1MA0/4H

Edexcel GCSE
Mathematics (Linear) – 1MA0
Practice Paper 4H (Calculator)
Set A

Higher Tier
Time: 1 hour 45 minutes

Materials required for examination	Items included with question papers
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser. Tracing paper may be used.	Nil

Instructions

Use black ink or ball-point pen.
Fill in the boxes at the top of this page with your name, centre number and candidate number.
Answer all questions.
Answer the questions in the spaces provided – there may be more space than you need.
Calculators may be used.

Information

The total mark for this paper is 100.
The marks for each question are shown in brackets – use this as a guide as to how much time to spend on **each** question.
Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

Advice

Read each question carefully before you start to answer it.
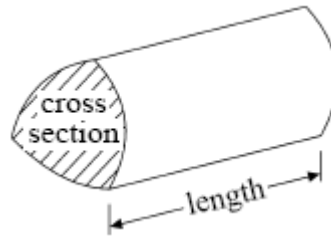Keep an eye on the time.
Try to answer every question.
Check your answers if you have time at the end.
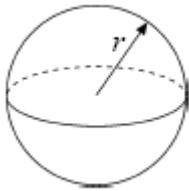
You must not write on this formulae page.
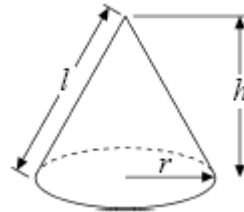**Anything you write on this formulae page will gain NO credit.**

Volume of prism = area of cross section × length

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

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

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

Curved surface area of cone $= \pi r l$

In any triangle ABC
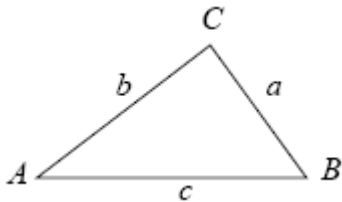
The Quadratic Equation
The solutions of $ax2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Sine Rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle $= \frac{1}{2}ab \sin C$

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Anil cycled from his home to the park.
Anil waited in the park.
Then he cycled back home.

Here is a distance-time graph for Anil's complete journey.
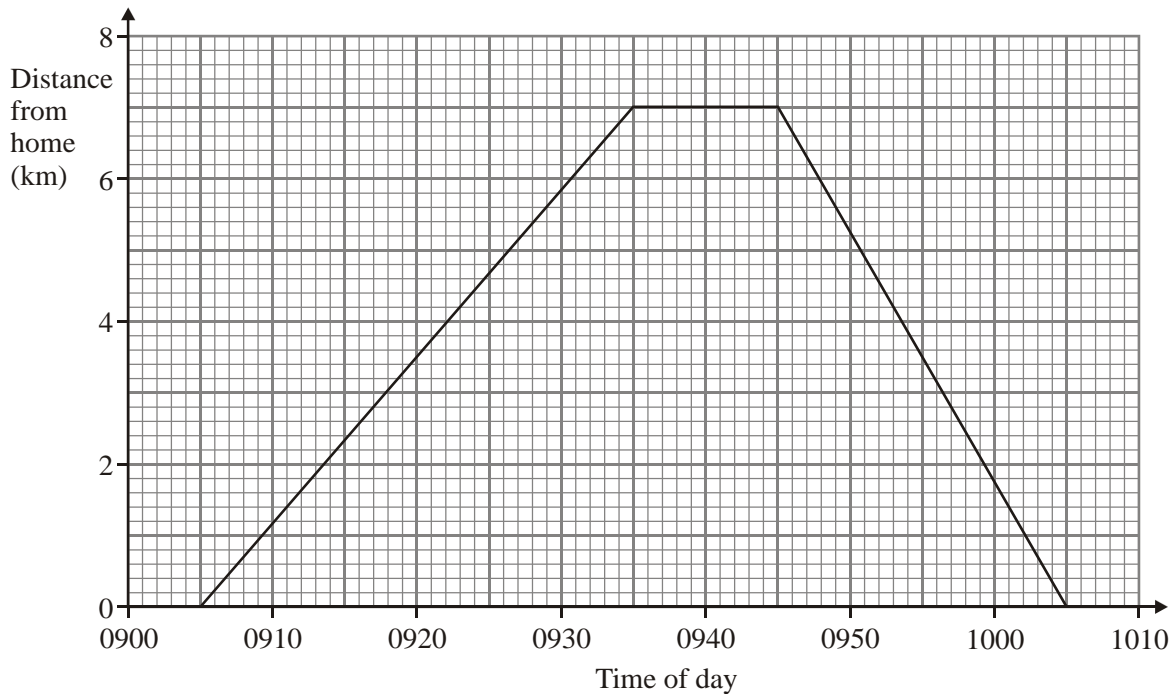
(a) At what time did Anil leave home?

....
(1)

(b) What is the distance from Anil's home to the park?

.... km
(1)

(c) How many minutes did Anil wait in the park?

....
(1)

(Total 3 marks)

*2. This is a list of ingredients for making a pear & almond crumble for 4 people.

Ingredients for 4 people
80 g plain flour 60 g ground almonds 90 g soft brown sugar 60 g butter 4 ripe pears

Jessica wants to make a pear & almond crumble for 10 people.

Here is a list of the amount of each ingredient Jessica has in her cupboard.

