

GCSE (9–1) Mathematics

J560/01 Paper 1 (Foundation Tier)

Practice Paper

Date – Morning/Afternoon

Time allowed: 1 hour 30 minutes



You may use:

- A scientific or graphical calculator
- Geometrical instruments
- Tracing paper



First name					
Last name					
Centre number					
Candidate number					

INSTRUCTIONS

- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

INFORMATION

- The total mark for this paper is **100**.
- The marks for each question are shown in brackets [].
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- This document consists of **24** pages.

Answer **all** the questions

- 1 Leah asked some people about their favourite type of holiday. The pictogram shows her results.

Beach	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Walking	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Cruising	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Adventure	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Sightseeing	
Other	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Key : represents 4 people.

- (a) How many people answered Beach?

(a) [1]

- (b) 10 people answered Sightseeing.

Show this on the pictogram.

[1]

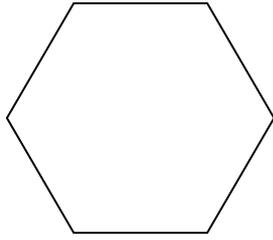
- (c) How many **more** people answered Cruising than Other?

(c) [1]

- (d) How many people were asked altogether?

(d) [2]

2 (a) Write down the mathematical name of this shape.



(a) [1]

(b) How many vertices does a cube have?

(b) [1]

(c) Sketch an isosceles triangle.

Mark the triangle to show that it is isosceles.

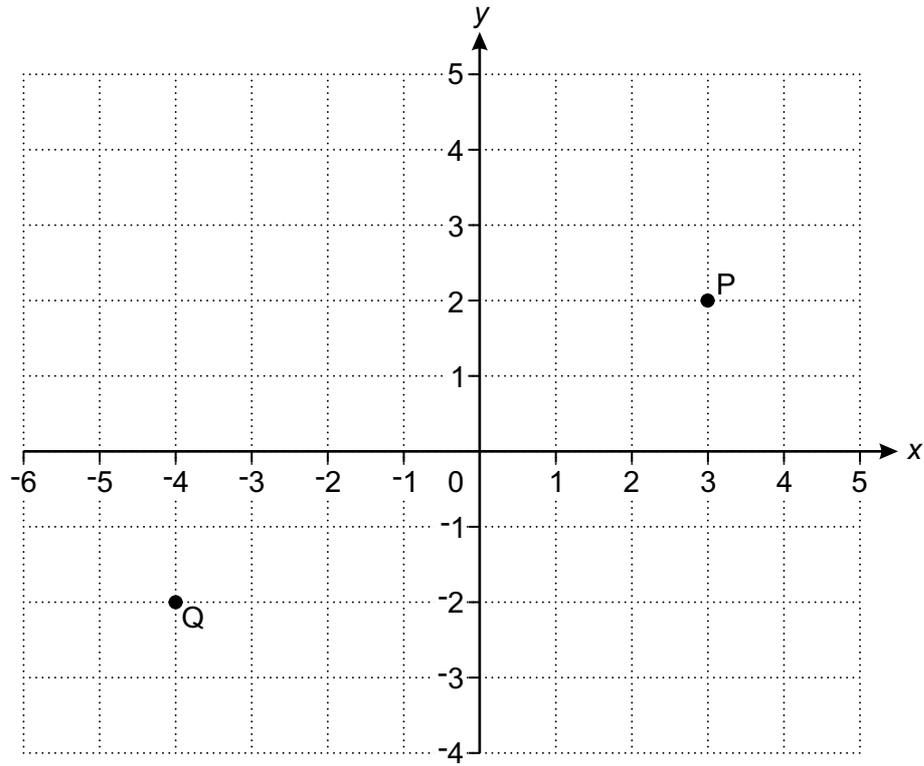
[1]

3 Write the following numbers in order of size, smallest first.

60.6 6.601 6.106 0.6 6.06

..... [2]
smallest

4 Points P and Q are shown on this grid.



(a) (i) Write down the coordinates of point P.

(a)(i) (..... ,) [1]

(ii) Write down the coordinates of point Q.

(ii) (..... ,) [1]

(b) Plot point R at (-2, 0).

