Cambridge Assessment
International Education

Cambridge IGCSE™

CANDIDATE
NAME

CENTRE
NUMBER

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NUMBER

MATHEMATICS   **0580/12**

Paper 1 (Core)   **February/March 2024**

                                                                 1 hour

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION
- The total mark for this paper is 56.
- The number of marks for each question or part question is shown in brackets [ ].

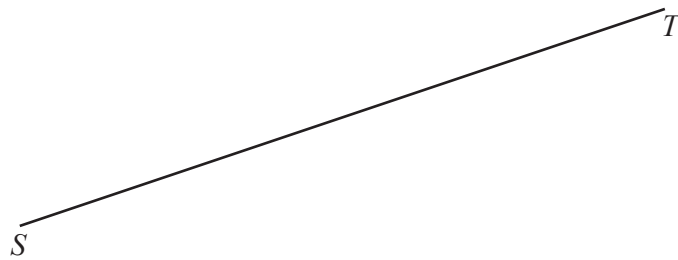This document has **12** pages. Any blank pages are indicated.

[Turn over

1   Write the number thirty thousand and fifty in figures.

.... [1]

2   Write 5926 correct to the nearest 10.

.... [1]
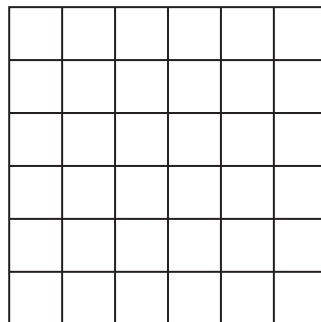
3

Mark the midpoint of the line *ST*.   [1]

4   **(a)** Shade $\frac{2}{9}$ of this shape.

[1]

(b) Write $\frac{2}{9}$ as a percentage.

.... % [1]

5 A night bus runs from 21 50 to 05 18 the next day.

Work out the number of hours and minutes that the night bus runs.

.... h .... min [1]

6 **(a)** 34   55   76   83   111   121

From this list of numbers, write down all the multiples of 11.

.... [1]

(b) Zaid has a non-calculator method for working out if a number is a multiple of 11.
He shows his method for the number 919 281.

Subtract and add alternately the digits in the number.	$9 - 1 + 9 - 2 + 8 - 1 = 22$
Check if the answer is a multiple of 11.	$22 = 2 \times 11$
As 22 is a multiple of 11 then 919 281 is a multiple of 11.	

Show that the number 918 271 937 is a multiple of 11 by using Zaid's method.

[2]

7 The range of eight numbers is 31.
These are seven of the numbers.

28   36   42   24   38   16   21

Find the two possible values of the eighth number.

.... or .... [2]

8 Calculate $\sqrt{5.76} + 2.8^3$.

.... [1]

9 Simplify $4m + 7k - m + 3k$.

.... [2]

10 -9 -7 -3 -1 0 2 5 6 8

From this list of numbers, find

(a) the highest number possible from the product of **two** of the numbers

.... [1]

(b) the lowest number possible from the product of **three** of the numbers.

.... [1]

11 Sarah records the number of people who play golf on each of 14 days.

28	46	54	71	70	65	49
50	64	77	68	72	45	58

(a) Complete the stem-and-leaf diagram.

2	
3	
4	
5	
6	
7	

Key: $2 \mid 8$ represents 28

[2]

(b) Find the median.

.... [1]

12

NOT TO SCALE

←—10 cm—→

4 cm

5 cm
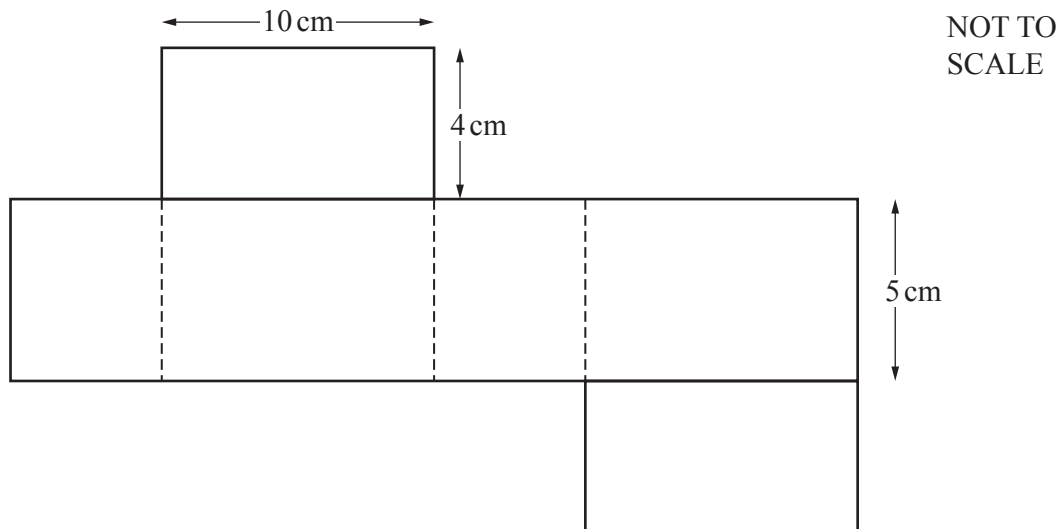
The diagram shows the net of a cuboid.

(a) Work out the surface area of this cuboid.

.... cm^2 [2]

(b) Work out the volume of this cuboid.

.... cm^3 [2]

13 There are 20 cars in a car park and 3 of the cars are blue.

(a) James wants to draw a pie chart to show this information.

Find the angle of the sector for the blue cars in this pie chart.

.... [2]

(b) One of the 20 cars is picked at random.

Find the probability that this car is **not** blue.

.... [1]

14 Factorise.
$$3x^3 - 7xy$$

.... [1]

15
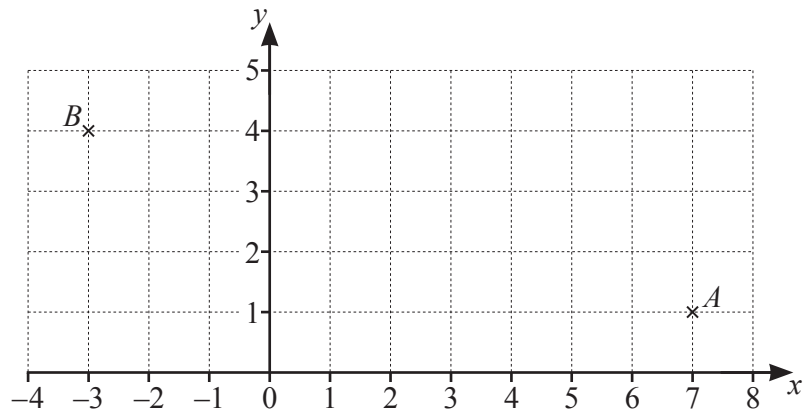
Write $\overrightarrow{AB}$ as a column vector.

$$\overrightarrow{AB} = \begin{pmatrix} \\ \end{pmatrix}$$ [1]

16

Exchange rates
1 euro = 1.05 dollars
1 rupee = 0.013 dollars

Vani changes x euros into dollars.
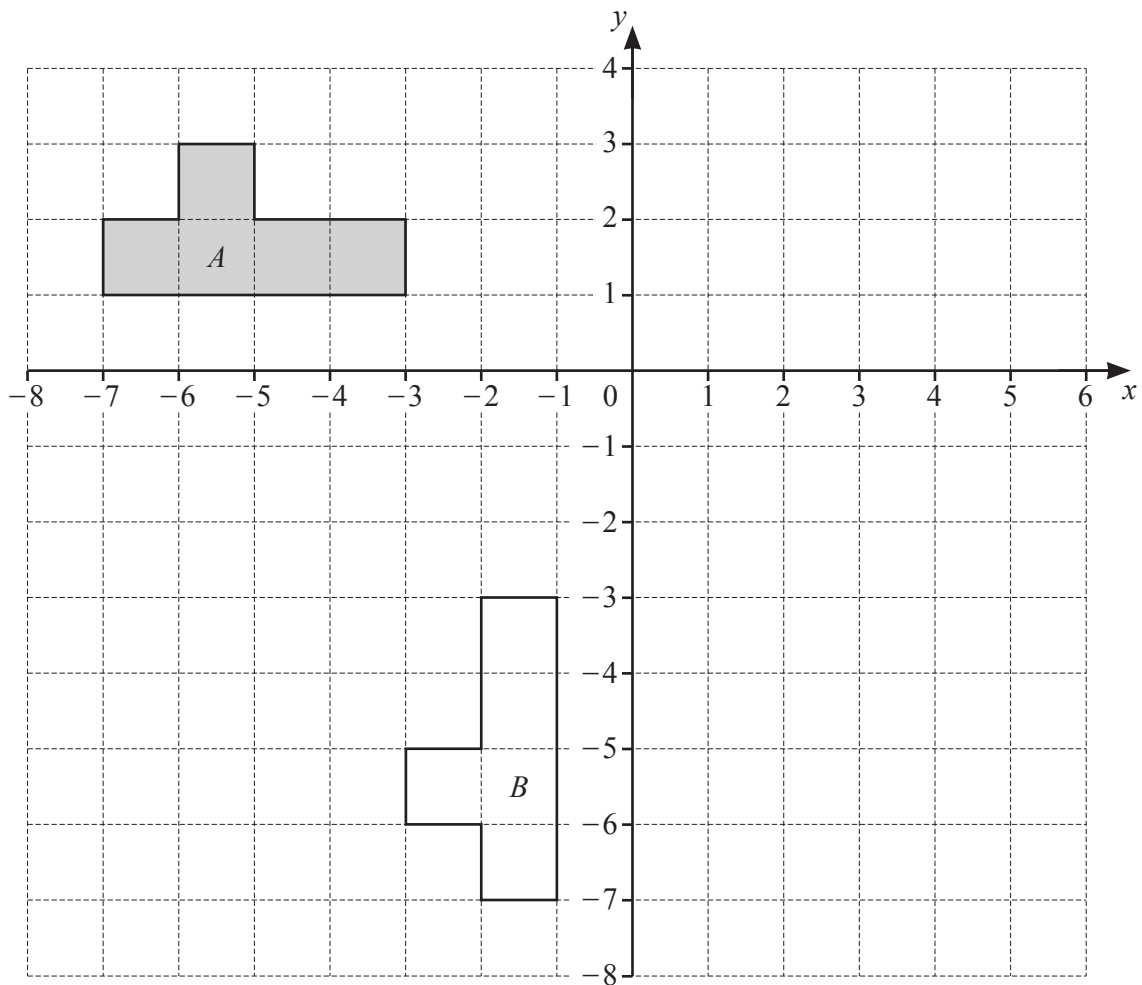She then changes the dollars into 17 850 rupees.