250 g plain flour
100 g ground almonds
200g soft brown sugar
150 g butter
8 ripe pears

Work out which ingredients Jessica needs to buy more of.
You must show all of your working.

………

(Total 4 marks)

3. During one week a dentist recorded the time, to the nearest minute, that it took her to do a particular type of filling.

Here are her results.

25	16	18	18	26
22	22	11	9	32
30	22	24	22	30

(a) Draw an ordered stem and leaf diagram to show this information.

Key:
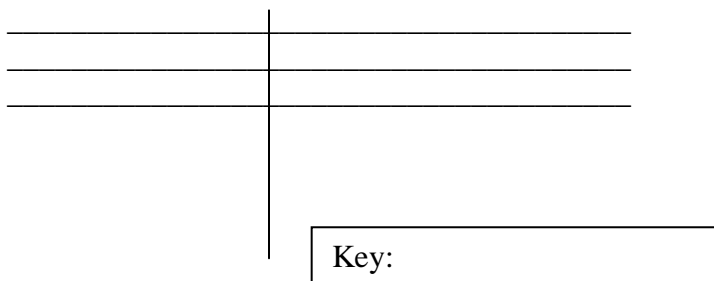
(3)

(b) Work out the mean of these results.

…………………………..

(2)

(Total 5 marks)

4.
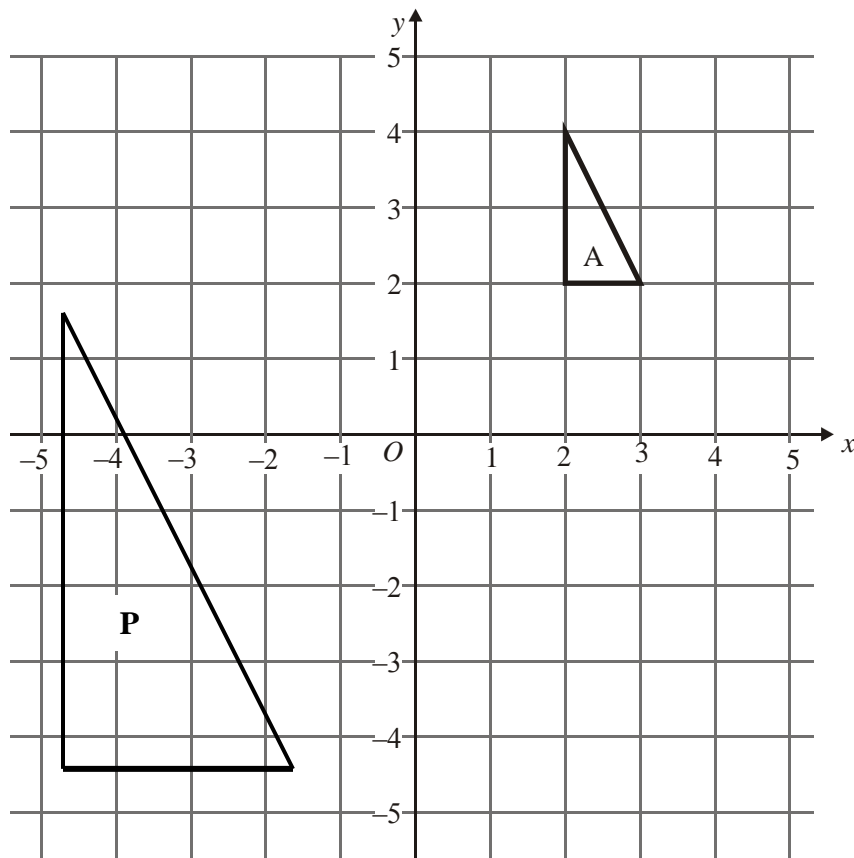
(a) On the grid, reflect triangle A in the x-axis.
   Label your new triangle B.

(2)

(b) Describe fully the single transformation which maps A onto shape P.

…………………………………………………………………………………………...…………………

…………………………………………………………………………………………...…………………

…………………………………………………………………………………………...………………….

(3)

(Total 5 marks)

5. Peter works out the cost of the gas he used last year.
At the start of the year, the gas meter reading was 12967 units.
At the end of the year, the gas meter reading was 14059 units.
Each unit of gas he used cost 44p.

Work out the mean cost per month of the gas he used last year.

£ ....

(Total 5 marks)

6.
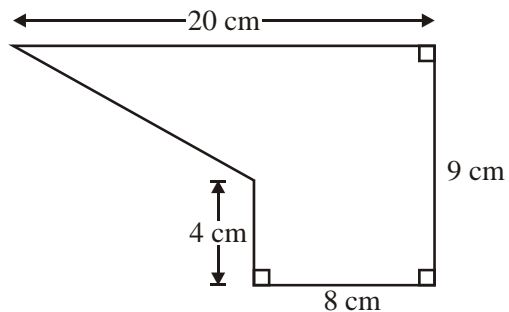
Diagram **NOT**
accurately drawn

The diagram shows a shape.
Work out the area of the shape.

.... cm^2

(Total 4 marks)

7. Stephen imports cars from the USA. He sells them in the UK.

He has just bought a car in the USA costing $24 000.
It cost him £900 to import the car to the UK.

The exchange rate is £1 = $1.45

Stephen needs to make a profit of 20% on his total costs.

Work out the least amount that Stephen must sell the car for in the UK.
Give your answer in pounds.

£ ……………………..

