Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

C300U10-1

S24-C300U10-1

THURSDAY, 16 MAY 2024 – MORNING

MATHEMATICS – Component 1
Non-Calculator Mathematics
FOUNDATION TIER

2 hours 15 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**7**	
2.	**3**	
3.	**5**	
4.	**6**	
5.	**2**	
6.	**4**	
7.	**4**	
8.	**7**	
9.	**3**	
10.	**2**	
11.	**5**	
12.	**3**	
13.	**4**	
14.	**5**	
15.	**3**	
16.	**4**	
17.	**5**	
18.	**4**	
19.	**3**	
20.	**2**	
21.	**4**	
22.	**5**	
23.	**4**	
24.	**5**	
25.	**4**	
26.	**3**	
27.	**4**	
28.	**6**	
29.	**4**	
Total	**120**	

ADDITIONAL MATERIALS

An additional formulae sheet.

The use of a calculator is not permitted in this examination.

A ruler, 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** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

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.

You are reminded of the need for good English and orderly, clear presentation in your answers.

JUN24C300U10101

C300U101
01

Formula list

Area and volume formulae

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone:

Curved surface area of a cone = πrl

Surface area of a sphere = $4\pi r^2$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

Kinematics formulae

Where a is constant acceleration, u is initial velocity, v is final velocity, s is displacement from the position when $t = 0$ and t is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

Examiner only

Answer **all** questions.

1. (a) Write down the value of 2 in the number 1·27. [1]

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(b) Write 32 928 correct to the nearest 1000. [1]

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(c) Write down the value of 8^2. [1]

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(d) Calculate 20 + 4 ÷ 4. [1]

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(e) Calculate 0·4 + 0·21. [1]

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(f) Write these numbers in order of size. Start with the smallest number. [1]

5 –7 3·2 –7·5

....

Smallest Largest

(g) Write the following inequality in words. [1]

$$-4 < x$$

.....

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03

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2. Lewis has a bag containing 10 coloured counters.
He chooses one counter from the bag at random.

(a) There is an even chance that Lewis chooses a blue counter.
How many blue counters are there in his bag? [1]

.....

(b) It is impossible for Lewis to choose a red counter.
How many red counters are there in his bag? [1]

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(c) It is unlikely that Lewis chooses a yellow counter.
What is the smallest number of yellow counters that Lewis could have in his bag? [1]

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3. (a) Write $\frac{3}{50}$ as a percentage. [1]

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(b) Calculate $\frac{3}{5}$ of 20. [2]

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(c) Calculate 70% of 50. [2]

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4. (a) Kelly is planning a family trip to the zoo.

The 2 adults and 3 children will all travel in the same car.
Each person will need an entrance ticket and lunch.

The costs for the trip are:

Petrol	£40
Tickets to the zoo	£15 per adult £10 per child
Lunch	£12 per adult £7 per child

Kelly has £180 to spend on the trip.
She pays for the petrol, the tickets and the lunches.
How much money will she have left? [4]

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Kelly has ..... left.

(b) Last year, 10% of visitors to the zoo bought a bag of animal feed.

This year the zoo expects 650 000 visitors.
How many bags of animal feed do they expect to sell this year? [2]

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5. (a) Circle the expression that is the same as '4 more than y'. [1]

$y-4$ $\quad$ $4+y$ $\quad$ $\frac{4}{y}$ $\quad$ $4y$ $\quad$ $\frac{y}{4}$

(b) Calculate the value of $-8x$ when $x = -3$. [1]