Calculate the value of x.

$x =$ .... [3]

17 The line $y = 2x - 5$ intersects the line $y = 3$ at the point P.

Find the coordinates of the point P.

(........................, ...) [2]

18 The diagram shows two shapes, A and B, on a grid.

(a) Describe fully the **single** transformation that maps shape A onto shape B.

....

.... [3]

(b) On the grid, draw the image of shape A after a reflection in the line $x = -1$. [2]

19

NOT TO SCALE
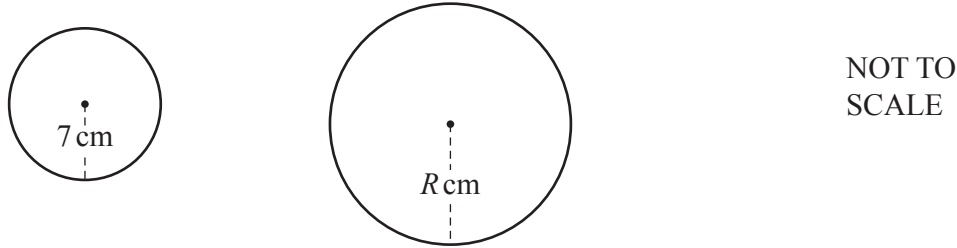
The diagram shows a small circle with radius 7 cm and a large circle with radius R cm.
The area of 16 small circles is the same as the area of one large circle.

Calculate the value of R.

$R =$ .... [3]

20 (a) The nth term of a sequence is $n^2 - 3$.

Find the first three terms of this sequence.

.... , ... , ... [2]

(b) These are the first five terms of a different sequence.

$$2 \quad 9 \quad 16 \quad 23 \quad 30$$

Find the nth term of this sequence.

.... [2]

21 The length, l m, of a rope is 18.7 m, correct to the nearest 10 centimetres.

Complete this statement about the value of l.

.... $\leqslant l <$ .... [2]

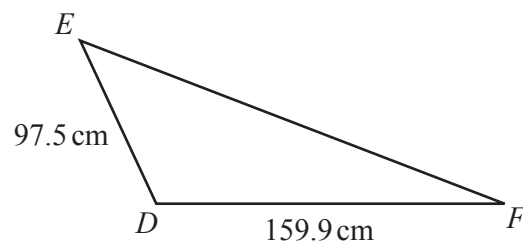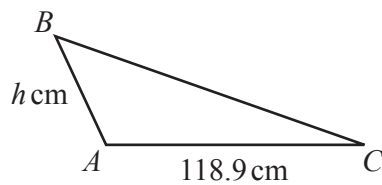**22** $6.5 \times 10^{19} \times n = 5.46 \times 10^{23}$

Calculate the value of n.
Give your answer in standard form.

$n =$ .... [2]

23

Triangle ABC is mathematically similar to triangle DEF.

Calculate the value of h.

$h =$ .... [2]

24 **Without using a calculator**, work out $1\frac{1}{4} - \frac{5}{6}$.

You must show all your working and give your answer as a fraction in its simplest form.

.... [3]

25 The highest common factor (HCF) of two numbers is 6.
The lowest common multiple (LCM) of the two numbers is 90.
Both numbers are greater than 6.

Work out the two numbers.

.... and .... [2]

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MATHEMATICS	**0580/12**
Paper 1 (Core)	**February/March 2024**
MARK SCHEME	
Maximum Mark: 56	

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the February/March 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **6** printed pages.

[Turn over

0580/12   Cambridge IGCSE – Mark Scheme   February/March 2024
Muhammad Shafiq ur Rehman (03247304567) Aitchison College (www.sirshafiq.com)
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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Mathematics-Specific Marking Principles

1   Unless a particular method has been specified in the question, full marks may be awarded for any correct method. However, if a calculation is required then no marks will be awarded for a scale drawing.

2   Unless specified in the question, non-integer answers may be given as fractions, decimals or in standard form. Ignore superfluous zeros, provided that the degree of accuracy is not affected.

3   Allow alternative conventions for notation if used consistently throughout the paper, e.g. commas being used as decimal points.

4   Unless otherwise indicated, marks once gained cannot subsequently be lost, e.g. wrong working following a correct form of answer is ignored (isw).

5   Where a candidate has misread a number or sign in the question and used that value consistently throughout, provided that number does not alter the difficulty or the method required, award all marks earned and deduct just 1 A or B mark for the misread.

6   Recovery within working is allowed, e.g. a notation error in the working where the following line of working makes the candidate's intent clear.

MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M   Method marks, awarded for a valid method applied to the problem.

A   Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.

B   Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation 'dep' is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

Abbreviations

awrt   answers which round to
cao   correct answer only
dep   dependent
FT   follow through after error
isw   ignore subsequent working
nfww   not from wrong working
oe   or equivalent
rot   rounded or truncated
SC   Special Case
soi   seen or implied

Question	Answer	Marks	Partial Marks
1	30 050	**1**	
2	5930	**1**	
3	Midpoint of *ST* marked	**1**	
4(a)	8 squares shaded	**1**	
4(b)	22.2 or 22.22…	**1**	
5	7h 28min	**1**	
6(a)	55 121	**1**	
6(b)	$9-1+8-2+7-1+9$ $-3+7$	**M1**	
	$33 = 3 \times 11$	**A1**	
7	11, 47	**2**	**B1** for each
8	24.352	**1**	
9	$3m + 10k$ final answer	**2**	**B1** for $3m$ or $10k$ in final answer or for $3m + 10k$ seen and spoilt
10(a)	63	**1**	
10(b)	−432	**1**	
11(a)	2 | 8 3 | 4 | 5 6 9 5 | 0 4 8 6 | 4 5 8 7 | 0 1 2 7	**2**	**B1** for three rows fully correct or for a correct unordered stem-and-leaf diagram
11(b)	61	**1**	
12(a)	220	**2**	**M1** for $[2](5 \times 4 + 4 \times 10 + 5 \times 10)$
12(b)	200	**2**	**M1** for $5 \times 4 \times 10$
13(a)	54	**2**	**M1** for $\frac{3}{20}[\times 360]$ oe or $\frac{360}{20}[\times 3]$ oe

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Question	Answer	Marks	Partial Marks
13(b)	$\dfrac{17}{20}$ oe	1	
14	$x\left(3x^2 - 7y\right)$	1	
15	$\begin{pmatrix} -10 \\ 3 \end{pmatrix}$	1	
16	221	3	**M2** for $\dfrac{17850 \times 0.013}{1.05}$ or **M1** for 17850×0.013 or for $\dfrac{1.05x}{0.013} = 17850$
17	$(4,3)$	2	**B1** for each or **M1** for $3 = 2x - 5$ or better
18(a)	Rotation [centre] (0,0) 90° [anticlockwise]	3	**B1** for each
18(b)	Shape drawn correctly	2	**M1** for reflection in $x = k$ or in $y = -1$
19	28	3	**M2** for $16 \times \pi 7^2 = \pi R^2$ or better or **M1** for $\pi 7^2$
20(a)	-2 1 6	2	**B1** for any 2 in correct position If 0 scored **SC1** for $-3, -2, 1$
20(b)	$7n - 5$ oe final answer	2	**B1** for $7n + j$ or $kn - 5$, $k \neq 0$ or $7n - 5$ seen then spoilt
21	18.65 18.75	2	**B1** for each If 0 scored **SC1** for both correct but reversed or written in centimetres.
22	8.4×10^3	2	**B1** for 8400 oe seen or **M1** for *their* answer correctly converted to standard form
23	72.5	2	**M1** for $\dfrac{118.9}{h} = \dfrac{159.9}{97.5}$ oe or better

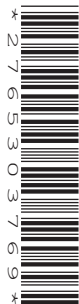| Question	Answer	Marks	Partial Marks
24	$\dfrac{5}{4}$ or $\dfrac{1}{4}+\dfrac{1}{6}$	**B1**	Correct method for dealing with mixed number Allow $\dfrac{5k}{4k}$
	$\dfrac{15}{12}$ and $\dfrac{10}{12}$	**M1**	Correct method to find common denominator e.g. [1]$\dfrac{3}{12}$ and $\dfrac{10}{12}$
	$\dfrac{5}{12}$ cao	**A1**	
25	18 30	**2**	**B1** for 2 numbers with HCF 6 or LCM 90 or for 2 numbers greater than 6 with product 540 OR **M1** for some multiples of 6 including 18 and 30 or for some factors of 90 including 18 and 30 or for a tree diagram/table showing prime factors of 540 or 6 **and** 90

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INSTRUCTIONS
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
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- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION
- The total mark for this paper is 70.
- The number of marks for each question or part question is shown in brackets [ ].

[Turn over

1   A night bus runs from 21 50 to 05 18 the next day.

Work out the number of hours and minutes that the night bus runs.