(Total 3 marks)

---

8. Angel Ltd manufacture components for washing machines. The probability that a component will be made within a tolerance of one tenth of a millimetre is 0.995.

Angel Ltd. manufacture 10 000 components each day.

Work out an estimate for the number of components that will not be within the tolerance of one tenth of a millimetre each day.

………………………

(Total 3 marks)

9. (a) Simplify $m^2 \times m^4$

....
(1)

(b) Simplify $y^7 \div y^5$

....
(1)

(c) Expand $2x(4x - 5y)$

....
(1)

(Total 3 marks)

10.

Diagram **NOT**
accurately drawn
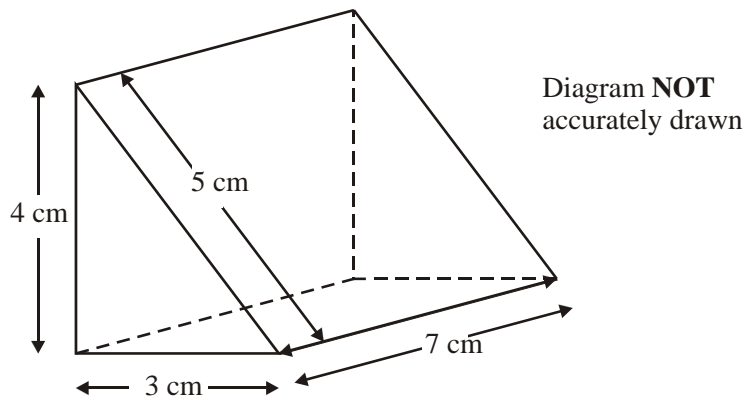
Calculate the volume of the triangular prism.

....

(Total 3 marks)

11. (a) Solve $3(x + 2) = 4$

$x =$ …………………
(2)

(b) Solve $\dfrac{3x}{2} - 5 = 7$

$x =$ …………………
(3)
(Total 5 marks)

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12. People have different reaction times when using either their left hand or their right hand. Melissa wants to investigate this.

Melissa selects a number of students from her class to use as a sample for this investigation.

(a) Give one reason why this is not a good way of taking a sample.

…………..……………………………………………………………………………………………..

…………..……………………………………………………………………………………………..

…………..……………………………………………………………………………………………..
(1)

(b) Describe a better way of taking a sample that Melissa could use.

…………..……………………………………………………………………………………………..

…………..……………………………………………………………………………………………..

…………..……………………………………………………………………………………………..
(1)
(Total 2 marks)

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13. Here are the first 5 terms of an arithmetic sequence.

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

(a) Write down the 12th term of this sequence.

....

(1)

(b) Find, in terms of n, an expression for the nth term of this sequence.

....

(2)

(Total 3 marks)

14.
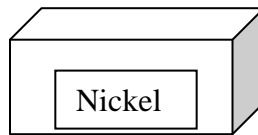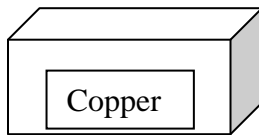
These two metal blocks each have a volume of 2.5 m^3.

The density of the copper block is 8.9 × 103 kg per m^3.

The density of the nickel block is 8.8 × 103 kg per m^3.

Work out the difference in the masses of the two blocks.
Give your answer in standard form.

.... kg

(Total 3 marks)

15. The diagram shows part of a building site in a town centre.
The scale is 1 cm = 1 m.

People must not be anywhere within 2 m from the site.

Make an accurate drawing of the region where people must not be.

Building Site

Scale: 1 cm = 1 m
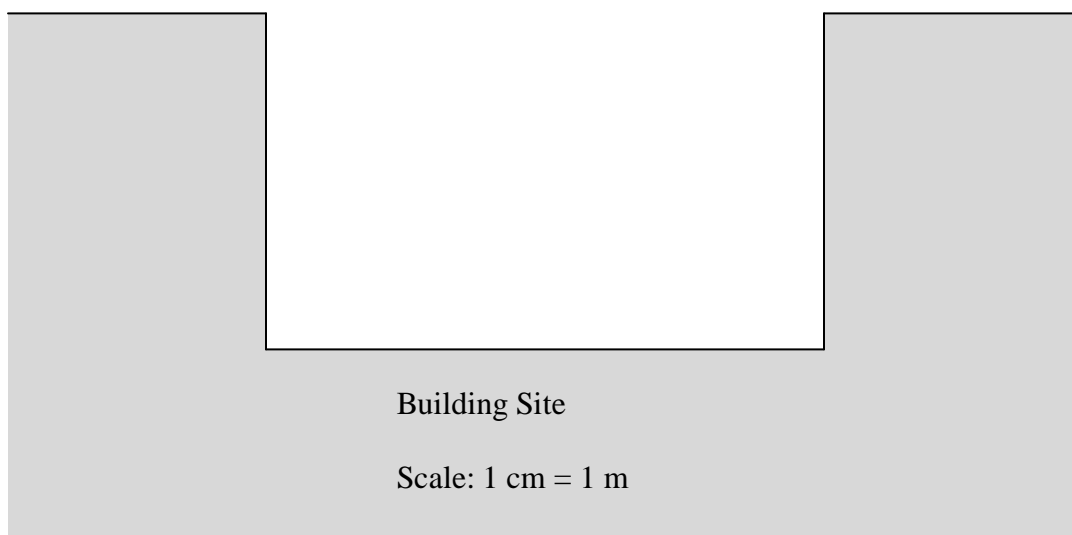
(Total 2 marks)