[1]

5 A game is played by rolling a fair ordinary dice and throwing a fair coin.

(a) List all the possible outcomes.

Dice	Coin

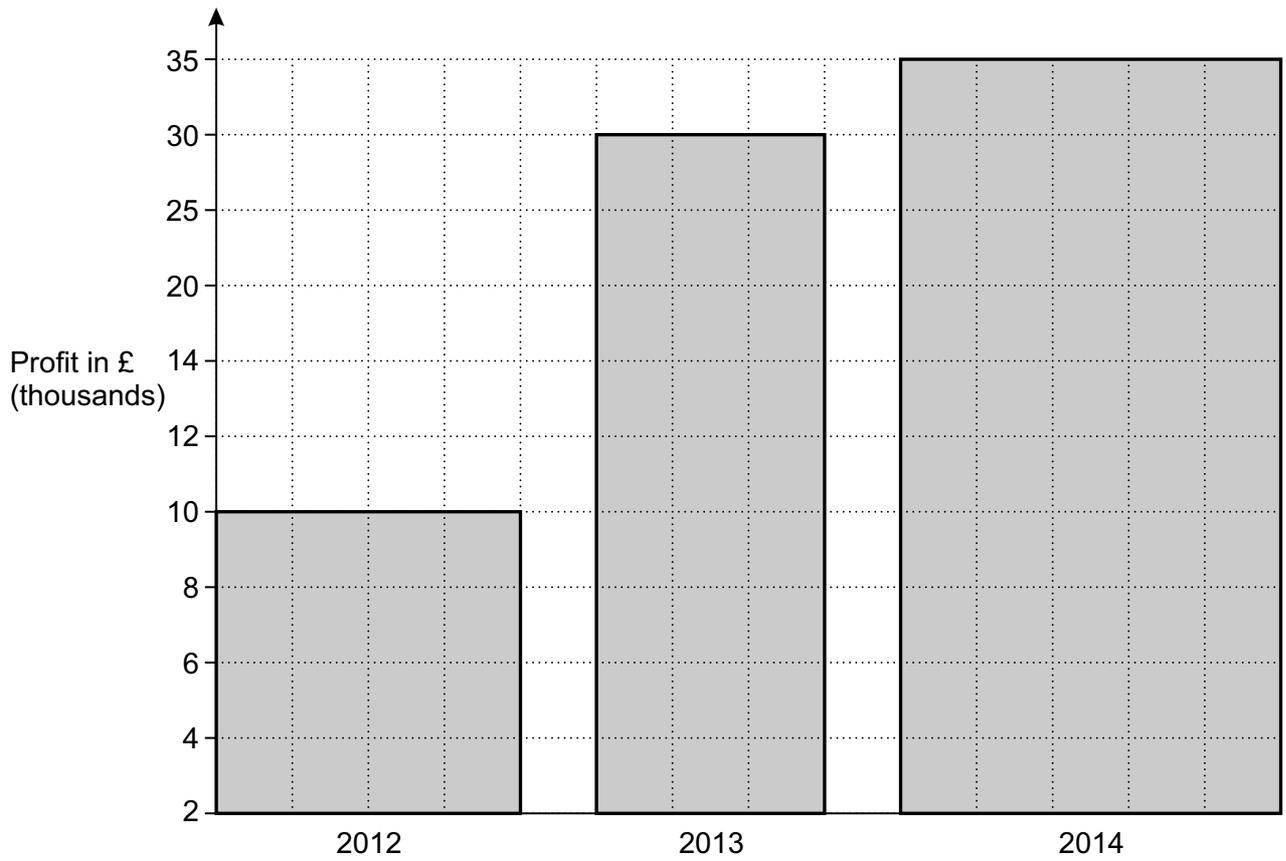
[2]

(b) Natalie wins if she gets an even number and a head.

What is the probability she wins?

(b) [1]

6 This chart shows a firm's profit for each of 3 years.



Give **two** reasons why the chart is misleading.

Reason 1

.....

Reason 2

..... [2]

7 (a) Simplify.

$$a \times a \times a \times a \times a$$

(a) [1]

(b) Solve.

$$3x + 7 = 19$$

(b) $x =$ [2]

(c) Here is a formula.

$$T = 5r + 3u$$

Work out the value of T when $r = 8$ and $u = 9$.