.... h .... min [1]

2   Calculate $\sqrt{5.76} + 2.8^3$.

.... [1]

3   Simplify $4m + 7k - m + 3k$.

.... [2]

4
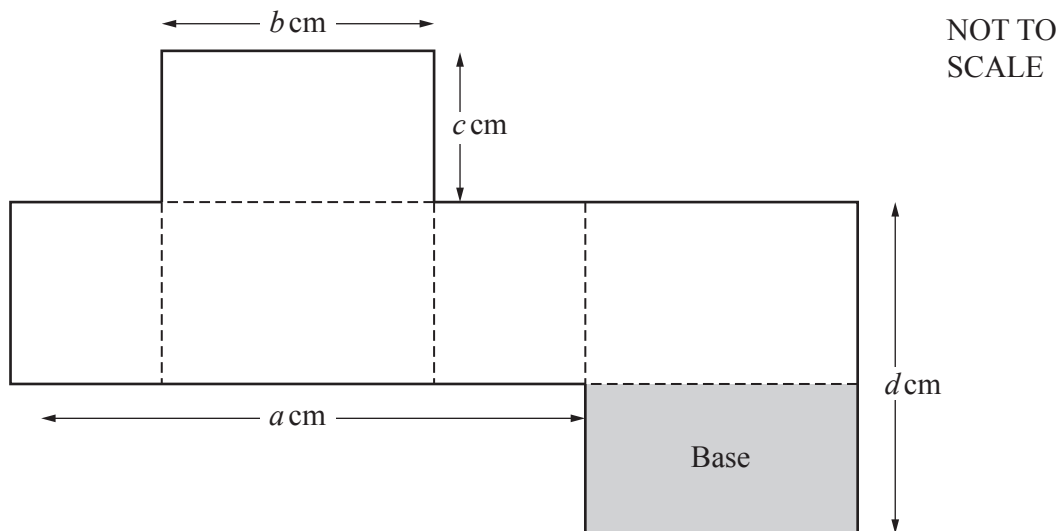
The diagram shows the net of a cuboid with its base shaded.
The length of the cuboid is 10 cm, its width is 4 cm and its height is 5 cm.

Write down the values of each of *a, b, c* and *d*.

a = ..., *b* = ..., *c* = ..., *d* = ... [4]

5 There are 20 cars in a car park and 3 of the cars are blue.

(a) James wants to draw a pie chart to show this information.

Find the angle of the sector for the blue cars in this pie chart.

.... [2]

(b) One of the 20 cars is picked at random.

Find the probability that this car is **not** blue.

.... [1]

6
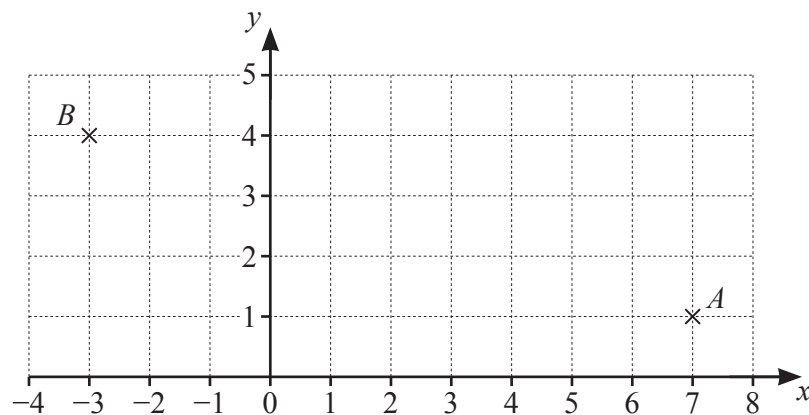
Write $\overrightarrow{AB}$ as a column vector.

$$\overrightarrow{AB} = \begin{pmatrix} & \\ & \end{pmatrix} \quad [1]$$

7 As the temperature increases, the number of people who go swimming increases.

Write down the type of correlation that this statement describes.

.... [1]

8 **(a)** The *n*th term of a sequence is $n^2 - 3$.

Find the first three terms of this sequence.

.... , ... , ... [2]

(b) These are the first five terms of a different sequence.

$$1 \qquad 3 \qquad 9 \qquad 27 \qquad 81$$

Find the *n*th term of this sequence.

.... [2]

9 The line $y = 2x - 5$ intersects the line $y = 3$ at the point *P*.

Find the coordinates of the point *P*.

(...................... , ...) [2]

10
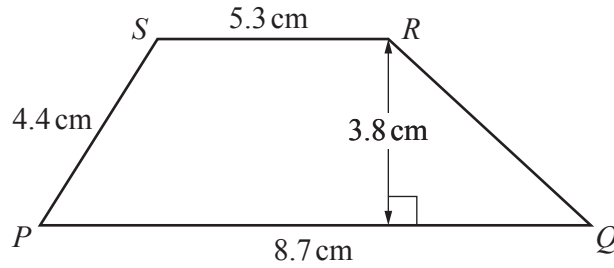
The diagram shows a trapezium *PQRS*.

Calculate the area of the trapezium.

.... cm^2 [2]

11 **Without using a calculator**, work out $1\frac{1}{4} - \frac{5}{6}$.

You must show all your working and give your answer as a fraction in its simplest form.

.... [3]

12 Farid spins a three-sided spinner with sides labelled *A*, *B* and *C*.
The probability that the spinner lands on *C* is 0.35 .
Farid spins the spinner 40 times.

Calculate the number of times he expects the spinner to land on *C*.

.... [1]

13 The bearing of *B* from *A* is 107°.

Calculate the bearing of *A* from *B*.

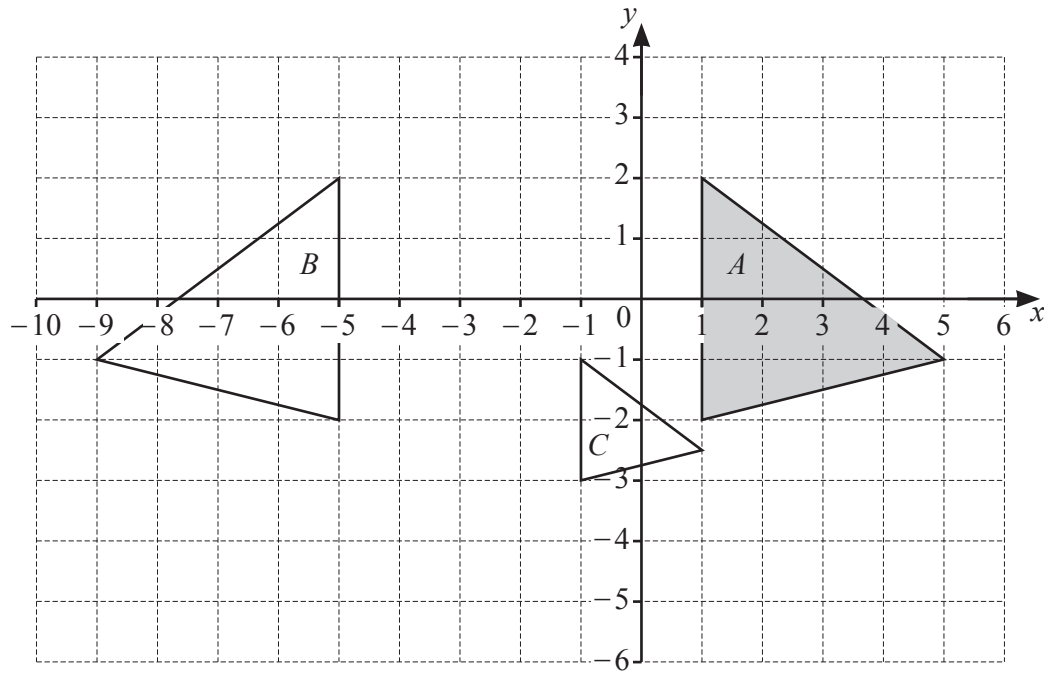.. [2]

14 A train, 1750 metres long, is travelling at 55 km/h.

Calculate how long it will take for the whole train to completely cross a bridge that is 480 metres long.
Give your answer in seconds, correct to the nearest second.

.... s [3]

15

(a) Describe fully the **single** transformation that maps

    (i) triangle *A* onto triangle *B*

    ....

    .... [2]

    (ii) triangle *A* onto triangle *C*.

    ....

    .... [3]
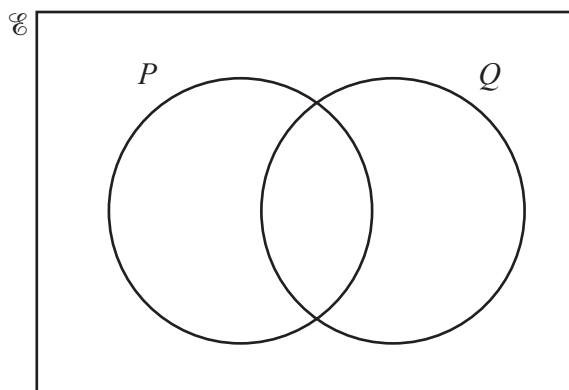
(b) Draw the image of triangle *A* after a rotation, 90° clockwise, about (1, 3).   [2]

16 x is an integer.

$\mathscr{E} = \{x : 1 \leqslant x \leqslant 10\}$
$P = \{x : x \text{ is an even number}\}$
$Q = \{x : x \text{ is a multiple of 5}\}$

Complete the Venn diagram. [2]

17   The height of each of 200 people is measured.
The table shows the results.

Height (h cm)	$100 < h \leqslant 120$	$120 < h \leqslant 130$	$130 < h \leqslant 150$	$150 < h \leqslant 190$
Frequency	32	55	64	49

Calculate an estimate of the mean height.