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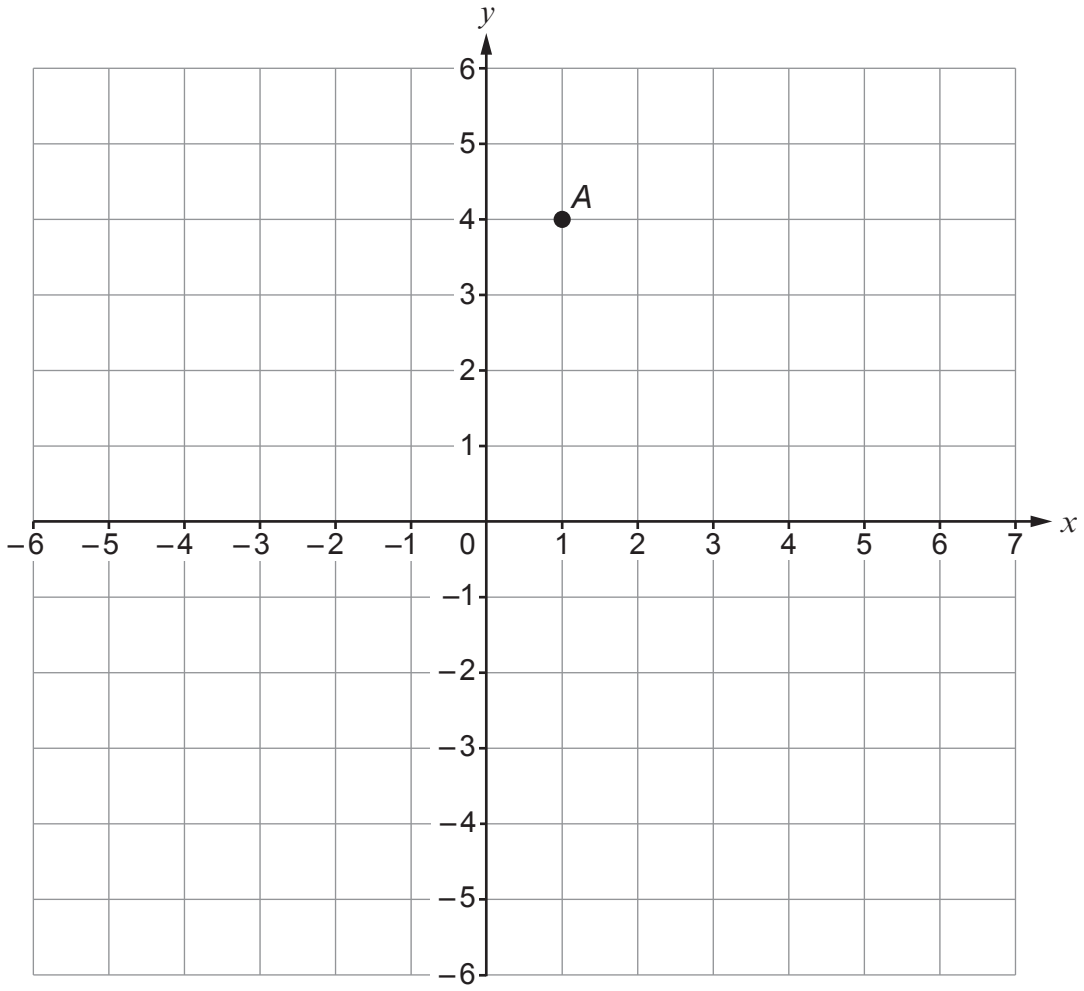
6.



(a) On the grid, plot the point B (5, –2). [1]

(b) ABC is a triangle with a right-angle at C.
Plot the position of the point C. [1]

(c) Find the coordinates of the midpoint of the line AB. [2]

Coordinates of the midpoint of line AB are (..... , ...)

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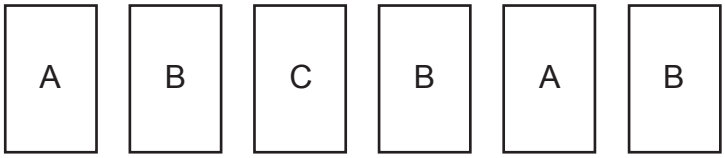
7. David has 6 cards.
Each card has a letter on it.