(c) [2]

8 (a) (i) Write 1.85 metres in centimetres.

(a)(i) cm [1]

(ii) Write 2086 grams in kilograms.

(ii) kg [1]

(b) In a box of 12 eggs, 5 are cracked.

What fraction is cracked?

(b) [1]

(c) (i) Write 45 : 15 as a ratio in its simplest form.

(c)(i) : [1]

(ii) Divide 32 in the ratio 5 : 3.

(ii) [3]

(d) The price of a watch is £230.
In a sale this price is reduced by 16%.

Calculate the sale price.

(d) £ [3]

9 (a) Round 27 146 correct to

(i) the nearest ten,

(a)(i) [1]

(ii) the nearest thousand.

(ii) [1]

(b) The width of a bench, b , is 984.8 cm correct to one decimal place.

Write down the error interval for the width of the bench.

(b) $\leq b <$ [2]

(c) (i) Write 856 000 000 in standard form.

(c)(i) [1]

(ii) Write 4.31×10^{-3} as an ordinary number.

(ii) [1]

(d) Work out.

$$\sqrt[3]{27} + \sqrt{25}$$

(d) [2]

10 (a) Write down a factor of 15.

(a) [1]

(b) Write 360 as the product of its prime factors.

(b) [2]

(c) Gary's alarm and Ian's alarm both bleep at 7:50 am.
Then Gary's alarm bleeps every 6 minutes and Ian's alarm bleeps every 4 minutes.

What is the next time both alarms bleep together?

(c) [4]

11 (a) Put brackets in these calculations to make them correct.

(i) $5 - 3 \times 12 \div 4 = 6$ [1]

(ii) $6 \times 4 + 3^2 - 5 = 289$ [1]

(b) Calculate.

$$\frac{7.5 \times 3.4}{15.2 - 12.8}$$

Give your answer correct to 2 decimal places.

(b) [2]

12 Katy organised a wedding.

Guests had to choose their meal from pasta, chicken or beef.

- $\frac{1}{3}$ of the guests chose pasta.
- $\frac{5}{12}$ of the guests chose chicken.
- 24 of the guests chose beef.

How many guests were at the wedding?

..... [4]

- 13** Bridget took a maths test. She scored 28 marks out of 40.
Sam took an English test. He scored 32 marks out of 47.

Sam said

I did better than Bridget as I scored more marks.

By writing each score as a percentage, show that Sam is wrong.

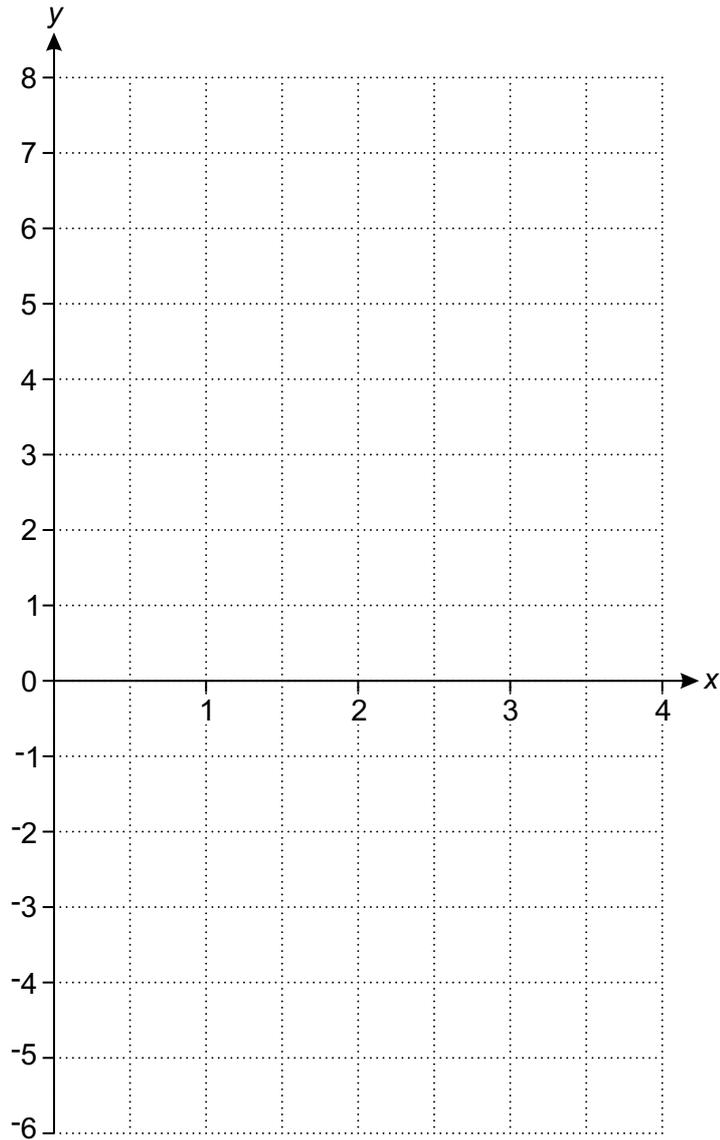
[3]