.... cm [4]

18   Find the highest common factor (HCF) of $28x^5$ and $98x^3$.
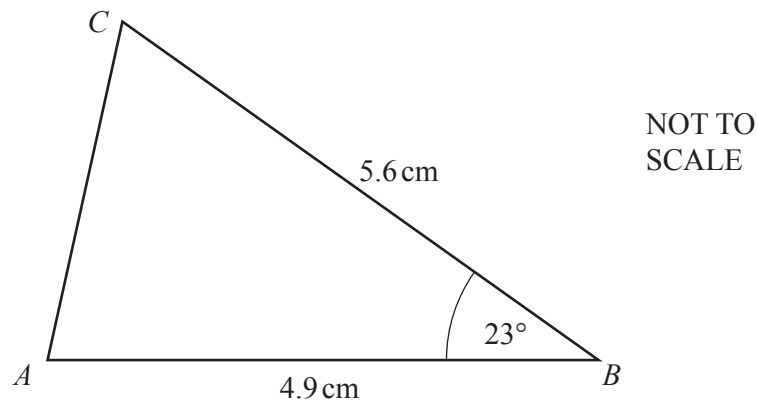
.... [2]

19
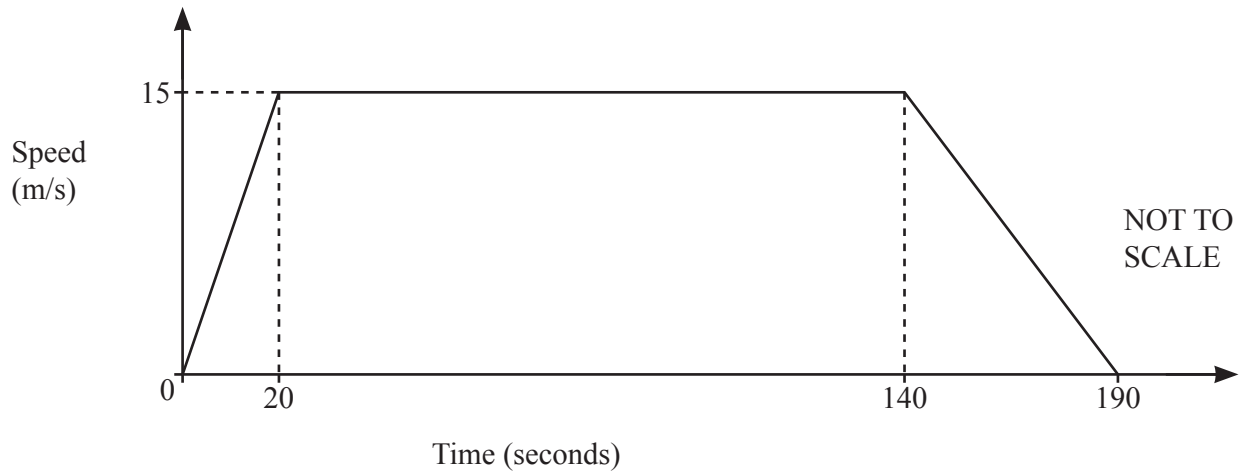
The speed–time graph shows information about a bus journey.

Calculate the total distance travelled by the bus.

.... m [3]

20

Calculate the area of triangle *ABC*.

.... cm^2 [2]

21 (a) $\sqrt[5]{3} = 3^h$

Write down the value of h.

$h =$ .... [1]

(b) Simplify $\left(4x^3\right)^3$.

.... [2]

22 y is inversely proportional to the square of $(x+3)$.
When $x = 5$, $y = 0.375$.

Find y in terms of x.

$y =$ .... [2]

23 **(a)** On the axes, sketch the graph of $y = \cos x$, for $0° \leqslant x \leqslant 360°$.
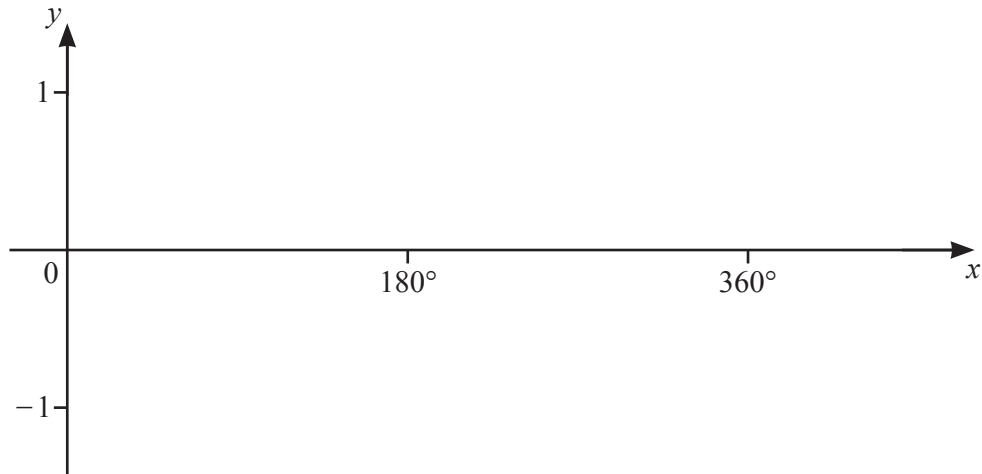
[2]

(b) Solve the equation $\cos x = 0.294$ for $0° \leqslant x \leqslant 360°$.

$x =$ .... or $x =$ .... [2]

24 $x^2 - 16x + a$ can be written in the form $(x + b)^2$.

Find the value of a and the value of b.

$a =$ ....

$b =$ .... [2]

Questions 25 and 26 are printed on the next page.

25 A bag contains 2 green buttons, 5 red buttons and 6 blue buttons.
Two buttons are taken at random from the bag without replacement.

Calculate the probability that the two buttons are different colours.

.... [4]

26 *A* is the point (6, 1) and *B* is the point (2, 7).

Find the equation of the perpendicular bisector of *AB*.
Give your answer in the form $y = mx + c$.

$y =$ .... [5]

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MATHEMATICS   **0580/22**

Paper 2 (Extended)   **February/March 2024**

MARK SCHEME

Maximum Mark: 70

Published

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GENERIC MARKING PRINCIPLE 5:

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GENERIC MARKING PRINCIPLE 6:

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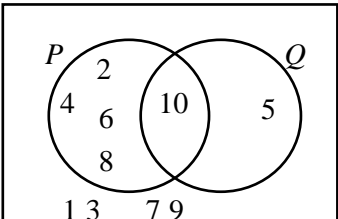

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Mathematics-Specific Marking Principles

1   Unless a particular method has been specified in the question, full marks may be awarded for any correct method. However, if a calculation is required then no marks will be awarded for a scale drawing.

2   Unless specified in the question, non-integer answers may be given as fractions, decimals or in standard form. Ignore superfluous zeros, provided that the degree of accuracy is not affected.

3   Allow alternative conventions for notation if used consistently throughout the paper, e.g. commas being used as decimal points.

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5   Where a candidate has misread a number or sign in the question and used that value consistently throughout, provided that number does not alter the difficulty or the method required, award all marks earned and deduct just 1 A or B mark for the misread.

6   Recovery within working is allowed, e.g. a notation error in the working where the following line of working makes the candidate's intent clear.

Abbreviations

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Marks	Partial Marks
1	7h 28min	1	
2	24.352	1	
3	$3m + 10k$ final answer	2	**B1** for $3m$ or $10k$ in final answer or for $3m + 10k$ seen and spoilt
4	$a = 18$ $b = 10$ $c = 4$ $d = 9$	4	**B1** for each If 0 scored, **SC1** for b or c = 4, 5 or 10
5(a)	54	2	**M1** for $\dfrac{3}{20}[\times 360]$ oe or $\dfrac{360}{20}[\times 3]$ oe
5(b)	$\dfrac{17}{20}$ oe	1	
6	$\begin{pmatrix} -10 \\ 3 \end{pmatrix}$ final answer	1	
7	Positive	1	
8(a)	−2 1 6	2	**B1** for any 2 correct in correct position If 0 scored **SC1** for $-3 - 2$ 1
8(b)	3^{n-1}	2	**B1** for 3^{an+k} , $a \neq 0$ or 3^c for any integer c>1
9	$(4,3)$	2	**B1** for each or **M1** for $3 = 2x - 5$ or better
10	26.6	2	**M1** for $\dfrac{1}{2} \times (5.3 + 8.7) \times 3.8$ oe

Question	Answer	Marks	Partial Marks
11	$\dfrac{5}{4}$ or $\dfrac{1}{4}+\dfrac{1}{6}$	**B1**	Correct method for dealing with mixed number Allow $\dfrac{5k}{4k}$
	$\dfrac{15}{12}$ and $\dfrac{10}{12}$	**M1**	Correct method to find common denominator e.g. $[1]\dfrac{3}{12}$ and $\dfrac{10}{12}$
	$\dfrac{5}{12}$ cao	**A1**	
12	14	**1**	
13	287	**2**	**M1** for $360 - (180 - 107)$ oe or indicates correct angle on a diagram
14	146 cao	**3**	**M2** for $\dfrac{1750+480}{55\times1000}\times60\times60$ oe or **M1** for distance = 1750 + 480 oe or $\dfrac{55\times1000}{60\times60}$ oe soi or correctly writing *their* whole number of seconds from a more accurate answer seen
15(a)(i)	reflection $x = -2$	**2**	**B1** for each
15(a)(ii)	enlargement [sf] $\dfrac{1}{2}$ $(-3,-4)$	**3**	**B1** for each
15(b)	Image at $(0,3)$, $(-4,3)$, $(-3,-1)$	**2**	**B1** for correct size and orientation, wrong centre
16		**2**	**B1** for two sections correct out of four

Question	Answer	Marks	Partial Marks
17	138.425	**4**	**M1** for mid-points soi (110, 125, 140, 170) **M1** for use of Σfh with h in correct interval including both boundaries **M1** for (dep on 2nd M1) for $\Sigma fh \div 200$
18	$14x^3$	**2**	**B1** for $14x^k$ or $7x^3$ or $2x^3$
19	2325	**3**	**M2** for correct method for total area e.g. $\frac{1}{2} \times 15 \times (190+120)$ or **M1** for correct method for one area e.g. $\frac{1}{2} \times 20 \times 15$, $(140-20) \times 15$ or $\frac{1}{2} \times (190-140) \times 15$ oe
20	5.36 or 5.360 to 5.361	**2**	**M1** for $\frac{1}{2} \times 5.6 \times 4.9 \times \sin 23$ oe
21(a)	$\frac{1}{5}$ oe	**1**	
21(b)	$64x^9$	**2**	**B1** for $64x^k$ or kx^9 as final answer or correct answer spoiled
22	$[y =] \dfrac{24}{(x+3)^2}$ oe final answer	**2**	**M1** for $y = \dfrac{k}{(x+3)^2}$
23(a)	 Correct sketch to go through (0, 1), close to (360, 1) and reasonably close to (180, –1)	**2**	**M1** for correct cosine curve shape through (0, 1)
23(b)	72.9 and 287.1	**2**	**B1** for one correct If 0 scored, **SC1** for two angles with a sum of 360