16.
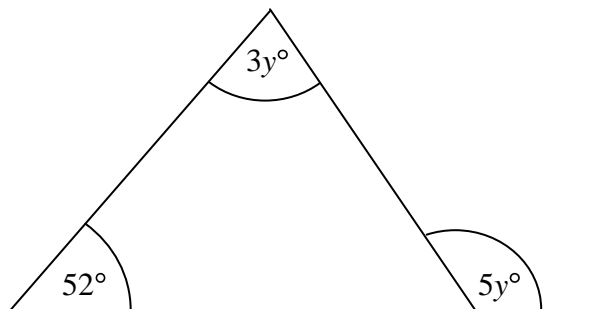
Work out the value of *y*.

y = ……………………

(Total 3 marks)

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17. In a sale, normal prices are reduced by 12%.

Stephen buys a DVD player in the sale.
He pays £242

Work out how much Stephen has saved by buying the DVD in the sale.

£ ………………………

(Total 3 marks)

18. The weight, in kg, of 50 people in a club was recorded.
The cumulative frequency diagram shows these results.

Weight of people in a club
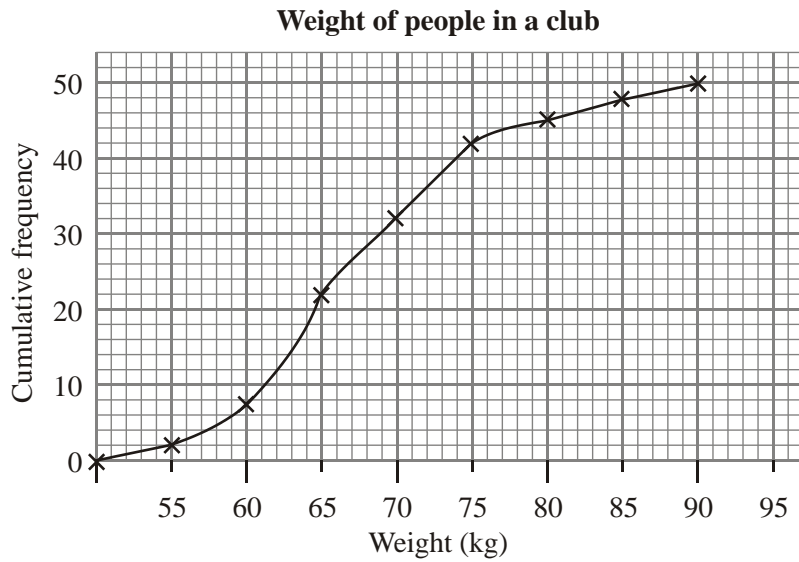
(a) Using the cumulative frequency diagram, find an estimate for

 (i) the median,

 …………………………………… kg

 (ii) the inter-quartile range.

 …………………………………..... kg
 (3)

(b) Write down the percentage of the weights represented by the inter-quartile range.

 ……………… %
 (1)

14

The lowest weight recorded was 50 kg and the heaviest was 90 kg.

(c) Draw a box plot for this data.
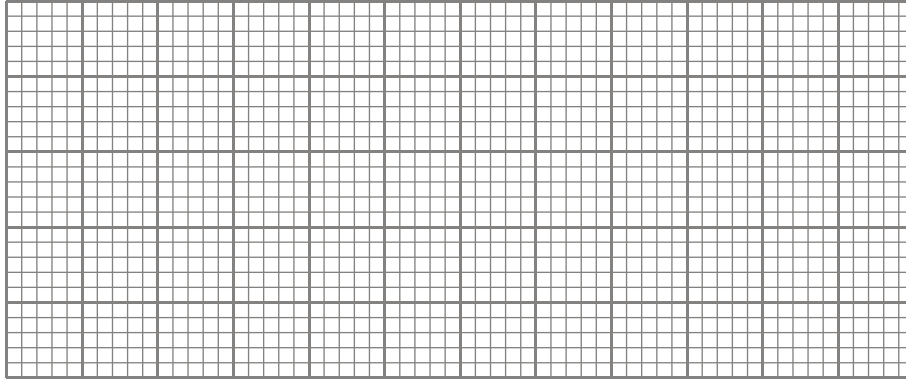
(3)

(Total 7 marks)

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19. Solve $\qquad x^2 + 2x - 15 = 0$

…………………………………….

(Total 3 marks)