(a) Which letter is the mode? [1]

.....

(b) One of the cards is chosen at random.

(i) On the probability scale below, mark with an arrow (↓) the probability that the card chosen has a letter A on it. [1]

(ii) Write down the probability that the card chosen has a letter C on it. [1]

.....

(c) Write down the ratio of the number of cards with a letter A to the number of cards with a letter B. [1]

.....

A : B = ... : .....

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8. (a) Simplify $4 \times w \times 3 \times y$. [1]

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(b) In **each** of the spaces below, write a term to make the statement correct. [1]

$$f + \text{.....} - \text{.....} = 6f$$

(c) Solve each of the following equations.

(i) $6x = 48$ [1]

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(ii) $\frac{a}{4} = 40$ [1]

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(d) Twowheels is a bike hire company.
Customers can hire bikes from Twowheels for a whole number of days.

The company uses the following formula to calculate its hire costs.

Bike hire cost = £20 + £15 × number of hire days

Tom wants to hire a bike from Twowheels.
He has £150 to spend.

What is the greatest number of days for which Tom can hire a bike? [3]

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Tom can hire a bike for ..... days

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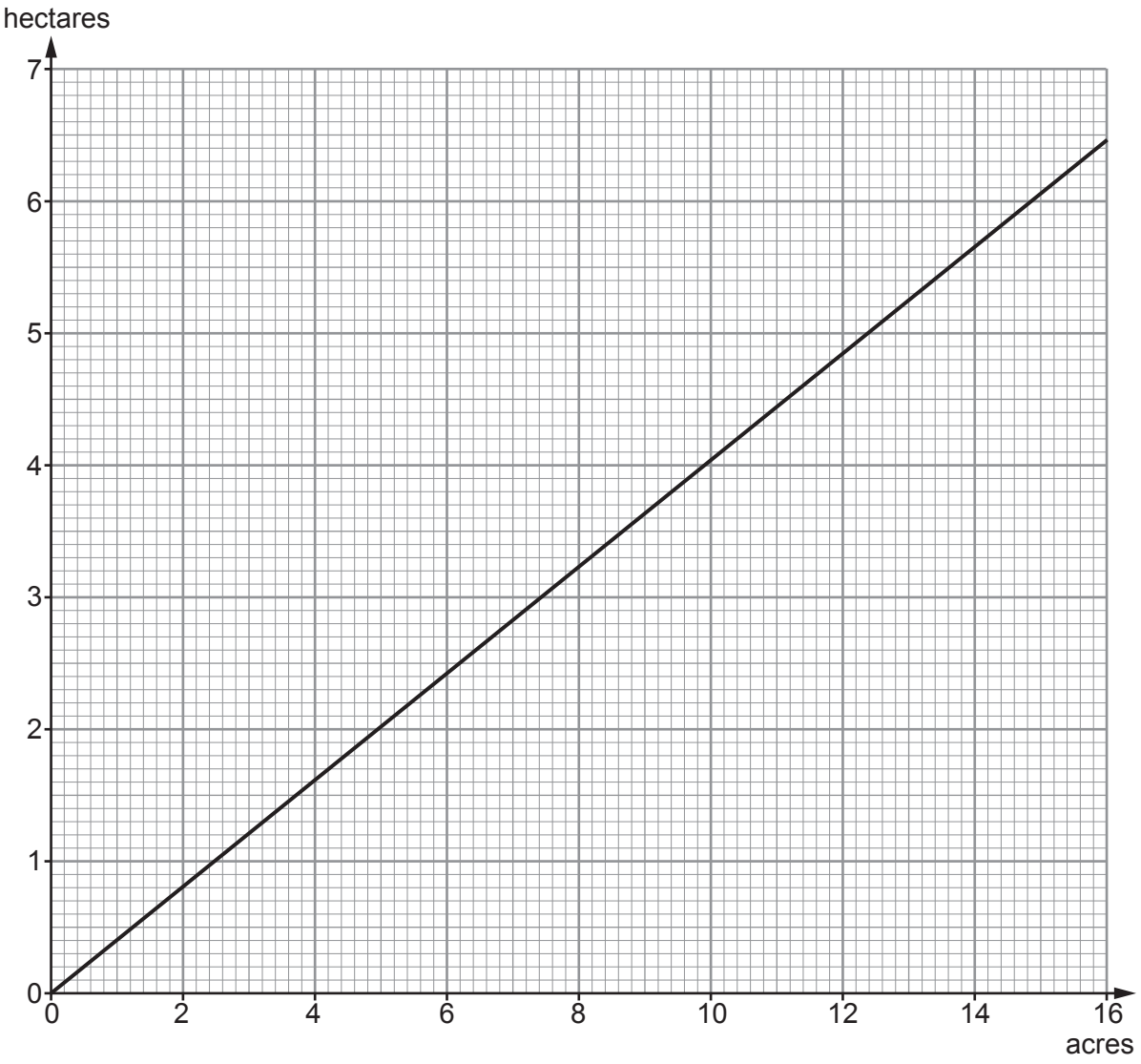
9. The conversion graph below can be used to convert between acres and hectares.