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Question	Answer	Marks	Partial Marks
24	$[a =]$ 64 $[b =]$ -8	2	**B1** for each or for both $(x-8)^2$ and $x^2 - 16x + 64$
25	$\dfrac{2}{3}$ oe nfww	4	**M3** for $\dfrac{2}{13} \times \dfrac{11}{12} + \dfrac{5}{13} \times \dfrac{8}{12} + \dfrac{6}{13} \times \dfrac{7}{12}$ oe or $1 - \left(\dfrac{2}{13} \times \dfrac{1}{12} + \dfrac{5}{13} \times \dfrac{4}{12} + \dfrac{6}{13} \times \dfrac{5}{12} \right)$ oe or **M2** for sum of three or more correct product pairs and no incorrect pairs or for $\dfrac{2}{13} \times \dfrac{1}{12} + \dfrac{5}{13} \times \dfrac{4}{12} + \dfrac{6}{13} \times \dfrac{5}{12}$ and no other pairs or **M1** for $\dfrac{j}{13} \times \dfrac{k}{12}$ If 0 scored **SC1** for answer $\dfrac{104}{169}$ oe
26	$y = \dfrac{2}{3} x + \dfrac{4}{3}$ final answer	5	**B1** for midpoint $(4,4)$ soi **M1** for [gradient AB =] $\dfrac{7-1}{2-6}$ oe **M1** for [m =] $\dfrac{-1}{their \text{ gradient of } AB}$ **M1** for substituting *their* midpoint into $y = (their\, m)x + c$ dep on at least M1 earned

Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS **0580/42**

Paper 4 (Extended) **February/March 2024**

2 hours 30 minutes

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION
- The total mark for this paper is 130.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

[Turn over

1   A grocer sells potatoes, mushrooms and carrots.

   (a) A customer buys 3 kg of mushrooms at $1.04 per kg and 4 kg of carrots at $1.28 per kg.

   Calculate the total cost.

   $ .... [2]

   (b) In one week, the ratio of the masses of vegetables sold by the grocer is

   potatoes : mushrooms : carrots = 11 : 8 : 6.

   (i) Work out the mass of mushrooms sold as a percentage of the total mass.

   .... % [2]

   (ii) The total mass of potatoes, mushrooms and carrots sold is 1500 kg.

   Find the mass of carrots the grocer sells this week.

   .... kg [2]

   (iii) The profit the grocer makes selling 1 kg of carrots is $0.75 .

   Find the total profit the grocer makes selling carrots this week.

   $ .... [1]

(iv) On the last day of the week, the grocer reduces the price of 1 kg of potatoes by 8% to $1.15 .

Calculate the original price of 1 kg of potatoes.

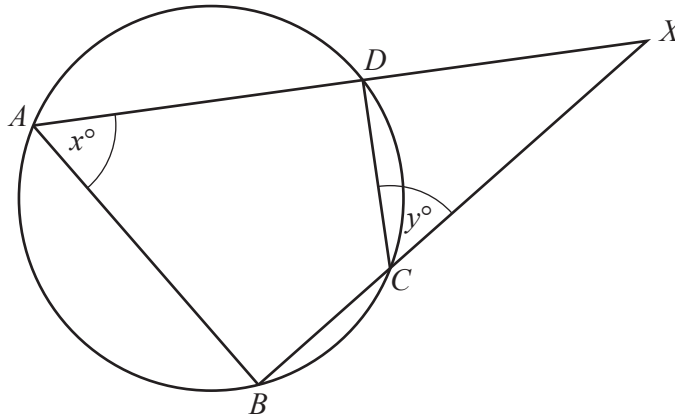$ .... [2]

(c) The grocer buys 620 kg of onions, correct to the nearest 20 kg.
He packs them into bags each containing 5 kg of onions, correct to the nearest 1 kg.

Calculate the upper bound for the number of bags of onions that he packs.

.... [3]

2

NOT TO
SCALE

A, *B*, *C* and *D* are points on a circle.
ADX and *BCX* are straight lines.
Angle *BAD* = $x°$ and angle *DCX* = $y°$.

(a) Explain why $x = y$.
Give a geometrical reason for each statement you make.

[2]

(b) Show that triangle *ABX* is similar to triangle *CDX*.

[2]

(c) $AD = 15$ cm, $DX = 9$ cm and $CX = 12$ cm.

(i) Find BC.

$BC =$ .... cm [3]

(ii) Complete the statement.

The ratio   area of triangle ABX : area of triangle CDX = ... : 1.   [1]

3 **(a)** The table shows information about the marks gained by each of 10 students in a test.

Mark	15	16	17	18	19	20
Frequency	4	1	2	1	0	2

(i) Calculate the range.

.... [1]

(ii) Calculate the mean.

.... [3]

(iii) Find the median.

.... [1]

(iv) Write down the mode.

.... [1]

(b) Paulo's mean mark for 7 homework tasks is 17.
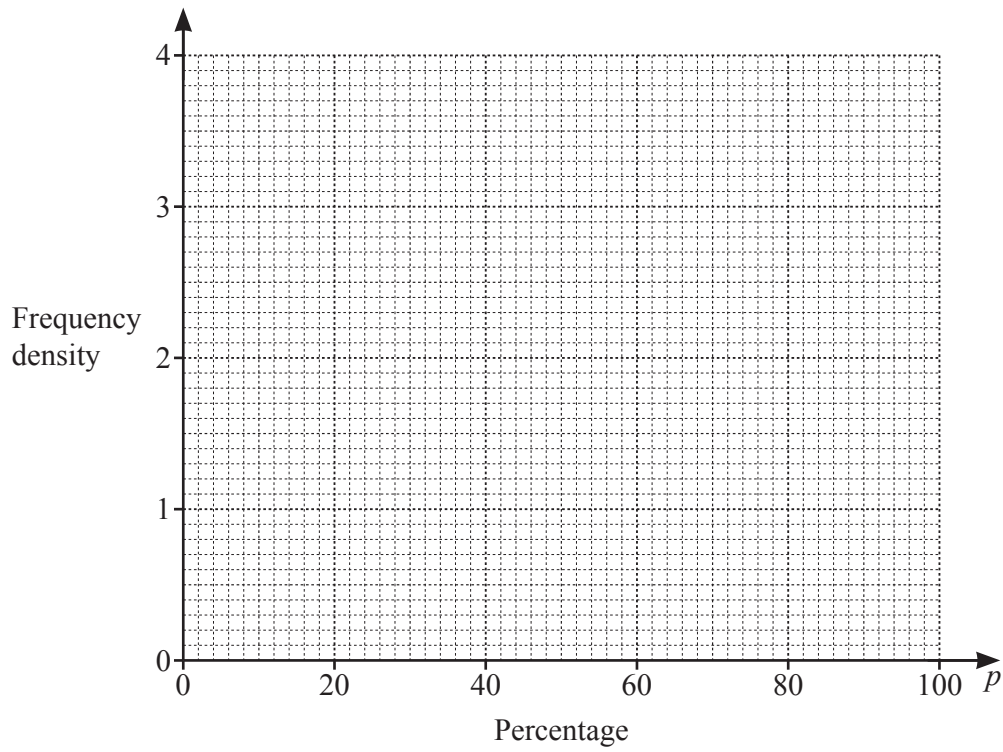After completing the 8th task, his mean mark is 17.5 .

Calculate Paulo's mark for the 8th task.

.... [3]

(c) The table shows the percentage scored by each of 100 students in their final exam.

Percentage (p)	$0 < p \leqslant 30$	$30 < p \leqslant 50$	$50 < p \leqslant 60$	$60 < p \leqslant 70$	$70 < p \leqslant 100$
Frequency	12	18	35	20	15

On the grid, draw a histogram to show this information.

[4]

4 **(a)**
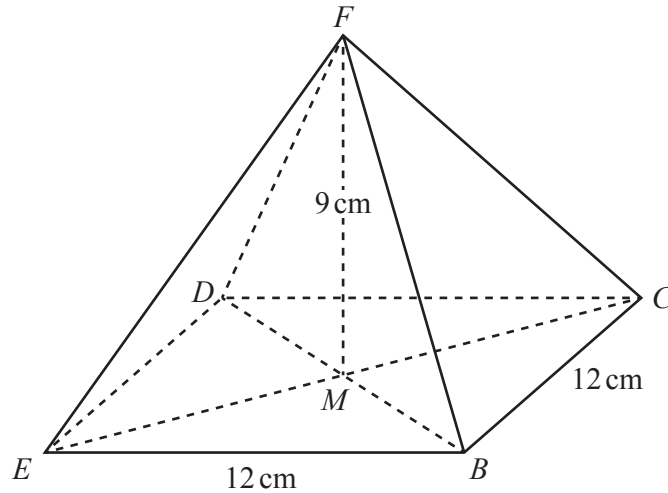
The diagram shows a pyramid with a square base *BCDE*.
The diagonals *CE* and *BD* intersect at *M*, and the vertex *F* is directly above *M*.
BE = 12 cm and *FM* = 9 cm.

(i) Calculate the volume of the pyramid.

[The volume, *V*, of a pyramid with base area *A* and height *h* is $V = \frac{1}{3}Ah$.]

.... cm^3 [2]

(ii) Calculate the total surface area of the pyramid.