14 (a) Complete this table for $y = 2x - 3$.

x	0	1	2	3	4
y	-3		1		5

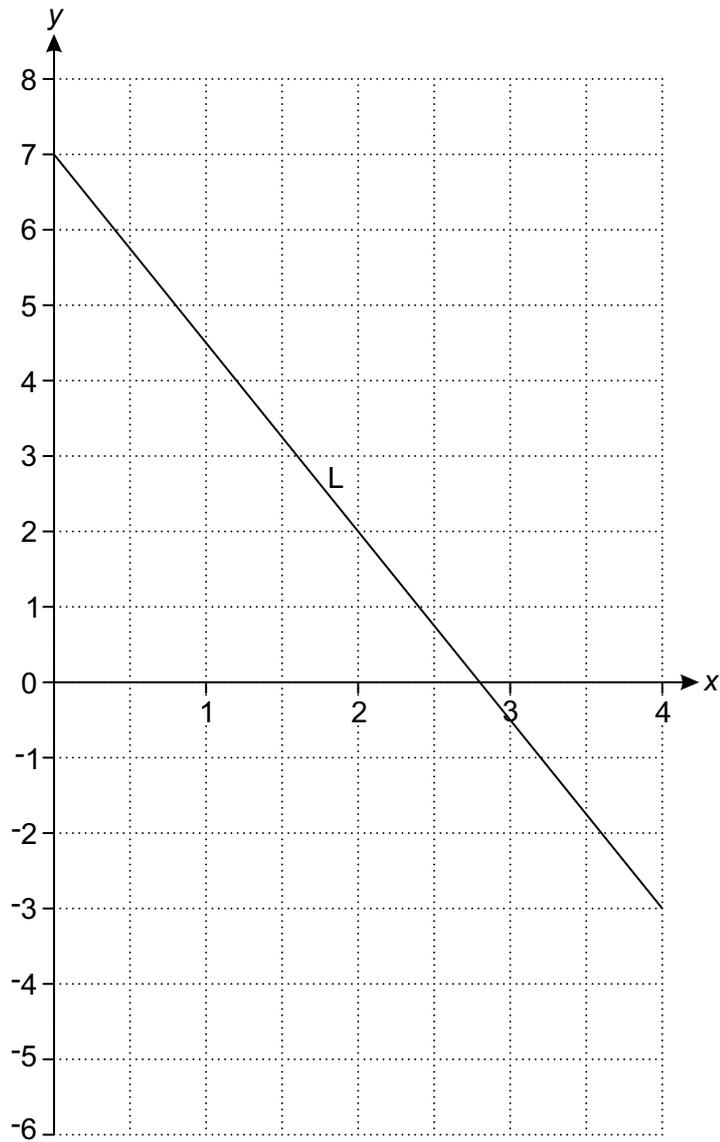
[1]

(b) On the grid below, draw the graph of $y = 2x - 3$ for values of x from 0 to 4.



[2]

(c) Line L is drawn on the grid below.



Work out the equation of line L.

(c) [3]

15 Eddie and Caroline are going to the school play.

Eddie buys 6 adult tickets and 2 child tickets. He pays £39.

Caroline buys 5 adult tickets and 3 child tickets. She pays £36.50.