Use the graph to answer the following questions.

(a) How many acres are equal to 4·5 hectares? [1]

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(b) Complete the following statement.
You must show all your working. [2]

26 acres is equal to ..... hectares.

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09

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10. A shop that sells scented candles is holding a sale.
The original price of each candle was £3.

In the sale, the candles are sold at half price.
Sam has £38.
Sam thinks that the maximum number of candles that she can now buy is exactly twice as many as she could buy at the original price.

Is Sam correct?

☐ Yes ☐ No

You must explain your reasoning. [2]

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Examiner only

11. Here is part of a train timetable between London Paddington and Bristol Parkway.

London Paddington	18:01	18:18	18:43	19:18	19:48	20:01
Reading		18:43	19:10	19:43	20:13	
Swindon		19:10	19:37	20:10	20:40	
Bristol Temple Meads	19:30					21:34
Bristol Parkway	19:46	19:51	19:59	20:31	21:01	21:56

(a) Darren catches the 19:48 train from London Paddington to Bristol Parkway.
How many **minutes** should his train journey take? [2]

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(b) Jennifer lives in London.
She went to an event in Swindon.

Jennifer left her house at 6:10 p.m.
It took her 10 minutes to get to London Paddington station.
She then took the next train to Swindon.
This train arrived in Swindon on time.
It then took her 12 minutes to get to the event.

The event started at 7:45 p.m.
How many minutes late did Jennifer arrive at the event?
You must show your working. [3]

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Jennifer arrived ..... minutes late

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Examiner only

12. (a) Lisa, Flynn and Jane each have a number of marbles.

Jane has 8 marbles.

Jane has half as many marbles as Flynn.
Flynn has 4 times as many marbles as Lisa.

Write the numbers of marbles they each have as a ratio.
Give your answer in its simplest form. [2]

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Lisa : Flynn : Jane = ... : ..... : .....

(b) Siân is trying to write 2 m to 30 cm as a ratio in its simplest form.
Here is her working.

Explain why Siân's answer is **not** correct. [1]