.... cm^2 [5]

(b)
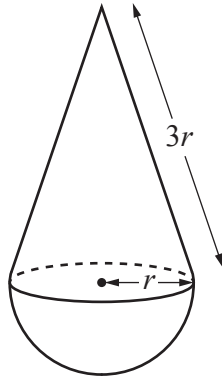
NOT TO
SCALE

The diagram shows a toy made from a cone and a hemisphere.
The base radius of the cone and the radius of the hemisphere are both r cm.
The slant height of the cone is $3r$ cm.

The total surface area of the toy is $304 \, \text{cm}^2$.

Calculate the value of r.

[The curved surface area, A, of a cone with radius r and slant height l is $A = \pi r l$.]
[The curved surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]

$r =$ .... [4]

5 **(a) (i)** Factorise.
$$x^2 - x - 12$$

.... [2]

(ii) Simplify.
$$\frac{x^2 - 16}{x^2 - x - 12}$$

.... [2]

(b) Simplify.
$$(2x - 3)^2 - (x + 1)^2$$

.... [3]

(c) Write as a single fraction in its simplest form.

$$\frac{2x + 4}{x + 1} - \frac{x}{x - 3}$$

.... [4]

(d) Expand and simplify.
$$(x-3)(x-5)(2x+1)$$

.... [3]

(e) Solve the simultaneous equations.
You must show all your working.

$$x - 3y = 13$$
$$2x^2 - 9y = 116$$

$x =$ .... $y =$ ....

$x =$ .... $y =$ .... [6]

[Turn over

6

NOT TO SCALE
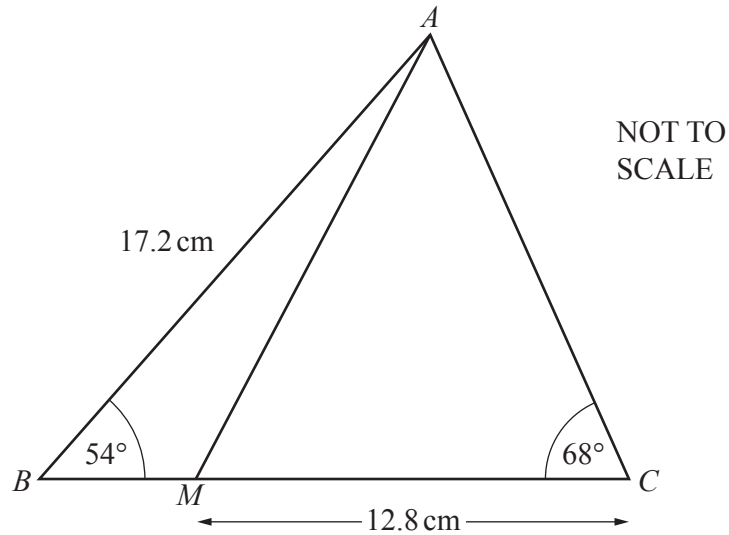
The diagram shows triangle ABC with $AB = 17.2$ cm.
Angle $ABC = 54°$ and angle $ACB = 68°$.

(a) Calculate AC.

$AC =$ .... cm [3]

(b) M lies on BC and $MC = 12.8$ cm.

Calculate AM.

$AM =$ .... cm [3]

(c) Calculate the shortest distance from A to BC.

....cm [3]

7 **(a)** $\quad \mathbf{p} = \begin{pmatrix} 8 \\ -5 \end{pmatrix} \qquad \mathbf{q} = \begin{pmatrix} -4 \\ 5 \end{pmatrix}$

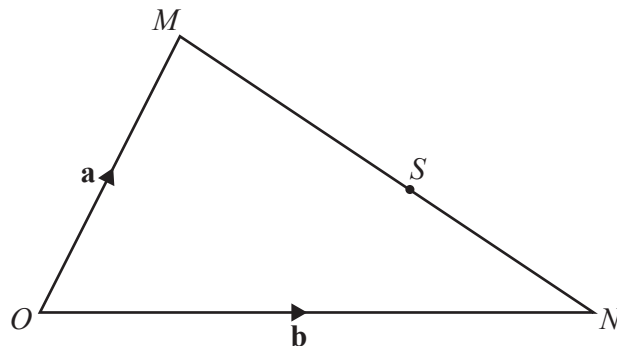**(i)** Find $3\mathbf{q}$.

$$\begin{pmatrix} \\ \end{pmatrix}$$ [1]

(ii) **(a)** Find $\mathbf{p} - \mathbf{q}$.

$$\begin{pmatrix} \\ \end{pmatrix}$$ [1]

(b) Find $|\mathbf{p} - \mathbf{q}|$.

.... [2]
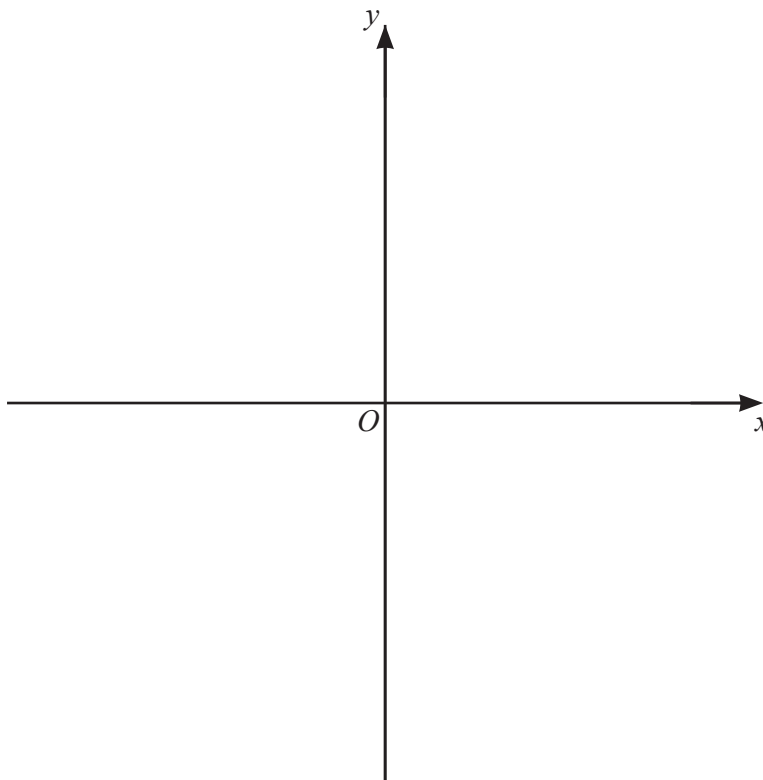
(b)

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In triangle *OMN*, *O* is the origin, $\overrightarrow{OM} = \mathbf{a}$ and $\overrightarrow{ON} = \mathbf{b}$.
S is a point on *MN* such that $MS : SN = 5:3$.

Find, in terms of **a** and/or **b**, the position vector of *S*.
Give your answer in its simplest form.

.... [3]

8 **(a)** On the axes, sketch the graph of $y = 4 - 3x$.

[2]

(b) On the axes, sketch the graph of $y = -x^2$.
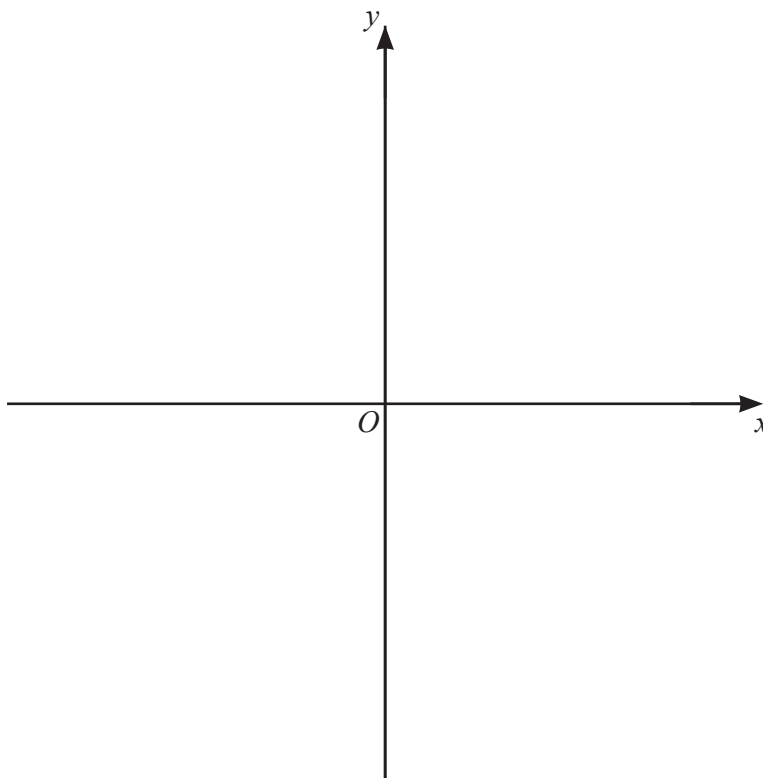
[2]

(c) **(i)** Find the coordinates of the turning points of the graph of $y = 10 + 9x^2 - 2x^3$.
You must show all your working.

(.............. , ...) and (.............. , ...) [5]

(ii) Determine whether each turning point is a maximum or a minimum.
Show how you decide.

[3]

9 **(a)** Janna and Kamal each invest $8000.
At the end of 12 years, they each have $12 800.

    (i) Janna invests in an account that pays simple interest at a rate of r% per year.

    Calculate the value of r.

$r =$ .... [3]

    (ii) Kamal invests in an account that pays compound interest at a rate of R% per year.

    Calculate the value of R.

$R =$ .... [3]

(b) The population of a city is growing exponentially at a rate of 1.8% per year.
The population now is 260 000.