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20. The graph shows the TV repair charges made by Vision Services.
The charges depend on the length of time taken for the repair.
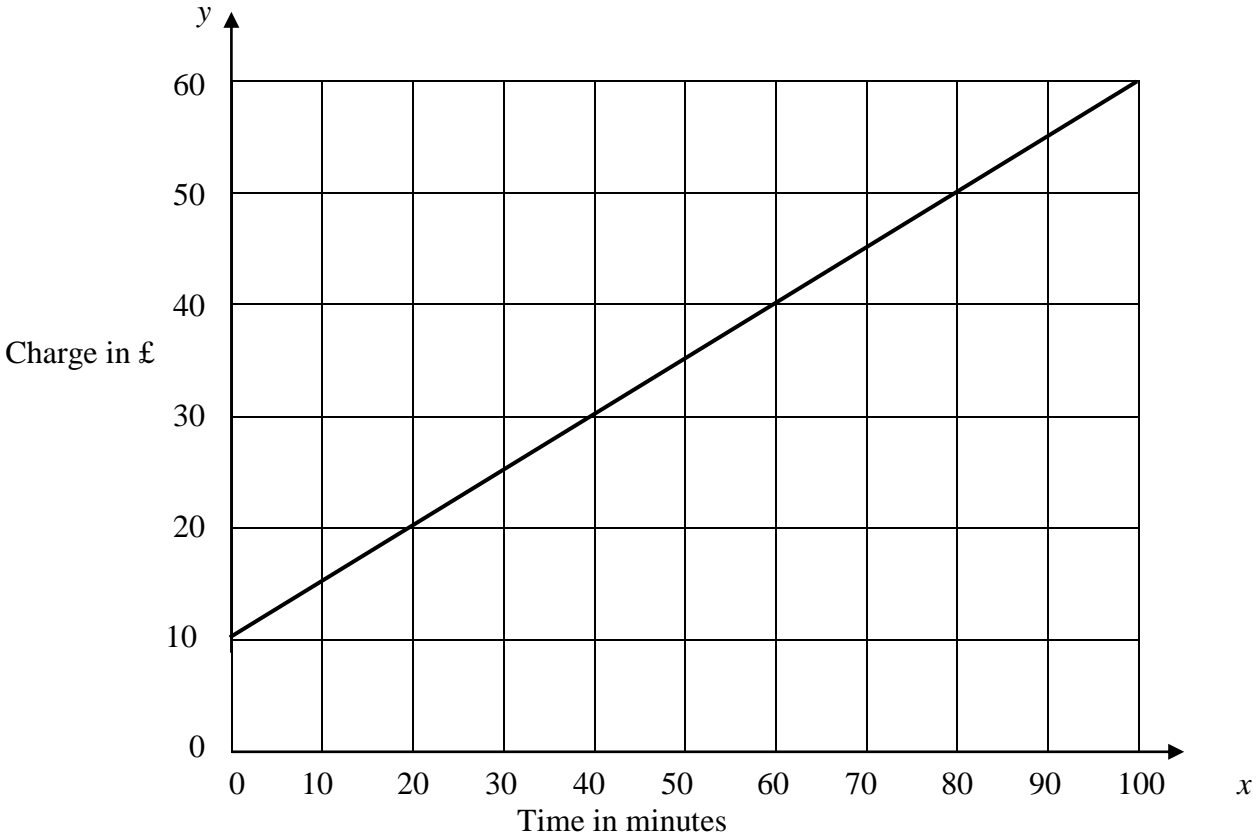
(i) Write down the equation of the straight line in the form $y = mx + c$

…………………………………………..

*(ii) State clearly what this value of m and this value of c represent.

..……

..……

..……

..……

(Total 5 marks)

16

21. $-2 < x \le 1$ $y > -2$ $y < x + 1$

x and *y* are integers.

On the grid, mark with a cross (×), each of the six points which satisfies all these 3 inequalities.
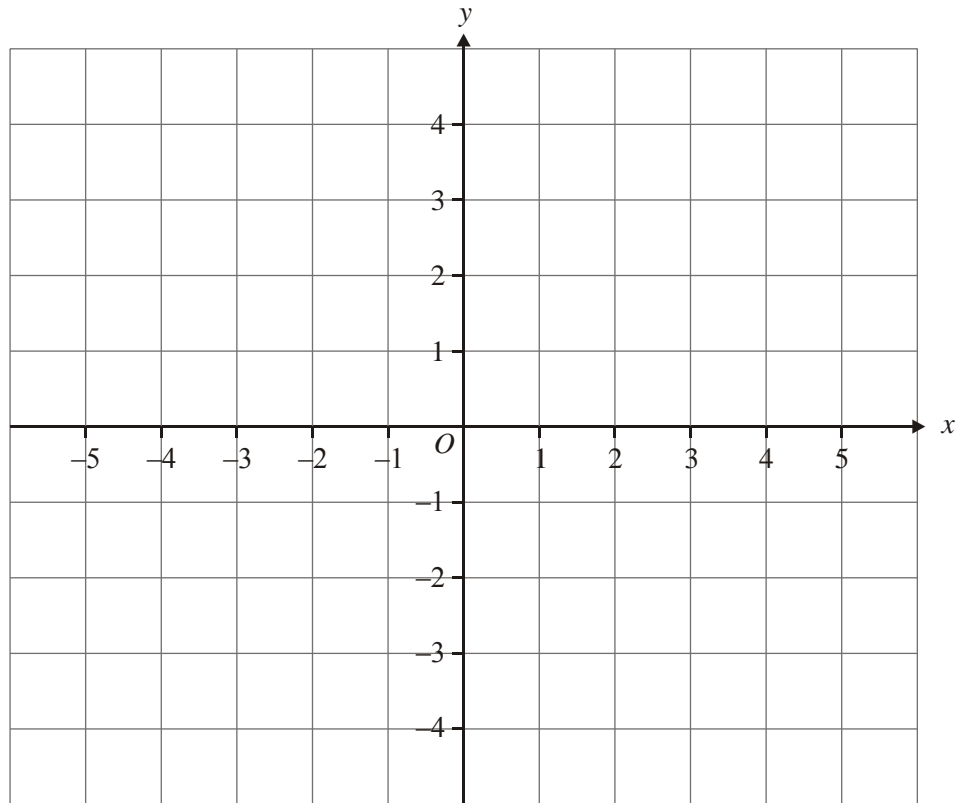
(Total 3 marks)

