle your answer. [1]

$$N \times 1 \cdot 04 \qquad N \div 1 \cdot 04 \qquad N \times 1 \cdot 4 \qquad N \div 1 \cdot 4 \qquad N - 4$$

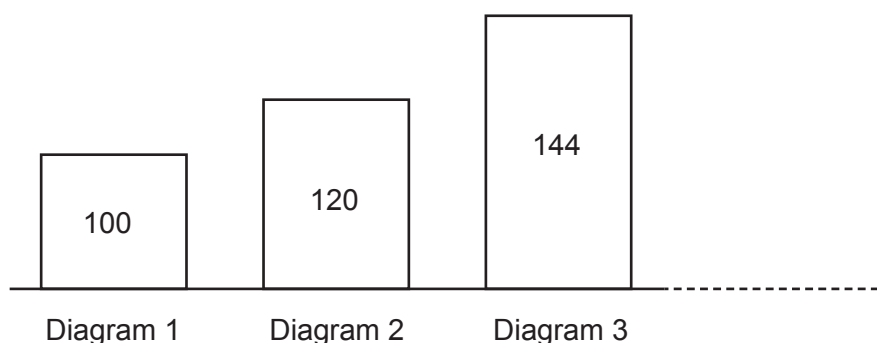*(b)* The number shown on each diagram below is 20% greater than the number shown on the previous diagram.

	144
120	
100	

Diagram 1   Diagram 2   Diagram 3

Diagram not drawn to scale

Find the number that should be shown on Diagram 6. [2]

Turn over.

17. Factorise $x^2 - 4x - 12$, and hence solve $x^2 - 4x - 12 = 0$. [3]

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END OF PAPER

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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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