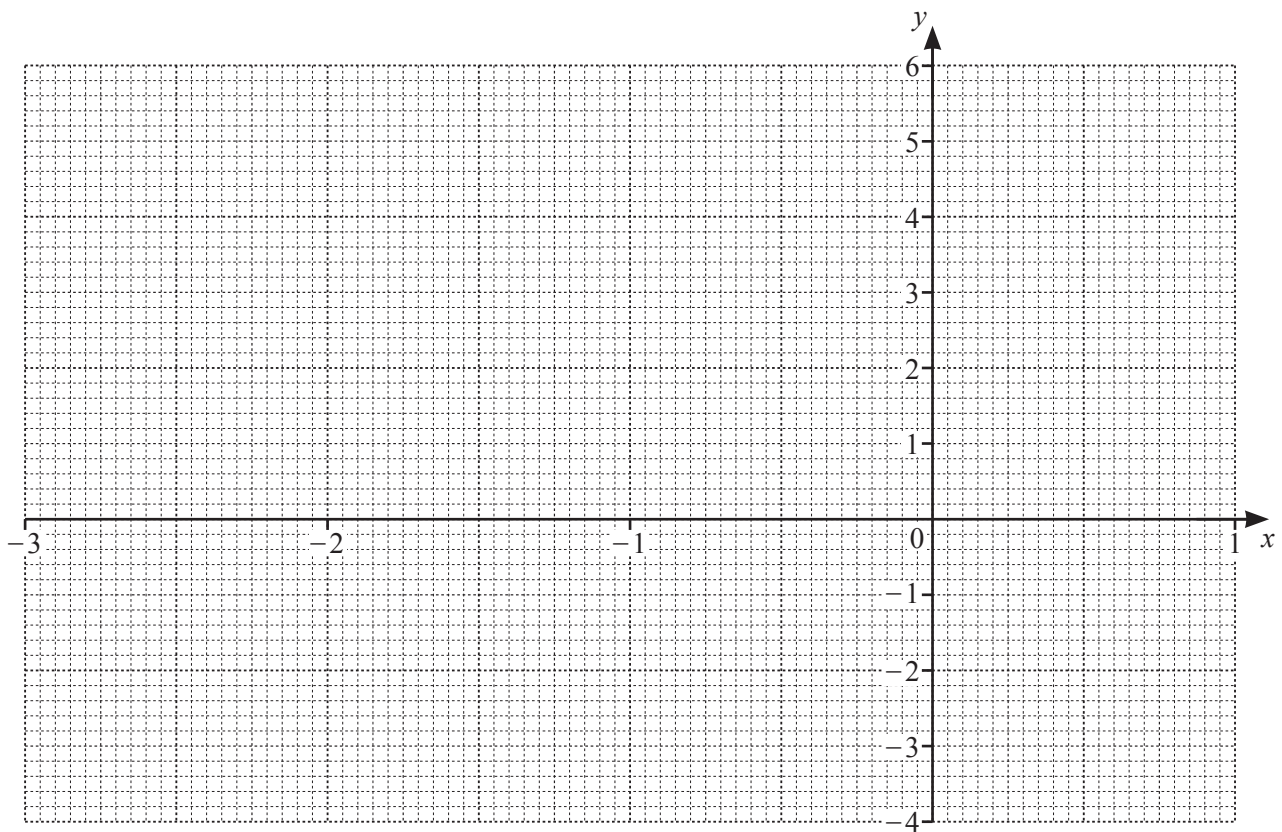Find the number of complete years from now when the population will first be more than 300 000.

.... years [3]

10 The table shows some values for $y = 2x^3 + 6x^2 - 2.5$.

x	-3	-2.5	-2	-1.5	-1	-0.5	0	0.5	1
y		3.75	5.5	4.25	1.5		-2.5	-0.75	

(a) Complete the table. [3]

(b) On the grid, draw the graph of $y = 2x^3 + 6x^2 - 2.5$ for $-3 \leqslant x \leqslant 1$.

[4]

(c) By drawing a suitable line on the graph, solve the equation $2x^3 + 6x^2 = 4.5$.

$x = $ .... or $x = $ .... or $x = $ .... [3]

(d) The equation $2x^3 + 6x^2 - 2.5 = k$ has exactly two solutions.

Write down the two possible values of k.

$k = $ .... or $k = $ .... [2]

11 $\quad f(x) = \dfrac{1}{x}, x \neq 0 \qquad g(x) = 3x - 5 \qquad h(x) = 2^x$

(a) Find.

(i) gf(2)

.... [2]

(ii) $g^{-1}(x)$

$g^{-1}(x) = $ .... [2]

(b) Find in its simplest form $g(x-2)$.

.... [2]

(c) Find the value of x when

(i) fg(x) = 0.1

$x = $ .... [2]

(ii) $h(x) - g(7) = 0$.

$x = $ .... [2]

12 (a)
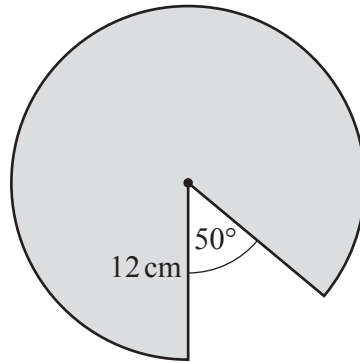
NOT TO
SCALE

The diagram shows a circle of radius 12 cm, with a sector removed.

Calculate the perimeter of the remaining shaded shape.

....cm [4]

(b) The diagram in **part(a)** shows the top of a cylindrical cake with a slice removed.
The volume of cake that remains is $3510 \, cm^3$.

Calculate the height of the cake.

....cm [3]

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MATHEMATICS	**0580/42**
Paper 4 (Extended)	**February/March 2024**
MARK SCHEME	
Maximum Mark: 130	

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the February/March 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **11** printed pages.

[Turn over

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Mathematics-Specific Marking Principles

1   Unless a particular method has been specified in the question, full marks may be awarded for any correct method. However, if a calculation is required then no marks will be awarded for a scale drawing.

2   Unless specified in the question, non-integer answers may be given as fractions, decimals or in standard form. Ignore superfluous zeros, provided that the degree of accuracy is not affected.

3   Allow alternative conventions for notation if used consistently throughout the paper, e.g. commas being used as decimal points.

4   Unless otherwise indicated, marks once gained cannot subsequently be lost, e.g. wrong working following a correct form of answer is ignored (isw).

5   Where a candidate has misread a number or sign in the question and used that value consistently throughout, provided that number does not alter the difficulty or the method required, award all marks earned and deduct just 1 A or B mark for the misread.

6   Recovery within working is allowed, e.g. a notation error in the working where the following line of working makes the candidate's intent clear.

Abbreviations

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Marks	Partial Marks
1(a)	8.24 cao	**2**	**M1** for $3 \times 1.04 + 4 \times 1.28$
1(b)(i)	32	**2**	**M1** for $\dfrac{8}{11+8+6}[\times 100]$ oe
1(b)(ii)	360	**2**	**M1** for $\dfrac{1500}{11+8+6} \times k$ where $k = 1$, 11, 8 or 6
1(b)(iii)	270	**1**	**FT** $0.75 \times$ *their* 360
1(b)(iv)	1.25 cao	**2**	**M1** for $x \times \left(1 - \dfrac{8}{100}\right) = 1.15$ oe or better
1(c)	140 nfww	**3**	**M2** for $\dfrac{620 \text{ to } 640}{5 - 0.5}$ or $\dfrac{620 + 10}{4 \text{ to } 5}$ oe or **M1** for 620 + 10 oe or 620 − 10 oe or 5 + 0.5 oe or 5 − 0.5 oe seen
2(a)	$y + $ angle $BCD = 180$ oe AND angles on a straight line AND $x + $ angle $BCD = 180$ oe AND opposite angles of a cyclic quadrilateral are supplementary OR angles in opposite segments are supplementary leading to $x = y$ with no errors	**B2**	**B1** for angles on a straight line OR opposite angles of a cyclic quadrilateral are supplementary OR angles in opposite segments are supplementary

Question	Answer	Marks	Partial Marks
2(b)	Allow any two statements from: CXD is common angle or angle AXB = angle CXD $x = y$ or angle BAX = angle DCX angle ABX = angle CDX	**M1**	
	States all three equal pairs of angles OR 2/all angles equal so triangles similar	**A1**	
2(c)(i)	6 nfww	**3**	**B2** for BX = 18 nfww or **M2** for $\dfrac{24}{12} = \dfrac{BC+12}{9}$ oe or **M1** for $\dfrac{24}{12} = \dfrac{BX}{9}$ oe If 0 scored, **SC1** for answer 18
2(c)(ii)	4	**1**	
3(a)(i)	5	**1**	
3(a)(ii)	16.8	**3**	**M1** for $15 \times 4 + 16\,[\times 1] + 17 \times 2 + 18\,[\times 1]$ $[+\ 19 \times 0] + 20 \times 2$ oe **M1** dep on previous M1 for *their* $\Sigma fx \div 10$
3(a)(iii)	16.5	**1**	
3(a)(iv)	15	**1**	
3(b)	21	**3**	**M2** for 8×17.5 and 7×17 oe or **M1** for 7×17 or 8×17.5 oe seen
3(c)	5 correct blocks, with correct widths, heights 0.8cm, 1.8cm 7cm, 4cm, 1cm	**4**	**B3** for 4 correct blocks or **B2** for 3 correct blocks or **B1** for 2 correct blocks If 0 scored **SC1** for correct frequency densities (0.4 0.9 3.5 2 0.5) soi
4(a)(i)	432	**2**	**M1** for $12 \times 12 \times 9 \div 3$ oe