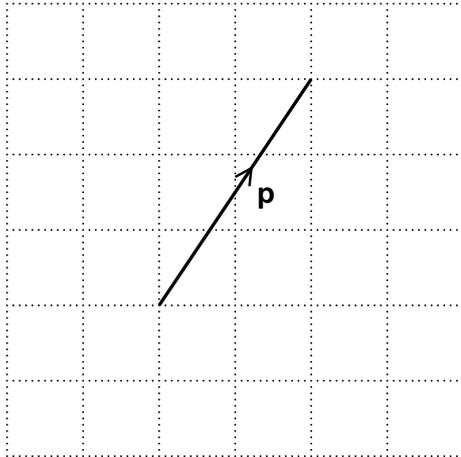
Work out the cost of an adult ticket and the cost of a child ticket.

Adult ticket £

Child ticket £ [5]

- 16 Show that $3r = 2(5k^2 - 2r)$ can be rearranged to $k = \sqrt{\frac{7r}{10}}$. [4]

17 (a) Vector \mathbf{p} is shown on a unit grid.



Write \mathbf{p} as a column vector.

(a) $\begin{pmatrix} \\ \end{pmatrix}$ [1]

(b) $\mathbf{q} = \begin{pmatrix} -2 \\ 4 \end{pmatrix}$ $\mathbf{r} = \begin{pmatrix} 5 \\ -3 \end{pmatrix}$

Work out $\mathbf{q} + \mathbf{r}$.

(b) $\begin{pmatrix} \\ \end{pmatrix}$ [2]

- 18** A shop has a sale that offers 20% off all prices.
On the final day they reduce all sale prices by 25%.
Alex buys a hairdryer on the final day.

Work out the **overall** percentage reduction on the price of the hairdryer.

..... % **[6]**

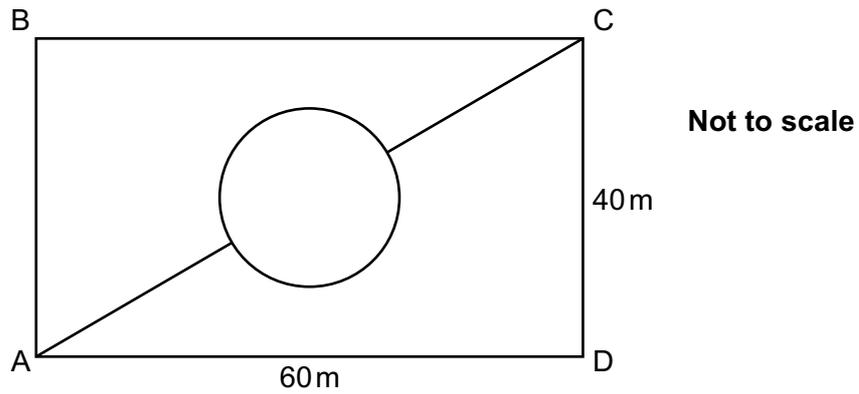
19 Some of the children at a nursery arrive by car.

- 40% of the children at the nursery are boys.
- 70% of the boys at the nursery arrive by car.
- 60% of the girls at the nursery arrive by car.

What is the probability that a child chosen at random from the nursery arrives by car?

..... [5]

20 The rectangle ABCD represents a park.



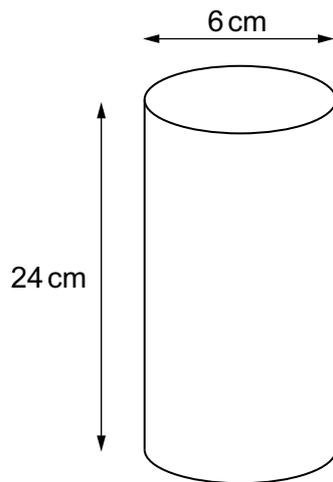
The lines show all the paths in the park.

The circular path is in the centre of the rectangle and has a diameter of 10 m.

Calculate the shortest distance from A to C across the park, using only the paths shown.

..... m [6]

21 Four solid balls are packed in a cylindrical container.



The diameter of each ball is 6 cm.
The cylinder has diameter 6 cm and height 24 cm.