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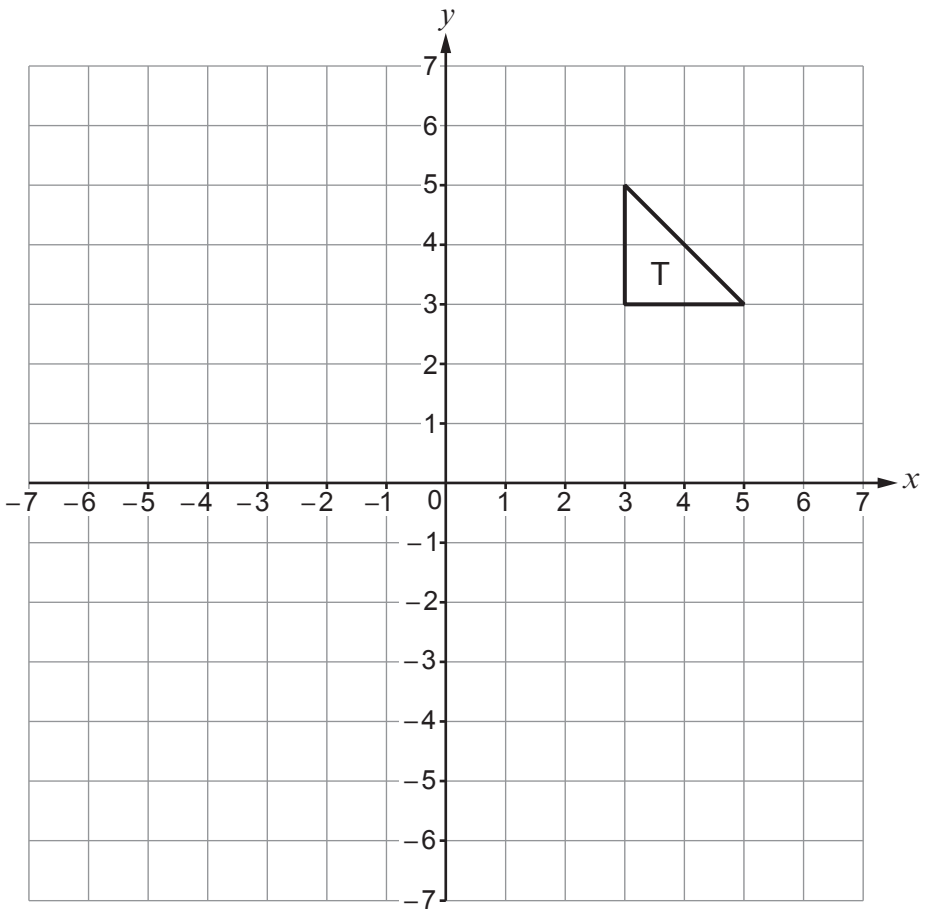
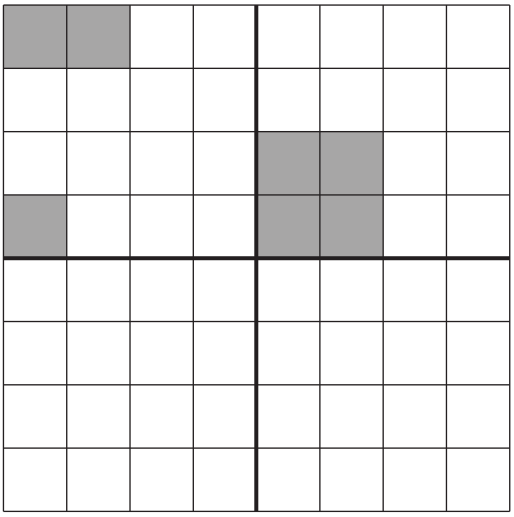
Examiner only

13. (a) Reflect the triangle T in the line $y = 2$. [2]



(b) Shade the least number of squares in the lower two quadrants so that the grid has rotational symmetry of order 2. [2]



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14. (a) Suzanne drives from Liverpool to Hull.
She drives at an average speed of 52 miles per hour for $2\frac{1}{2}$ hours.
Calculate the distance that Suzanne travels. [2]

Suzanne travels ..... miles

(b) Suzanne planned her journey using a map.
The map has a scale of 1:200 000.