22. The incomplete table and histogram give some information about the ages of the people who live in a village.
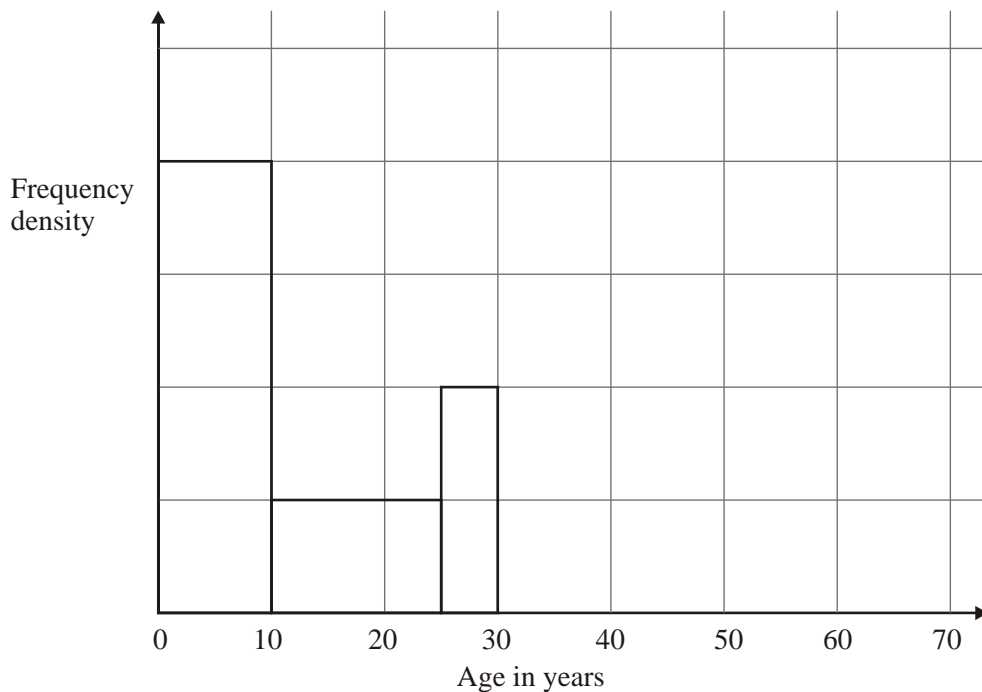
(a) Use the information in the histogram to complete the frequency table below.

Age (x) in years	Frequency
$0 < x \le 10$	160
$10 < x \le 25$	
$25 < x \le 30$	
$30 < x \le 40$	100
$40 < x \le 70$	120

(2)

(b) Complete the histogram.

(2)

(Total 4 marks)

23. Jo has a photograph of her father standing beside a car.

Jo measured the length of the car and the height of her father on the photograph.

The length of the car, on the photograph, was 8.5 cm correct to two significant figures.
The height of Jo's father, on the photograph, was 4.8 cm correct to two significant figures.

The ratio of the length of the car to the height of Jo's father is $n : 1$

Calculate the least possible value of n.
Give your answer correct to 3 significant figures.

$n =$…………………….

(Total 4 marks)

24. ABCD is a trapezium.

A   B

60°

5 cm

20°

D   P   C
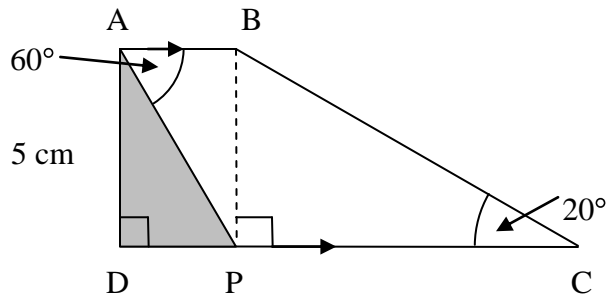
AB is parallel to DC.

Angle ADP = 90°.   Angle BPC = 90°.   Angle BAP = 60°.   Angle BCP = 20°.

AD = 5 cm.

Work out the percentage of the trapezium ABCD that is shaded.
Give your answer correct to one decimal place.

.... %

(Total 5 marks)

25. This is a sketch of the curve with equation $y = f(x)$.
It passes through the origin O.
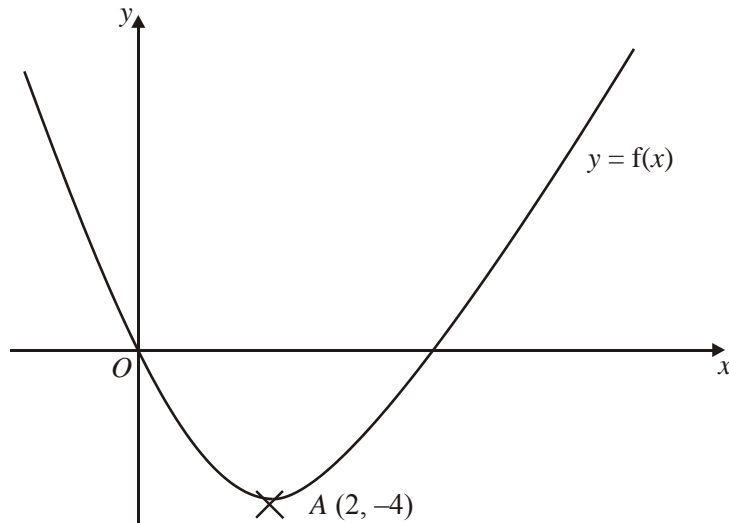
The only vertex of the curve is at A $(2, -4)$

Write down the coordinates of the vertex of the curve with equation

(i) $y = f(x - 3)$,

(...... , ...)