Calculate the volume of unused space in the cylinder.

[The volume V of a sphere is $V = \frac{4}{3}\pi r^3$ where r is the radius.]

..... cm³ [6]

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Date – Morning/Afternoon

GCSE MATHEMATICS

J560/01 Paper 1 (Foundation Tier)

PRACTICE PAPER MARK SCHEME

Duration: 1 hours 30 minutes

MAXIMUM MARK 100

DRAFT

This document consists of 12 pages

Subject-Specific Marking Instructions

1. **M** marks are for using a correct method and are not lost for purely numerical errors.
A marks are for an accurate answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
B marks are independent of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
SC marks are for special cases that are worthy of some credit.
2. Unless the answer and marks columns of the mark scheme specify **M** and **A** marks etc, or the mark scheme is 'banded', then if the correct answer is clearly given and is not from wrong working **full marks** should be awarded.

Do not award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen and the correct answer clearly follows from it.

3. Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct.

Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, eg FT $180 \times (\textit{their} '37' + 16)$, or FT $300 - \sqrt{(\textit{their} '5^2 + 7^2')}$. Answers to part questions which are being followed through are indicated by eg FT $3 \times \textit{their} (a)$.

For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

4. Where dependent (**dep**) marks are indicated in the mark scheme, you must check that the candidate has met all the criteria specified for the mark to be awarded.
5. The following abbreviations are commonly found in GCSE Mathematics mark schemes.
 - **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point eg 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
 - **isw** means **ignore subsequent working** after correct answer obtained and applies as a default.
 - **nfww** means **not from wrong working**.
 - **oe** means **or equivalent**.
 - **rot** means **rounded or truncated**.
 - **seen** means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.
 - **soi** means **seen or implied**.

6. In questions with no final answer line, make no deductions for wrong work after an acceptable answer (ie **isw**) unless the mark scheme says otherwise, indicated by the instruction 'mark final answer'.
7. In questions with a final answer line following working space,
 - (i) if the correct answer is seen in the body of working and the answer given on the answer line is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.
 - (ii) if the correct answer is seen in the body of working but the answer line is blank, allow full marks. Place the annotation ✓ next to the correct answer.
 - (iii) if the correct answer is seen in the body of working but a completely different answer is seen on the answer line, then accuracy marks for the answer are lost. Method marks could still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.
8. In questions with a final answer line:
 - (i) If one answer is provided on the answer line, mark the method that leads to that answer.
 - (ii) If more than one answer is provided on the answer line and there is a single method provided, award method marks only.
 - (iii) If more than one answer is provided on the answer line and there is more than one method provided, award zero marks for the question unless the candidate has clearly indicated which method is to be marked.
9. In questions with no final answer line:
 - (i) If a single response is provided, mark as usual.
 - (ii) If more than one response is provided, award zero marks for the question unless the candidate has clearly indicated which response is to be marked.
10. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation. **M** marks are not deducted for misreads.

11. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.
12. Ranges of answers given in the mark scheme are always inclusive.
13. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.
14. Anything in the mark scheme which is in square brackets [...] is not required for the mark to be earned, but if present it must be correct.

MARK SCHEME

Question		Answer	Marks	Part marks and guidance
1	(a)	12	1 1AO2.3a	
	(b)	2.5 rectangles shown	1 1AO2.3b	
	(c)	9	1 1AO1.3b	
	(d)	83	2 2AO1.3b	M1 for <i>their</i> '12 + 10 + 22 + 16 + 10 + 13'
2	(a)	Hexagon	1 1AO1.1	
	(b)	8	1 1AO1.1	
	(c)	Sketch of isosceles triangle with equal sides indicated	1 1AO2.3b	
3		0.6, 6.06, 6.106, 6.601, 60.6	2 2AO1.3a	M1 for 4 in correct order
4	(a) (i)	(3, 2)	1 1AO2.3b	
	(ii)	(-4, -2)	1 1AO2.3b	
	(b)	Point plotted at (-2, 0)	1 1AO2.3b	
5	(a)	12 correct outcomes listed	2 2AO1.3a	B1 for 9 correct outcomes
	(b)	$\frac{3}{12}$ oe	1 1AO1.3a	