Question	Answer	Marks	Partial Marks
4(a)(ii)	404 or 403.5 to 403.7	5	**M4** for $12^2 + 4 \times \frac{1}{2} \times 12 \times \sqrt{6^2 + 9^2}$ oe or **M3** for $\frac{1}{2} \times 12 \times \sqrt{6^2 + 9^2}$ oe or **M2** for explicit method to find height of triangular face e.g. $\sqrt{6^2 + 9^2}$ oe or **M1** for implicit method to find height of triangular face or for $6^2 + 9^2$ oe seen or **B1** for slant height of triangle *FC* $\sqrt{153}$ or $3\sqrt{17}$ or 12.4 or 12.36 to 12.37 soi
4(b)	4.4[0] or 4.398 to 4.399... nfww	4	**M3** for $\sqrt{\dfrac{304}{(2+3) \times \pi}}$ oe or **M2** for $\dfrac{4\pi r^2}{2} + \pi r \times 3r = 304$ oe or **M1** for $\dfrac{4\pi r^2}{2}$ oe seen or $\pi r \times 3r$ oe seen
5(a)(i)	$(x-4)(x+3)$ final answer	2	**M1** for $(x+a)(x+b)$ where $ab = -12$ or $a + b = -1$ or for $x(x+3) - 4(x+3)$ or $x(x-4) + 3(x-4)$
5(a)(ii)	$\dfrac{x+4}{x+3}$ final answer	2	**M1** for $(x-4)(x+4)$ seen
5(b)	$3x^2 - 14x + 8$ or $(x-4)(3x-2)$ final answer	3	**M2** for $\big((2x-3)-(x+1)\big)\big((2x-3)+(x+1)\big)$ or $\big(4x^2 - 6x - 6x + 9\big) - \big(x^2 + x + x + 1\big)$ or better or correct answer seen or **M1** for $(x-4)(ax+b)$ or $(3x-2)(x+c)$ or $\big(4x^2 - 6x - 6x + 9\big)$ or $\pm\big(x^2 + x + x + 1\big)$ oe
5(c)	$\dfrac{x^2 - 3x - 12}{(x+1)(x-3)}$ or $\dfrac{x^2 - 3x - 12}{x^2 - 2x - 3}$ final answer	4	**B1** for common denominator $(x+1)(x-3)$ oe isw **B1** for $(2x+4)(x-3) - x(x+1)$ or better seen **B1** for $2x^2 - 6x + 4x - 12$ or $-x^2 - x$ seen

Question	Answer	Marks	Partial Marks
5(d)	$2x^3 - 15x^2 + 22x + 15$ final answer	**3**	**B2** for correct expansion of three brackets unsimplified or for simplified four-term expression of correct form with 3 terms correct in final answer or **B1** for correct expansion of two brackets with at least 3 terms out of 4 correct
5(e)	$2x^2 - 3x - 77[=0]$ oe $\left(6x^2 - 9x - 231[=0]\right)$ or $18y^2 + 147y + 222[=0]$ oe $\left(6y^2 + 49y + 74[=0]\right)$	**M2**	**M1** for correct method to eliminate one variable e.g. $2(13+3y)^2 - 9y = 116$ or $2x^2 - 3(x-13) = 116$ oe
	$(2x+11)(x-7)\,[=0]$ oe or $\dfrac{[--]3 \pm \sqrt{([-]3)^2 - 4 \times 2 \times -77}}{2 \times 2}$ oe or $(6y+37)(3y+6)\,[=0]$ or $\dfrac{-147 \pm \sqrt{147^2 - 4 \times 18 \times 222}}{2 \times 18}$ oe	**M2**	**FT** *their* 3-term quadratic in *x* or *y*, correct factors, correct substitution into formula or for correctly completing square **M1** for a pair of factors giving 2 correct terms when expanded *their* quadratic or for e.g. $\sqrt{([-]3)^2 - 4 \times 2 \times -77}$ oe or $\dfrac{[--]3 \pm \sqrt{p}}{2 \times 2}$ oe
	$x = 7$ and $y = -2$ $x = -5\dfrac{1}{2}$ oe and $y = -6\dfrac{1}{6}$ oe	**B2**	**B1** for both *x*-values or both *y*-values or for 1 correct pair
6(a)	15[.0] or 15.00 to 15.01	**3**	**M2** for $\dfrac{17.2}{\sin 68} \times \sin 54$ oe or **M1** for $\dfrac{\sin 54}{AC} = \dfrac{\sin 68}{17.2}$ oe
6(b)	15.7 or 15.65 to 15.66	**3**	**M2** for $\sqrt{their 15^2 + 12.8^2 - 2 \times their 15 \times 12.8 \times \cos 68}$ OR **M1** for $their 15^2 + 12.8^2 - 2 \times their 15 \times 12.8 \times \cos 68$ **A1** for 244.9 to 245.2

Question	Answer	Marks	Partial Marks
6(c)	13.9 or 13.90 to 13.92	3	**M2** for $\frac{x}{17.2} = \sin 54$ oe or $\frac{x}{their 15} = \sin 68$ oe or **M1** for distance required is the perpendicular from A to BC soi
7(a)(i)	$\begin{pmatrix} -12 \\ 15 \end{pmatrix}$	1	
7(a)(ii)(a)	$\begin{pmatrix} 12 \\ -10 \end{pmatrix}$	1	
7(a)(ii)(b)	15.6 or 15.62…	2	**M1dep** for $their 12^2 + (their[-]10)^2$ oe, dep $their\ 12 \neq 0$ and $their\ -10 \neq 0$
7(b)	$\frac{3}{8}$a $+ \frac{5}{8}$b final answer	3	**B2** for an unsimplified correct answer or $MS = \frac{5}{8}(b-a)$ soi or $NS = \frac{3}{8}(-b+a)$ soi or **B1** for correct route for $\overrightarrow{OS}$ or for $MN = \mathbf{b} - \mathbf{a}$ or $NM = \mathbf{a} - \mathbf{b}$
8(a)	Ruled line with negative gradient and positive y-intercept	2	**B1** for ruled line with negative gradient or for ruled line with positive y-intercept or straight line with negative gradient and positive y-intercept
8(b)	Negative quadratic, with vertex at origin	2	**B1** for negative quadratic in other position or for sketch in 3rd and 4th quadrants only with single maximum at (0, 0) and no other turning point or for positive quadratic, with vertex at origin
8(c)(i)	$18x - 6x^2$ isw	B2	**B1** for one correct term $18x$ or $-6x^2$ seen
	setting *their* derivative $= 0$ or $\frac{dy}{dx} = 0$	M1	**Dep** on at least B1 earned or *their* derivative $= \pm 18x \pm 6x^2$
	(0, 10) and (3, 37)	B2	**B1** for $x = 0$ and $x = 3$ or for (0, 10) or (3, 37)

Question	Answer	Marks	Partial Marks
8(c)(ii)	(0, 10) minimum with correct reason AND (3, 37) maximum with correct reason	3	Reasons could be e.g. 1 A reasonable sketch of a negative cubic 2 Correct use of 2nd derivative = –12(0) + 18 = 18, 18 > 0, so (0, 10) is a minimum oe. 2nd derivative = –12(3) + 18 = –18, –18 < 0 so (3, 37) is a maximum oe. 3 Evaluates correctly values of y on both sides of both correct stationary points 4 Finds gradient on each side of both correct stationary points. **B2** for 1 correct with correct reason for that stationary point or for **both** x-values correct and reasonable sketch of a negative cubic, or for correct substitution and evaluation of **both** of *their* x-values into *their* second derivative or substitution and evaluation for one x-value on both sides of **both** of *their* stationary points to find the gradients soi or **M1** for showing [2nd derivative =] –12x + 18 or correct FT *their* 2nd derivative or substitution and evaluation shown for one x-value on both sides of **one** of *their* stationary points to find the gradients soi or for sketch of any negative cubic.
9(a)(i)	5	3	**M2** for $\dfrac{(12800-8000)\times 100}{8000\times 12}$ or **M1** for $[12800-8000=]\dfrac{8000\times 12\times r}{100}$ or 400 seen If 0 scored, **SC1** for answer 13.3 or 13.33…
9(a)(ii)	4[.0] or 3.99…	3	**M2** for $\sqrt[12]{\dfrac{12800}{8000}}$ or **M1** for $12800 = 8000\times k^{12}$ for any k

Question	Answer	Marks	Partial Marks
9(b)	9 nfww	**3**	**M2** for $260\,000 \times \left(1 + \dfrac{1.8}{100}\right)^{8}$ oe evaluated to 4 sf or better or $260\,000 \times \left(1 + \dfrac{1.8}{100}\right)^{9}$ oe evaluated to 2 sf or better or **M1** for $[300\,000 =\,] \; 260\,000 \times \left(1 + \dfrac{1.8}{100}\right)^{n}$ oe soi (Accept any inequality sign in $[300\,000 =\,]$)
10(a)	−2.5 −1.25 5.5	**3**	**B1** for each
10(b)	Correct graph	**4**	**B3FT** for 8 or 9 correct points or **B2FT** for 6 or 7 correct points or **B1FT** for 4 or 5 correct points
10(c)	$y = 2$ drawn	**M1**	
	−2.75 to −2.65 −1.1 to −1.05 0.75 to 0.85	**A2**	**A1** for 1 solution
10(d)	−2.5 5.5	**2**	**B1** for each
11(a)(i)	−3.5 oe	**2**	**M1** for $\mathrm{g}\left(\dfrac{1}{2}\right)$ seen or $3\left(\dfrac{1}{x}\right) - 5$ or better
11(a)(ii)	$\dfrac{x+5}{3}$ oe final answer	**2**	**M1** for correct first step $y + 5 = 3x$, $\dfrac{y}{3} = x - \dfrac{5}{3}$ or $x = 3y - 5$
11(b)	$3x - 11$ final answer	**2**	**M1** for $3(x - 2) - 5$
11(c)(i)	5	**2**	**M1** for $\dfrac{1}{3x-5}[= 0.1]$
11(c)(ii)	4 nfww	**2**	**M1** for $2^{x} - (3 \times 7 - 5)[= 0]$ or better

Question	Answer	Marks	Partial Marks
12(a)	88.9 or 88.92 to 88.93...	4	**M3** for $2 \times 12 + \dfrac{360-50}{360} \times 2 \times \pi \times 12$ oe or **M2** for $\dfrac{(360-50)}{360} \times 2 \times \pi \times 12$ oe isw or **M1** for $\dfrac{50}{360} \times 2 \times \pi \times 12$ oe isw
12(b)	9.01 or 9.009 to 9.010...	3	**M2** for $\dfrac{(360-50)}{360} \times \pi \times 12^2 \times h = 3510$ or **M1** for $\dfrac{k}{360} \times \pi \times 12^2 \times h$ oe seen with $k = 50$ or $360 - 50$