(ii) $y = f(x) - 5$,

(...... , ...)

(iii) $y = -f(x)$,

(...... , ...)

(iv) $y = f(2x)$.

(...... , ...)

(Total 4 marks)

26.
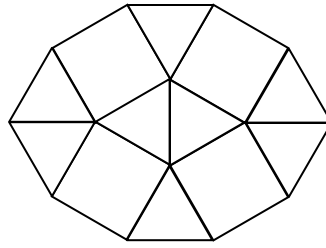
This 10-sided window is made up of squares and equilateral triangles.

The perimeter of the window is 12 m.

Calculate the area of the window.
Give your answer correct to 3 significant figures.

.... m^2

(Total 6 marks)

TOTAL FOR PAPER: 100 MARKS

END

Question	Working	Answer	Mark	Notes
1 (i) (ii) (iii)		09 05 7 10	3	B1 cao B1 cao B1 cao
*2	80 × 2.5 = 200 not enough flour 60 × 2.5 = 150 almonds ok 90 × 2.5 = 225 sugar ok 60 × 2.5 = 150 butter ok 4 × 2.5 = 10 not enough pears	More flour and pears needed	4	M1 for use of 2.5 oe A2 for answers of 200,150, 225, 150, 10 (A1 for any one answer) C1 ft for identifying the need for more flour and pears backed up from their results.
3(a) 3(b)	 (Sum of all times) ÷ 15 327 ÷ 15	0 | 9 1 | 1 6 8 8 2 | 2 2 2 2 4 5 | 6 3 0 0 2 Key: 3 | 2 = 32 21.8	3 2	B2 for a fully correct diagram (B1 for ordered or unordered leaves, with just one error or omission) B1 for a correct key M1 for summing all times **and** dividing by 15 A1 cao
4(a) 4(b)		Triangle with vertices (2,-2), (3,-2), (2,-4) Enlargement, scale factor 3, centre (5, 5)	2 3	B2 for correct triangle (B1 for a reflection in $y = k$, $k \neq 0$ or for a reflection in the y-axis) B1 for Enlargement B1 for scale factor = 3 B1 for centre = (5, 5)

Question	Working	Answer	Mark	Notes
5	14059 − 12967 = 1092 1092 × 0.44 = 480.48 480.48 ÷ 12	40.04	5	M1 for 14059 − 12967 M1 for '1092' × 0.44 oe M1 for '480.48' ÷ 12 M1 for correct conversion to pounds A1 cao
6	½ × 5 × 12 + 9 × 8	102	4	M1 for splitting into sensible shapes; triangles, rectangles or trapezia M1 for a correct method to find one of the composite shapes A2 cao (A1 for one correct area)
7	24000 ÷ 1.45 = £16551.72 + £900 = £17451.72 = total costs £17451.72 × 1.20	20 942.07	3	M1 for 24000 ÷ 1.45 M1 for ('£16551.72'+ £900) ×1.20 A1 cao
8	1 − 0.995 = 0.005 0.005 × 10 000	50	3	M1 for 1 − 0.995 (or 0.005 seen) M1 for '0.005' × 10 000 A1 cao
9(a)		m^6	1	B1 cao
9(b)		y^2	1	B1 cao
9(c)		$8x^2 - 10xy$	1	B1 cao
10	½ × 3 × 4 × 7	42 cm^3	3	M1 for ½ × 3 × 4 × 7 A1 for 42 B1 ft for cm^3

Question	Working	Answer	Mark	Notes
11(a)	$3x + 6 = 4$ $3x = -2$	-2/3	2	M1 for $3x + 6 = 4$ A1 for -2/3 oe
11(b)	$3x/2 = 12$ $3x = 24$	8	3	M1 for $3x/2 = 12$ or $3x - 10 = 14$ M1 for $3x = 24$ A1 cao
12(a)		Biased	1	B1 for "Biased towards a particular age range"
12(b)		Select a random sample from all people in the school	1	B1 for "sample from all people in the school"
13(a)		79	1	B1 cao
13(b)		$7n - 5$	2	B2 for $7n - 5$ oe (B1 for $7n \pm k$, where k is an integer $\neq \pm 5$)
14	$(8.9 \times 10^3 - 8.8 \times 10^3) \times 2.5$	2.5×10^2	3	M1 for $8.9 \times 10^3 - 8.8 \times 10^3$ M1 for '$(8.9 \times 10^3 - 8.8 \times 10^3)$' $\times 2.5$ A1 cao
15		Correct locus	2	B2 for correct locus (B1 for omission of rounded locus at corners or for a 'correct' locus at any consistent distance from the edges.
16	$5y = 3y + 52$ $2y = 52$	26	3	M1 for $5y = 3y + 52$ oe M1 for $2y = 52$ A1 cao