On the map, the distance between two roundabouts measures 3 cm.
What is the actual distance in **kilometres**? [3]

The actual distance is ..... km

15. (a) Factorise $3a + 7ab$. [1]

(b) Make w the subject of the formula $y = 5w - 4$. [2]

Examiner only

16. In the diagram below, *BE* is a straight line.

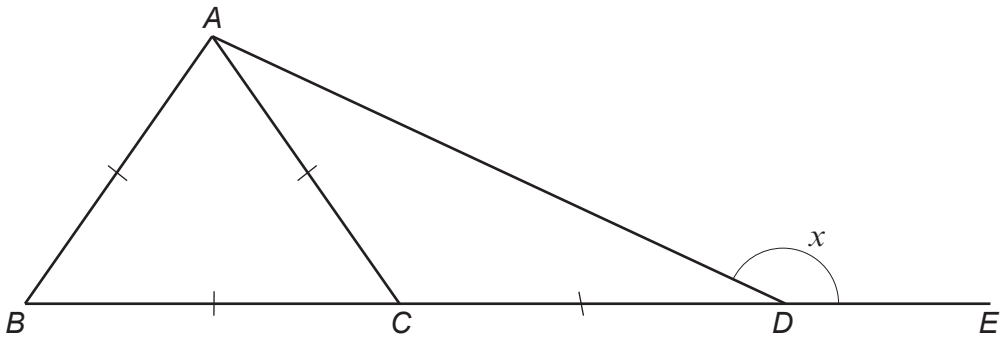

Diagram not drawn to scale

Show that x = 150º.
You must give a reason for each step of your working. [4]

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Examiner only

17. (a) Calculate $0{\cdot}4 \div 0{\cdot}01$. [1]

(b) Calculate each of the following.
Give your answers in their simplest form.

(i) $\frac{1}{4}+\frac{3}{5}$ [2]

(ii) $\frac{5}{6}\times\frac{3}{10}$ [2]

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18. The diagram below shows rectangle *ABCD*.

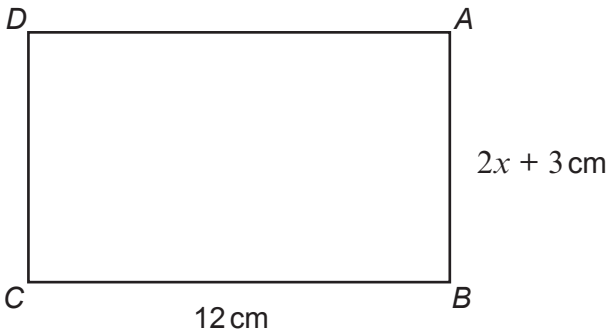

Diagram not drawn to scale

AB = $2x + 3$ cm and *BC* = 12 cm.

The perimeter of the rectangle is 40 cm.
Calculate the value of x. [4]

x = ...

Examiner only

19. Write down five positive whole numbers in the boxes below such that the numbers have:

- a range of 5 **and**
- a mean of 4 **and**
- a median of 3. [3]

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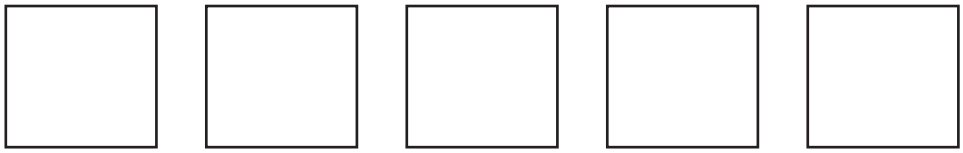

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20. Robin makes the two cubes below from centimetre cubes.

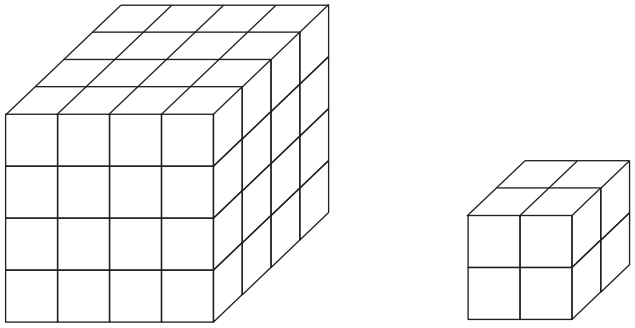

Diagram not drawn to scale

Sarah uses **all** of Robin's centimetre cubes to make a **single** cuboid.