Question	Working	Answer	Mark	Notes
17	$242 \times 0.88 = 275$ 275 - 242	33	3	M2 for $242 \times 0.88 = 275$ (M1 for $100 - 12$ or 88 or 0.88 seen) A1 cao
18(a)(i) (ii)		66 11 – 12	3	B1 for $66 - 67$ M1 for lines drawn from cf = 12.5 and 37.5 (oe) A1 for answer in range 11 to 12
18(b)		50	1	B1 cao
18(c)		Correct box plot	3	M1 for box drawn between 'quartiles' A1 for 'median' drawn inside the box A1 for points at 50 and 90 joining the box with straight lines
19	$(x + 5)(x - 3)$	$x = -5, x = 3$	3	M1 for $(x \pm 5)(x \pm 3)$ A1 for $x = -5$ A1 for $x = 3$
20(i) *(ii)		$y = 0.5x + 10$ $0.5 = 50$p charge per minute $10 = £10$ standing charge	5	M1 for grad $= (60 - 10)/100$ oe or for $(y =) 0.5x + c$ M1 for $(y =) mx + 10$ A1 for $y = 0.5x + 10$ oe C1 for $0.5 = 50$p charge per minute, oe C1 for $10 = £10$ standing charge
21		(1, 1), (1, 0), (1, -1), (0, 0), (0, -1), (-1, -1)	3	B3 for all 6 points + no extra points (B2 for 3/4 out of no more than 6 points) (B1 for any one point out of no more than 6)

Question	Working	Answer	Mark	Notes
22(a)		160, **60, 40,** 100, 120	2	B1 for 60 B1 for 40
22(b)		Block 2.5 squares high Block 1 square high	2	B1 for block 2.5 squares high B1 for block 1 square high
23	$8.45 \div 4.85 = 1.742$	1.74	4	B1 for either 8.55 or 8.45 B1 for either 4.75 or 4.85 M1 for $8.45 \div 4.85$ A1 for 1.74 or better
24	$AB = 5/\tan60 = 2.887\ldots$ $PC = 5/\tan20 = 13.737..$ Area $ADP = 0.5 \times 2.887 \times 5 = 7.2175$ Area $ABCD = 0.5 \times (2.887 + 2.887 + 13.737) \times 5 = 48.7775$ $7.2175/48.7775 \times 100$	14.8	5	M1 for either $AB = 5/\tan60$ oe or $PC = 5/\tan20$ M1 for Area $ADP = 0.5 \times 2.887 \times 5$ M1 for Area $ABCD = 0.5 \times (2.887 + 2.887 + 13.737) \times 5$ M1 for '7.2175'/'48.7775' $\times$ 100 A1 for 14.8 or better
25(i) (ii) (iii) (iv)		(5, -4) (2, -9) (-2, -4) (2, -4)	4	B1 cao B1 cao B1 cao B1 cao
26	$12 \div 10 = 1.2$m per edge Area of squares = $1.2^2 \times 4 = 5.76$ Area of triangles = $0.5 \times 1.2^2 \times \sin 60 \times 8 = 4.988$	10.7	6	B1 for $12 \div 10 = 1.2$m per edge M1 for $1.2^2 \times 4$ M1 for $0.5 \times 1.2^2 \times \sin60$ M1 for '5.76' + $0.5 \times 1.2^2 \times \sin60 \times 8$ A2 for 10.7 or better (A1 for area of a triangle = 0.624 or better)

Quest.	Topic/name	AO1	AO2	AO3	Total		FE	Nu	ManAI	NonManAI	G	S	Total	Low	Mid.	High	Total
1	Travel	3			3					3			3	3			3
2	Recipe			4	4		4	4					4	4			4
3	Stem & Leaf	5			5							5	5	5			5
4	Rot/Enlarge	5			5						5		5	5			5
5	Gas bill		3	2	5		5	5					5	5			5
6	Area		4		4						4		4	4			4
7	Car Sales		3		3		3	3					3	3			3
8	Machine comp			3	3		3					3	3	3			3
9	Indices	3			3				3				3	3			3
10	Volume	3			3						3		3	3			3
11	Equations	5			5				5				5	5			5
12	LH/Rhand		2		2						2		2	2			2
13	Sequence	3			3				3				3	3			3
14	Metal blocks		3		3			3					3			3	3
15	Loci	2			2		2				2		2	2			2
16	Angles in Tri		3		3				2		1		3			3	3
17	DVD		3		3		3	3					3			3	3
18	Cum Freq	7			7							7	7			7	7
19	Quadratic	3			3				3				3			3	3
20	TV Repairs		5		5		5			5			5			5	5
21	Inequalities	3			3					3			3			3	3
22	Histogram	4			4							4	4			4	4
23	Photograph			4	4		4						4			4	4
24	trapezium		3	2	5						5		5			5	5
25	Transform	4			4					4			4			4	4
26	Window		3	3	6						6		6			6	6
	Totals	50	32	18	100	0	25	22	16	15	26	21	100	50	27	23	100
	Percentage	50.0	32.0	18.0	100.0		25.0		AI:	31				50.0	27.0	23.0	
	Foundation % target:	40-50	30-40	15-25			30-40						Target %:	50	25	25	
	Higher % target:	40-50	30-40	15-25			20-30										