Each of the dimensions of Sarah's cuboid will be greater than one centimetre.

Give the dimensions of a cuboid that Sarah could make. [2]

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21. (a) **Estimate** the value of $\frac{2 \cdot 13 \times 99 \cdot 4}{39 \cdot 5}$.

You must show all your working. [2]

(b) Given that 3·4 × 7·8 = 26·52, write down the answer to each of the following:

(i) 34×78 [1]

(ii) $\frac{26 \cdot 52}{34}$ [1]

Examiner only

22. (a) Write 2475 as a product of its prime factors in index form. [3]

(b) Write down the square root of $64 \times 5^4 \times 7^4$.
Give your answer as a product of prime factors in index form. [2]

Examiner only

23. Pippa and Joe are working on a school project.
The project is based on the use of the local leisure facilities.

(a) Pippa decides to ask adults how much they spend on gym membership each month.
In the box below, write a suitable question with appropriate response boxes to collect this information. [2]

Question

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Response boxes

(b) Joe asked some adults how many hours they each spent at the leisure centre during the previous week.
His results are shown below.

Number of hours	0–4	5–9	10–14	15–19	20–24
Number of adults	9	2	1	1	2

Joe accurately calculated an estimate of the mean time spent per adult to be 7 hours.

In his project he stated:

'On average, the adults in my survey each spent 7 hours at the leisure centre last week.'

(i) Explain why the mean is not the best average to use for this data. [1]

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(ii) Give **one** other reason why Joe's results may not be reliable. [1]

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24. An empty water tank is filled using a hose with a steady rate of flow.

The tank takes:

- 30 minutes to fill if water is added at x litres/min
- 40 minutes to fill if the water is added at $(x-2)$ litres/min.

Form an equation in terms of x.
Solve the equation and hence find the capacity of the tank in litres. [5]

25. Three friends, Louis, Krystal and Jamal win some money in a competition.
They share the money in the ratio 3 : 7 : 11.

(a) What fraction of the total money won is given to Jamal? [1]

(b) **Jamal** spends £45 of the money he won.
He now has exactly twice as much as **Louis** won.
How much money did **Krystal** win? [3]

Examiner only

26. 6 printers take 36 minutes to print a number of identical booklets.
How long will it take 9 printers to print **half** as many of these booklets?
You may assume that all printers print at the same rate. [3]

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27. (a) The price of an item in a sale has been reduced by 25%.
If the sale price is £54, what was the original price of the item? [2]

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(b) Percentage change can be calculated using multipliers.

(i) A number is decreased by 33% of its value.
Circle the multiplier that would find the value after this decrease. [1]

0·67 –1·33 –0·67 0·33 0·77

(ii) A number is increased by 6% of its value.
This is done 3 times, each time increasing the previous value by 6%.
Circle the multiplier that would find the value after the 3 increases. [1]

1·06 1·18 $1·06^3$ 0·18 $0·06^3$

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28. Three friends, Luka, Mali and Nina buy some fruit.

Luka buys 3 apples and 4 bananas and pays £2.70.
Mali buys 2 apples and 3 bananas and pays £1.95.

Use an algebraic method to calculate how much Nina pays for 4 apples and 2 bananas. [6]

Nina pays .....

Examiner only

29. (a) Calculate the value of $\frac{1\cdot 29\times 10^{5}}{3\times 10^{-7}}$.

Give your answer in standard form. [2]

(b) Calculate the value of $\left(7\cdot 6\times 10^{5}\right)+\left(3\times 10^{4}\right)$.

Give your answer in standard form. [2]

END OF PAPER

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

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