Question		Answer	Marks	Part marks and guidance
6		Two from: Unequal width bars Frequency/profit scale not linear Vertical axis doesn't start at 0	2 2AO2.5b	B1 for one reason
7	(a)	a^5	1 1AO1.2	
	(b)	4	2 2AO1.3a	M1 for $3x = 12$ or for $x = \frac{k}{3}$ after $3x = k$
	(c)	67	2 2AO1.3a	M1 for 40 or 27
8	(a) (i)	185	1 1AO1.1	
	(ii)	2.086	1 1AO1.1	
	(b)	$\frac{5}{12}$	1 1AO3.1a	
	(c) (i)	3 : 1	1 1AO1.2	
	(ii)	20 and 12	3 3AO1.3a	M1 for $32 \div 8$ M1 for <i>their</i> '4' $\times 5$ or <i>their</i> '4' $\times 3$
	(d)	193.2[0]	3 3AO1.3a	M2 for 0.84×230 OR M1 for 0.16×230 <i>soi</i> by 36.8[0] M1 for $230 -$ <i>their</i> 36.8
9	(a) (i)	27 150	1 1AO1.3a	
	(ii)	27 000	1 1AO1.3a	

Question		Answer	Marks	Part marks and guidance	
	(b)	984.75, 984.85	2 2AO1.3a	B1 for one correct	
	(c) (i)	8.56×10^8	1 1AO1.3a		
	(ii)	0.00431	1 1AO1.3a		
	(d)	8	2 2AO1.3a	M1 for 3	
10	(a)	1, 3, 5 or 15	1 1AO1.1	Ignore correct extras	
	(b)	$2^3 \times 3^2 \times 5$ oe	2 2AO1.3b	M1 for any correct factor pair FT previous error, may be on a tree	
	(c)	[0]8:02 [am]	4 1AO1.3b 2AO3.1d 1AO3.2	M2 for 12 as LCM M1 for 7:50 plus <i>their</i> LCM OR M1 for listing 3 times with 6 minute intervals M1 for listing 3 times with 4 minute intervals	
11	(a) (i)	$(5 - 3) \times 12 \div 4 = 6$	1 1AO2.1a	Condone additional brackets if answer unaffected	
	(ii)	$6 \times (4 + 3)^2 - 5 = 289$	1 1AO2.1a	Condone additional brackets if answer unaffected	
	(b)	10.63	2 2AO1.3a	M1 for 10.625	
12		96	4 2AO1.3b 2AO3.1d	B3 for 32 and 40 Or B2 for 32 or 40 Or M2 for a common denominator and one correct numerator Or M1 for a common denominator Accept equivalent methods	

Question		Answer	Marks	Part marks and guidance
13		Bridget scored a higher percentage Dep on 70% and 68 – 68.1% with full working	3 1AO1.3a 2AO2.2	B2 for 70% and 68% oe decimal Or B1 for 70 or 68 oe decimal OR M2 for attempt at $28 \div 40$ and $32 \div 47$ Or M1 for attempt at $28 \div 40$ or $32 \div 47$
14	(a)	-1, 3	1 1AO1.3a	
	(b)	Correct ruled line from $x = 0$ to 4	2 1AO2.3a 1AO2.3b	M1 for 4 points correctly plotted FT <i>their</i> table
	(c)	$y = -2.5x + 7$ oe	3 2AO2.3a 1AO2.3b	B2 for $-2.5x$ Or B1 for -2.5 or 7 Or M1 for up/along for any 2 valid points
15		[a =] 5.5[0] [c =] 3[.00]	5 1AO1.3a 1AO2.3b 2AO3.1d 1AO3.3	M4 for correct method to eliminate 1 variable Or M3 for correct method to eliminate 1 variable, allow 1 arithmetic error Or M2 for 2 correct equations with a common coefficient Or M1 for $6a + 2c = 39$ or $5a + 3c = 36.50$
16		$3r = 10k^2 - 4r$ $3r + 4r = 10k^2$ $7r = 10k^2$ $\frac{7r}{10} = k^2$	M1 M1 M1 M1 4AO2.2	
17	(a)	$\begin{pmatrix} 2 \\ 3 \end{pmatrix}$	1 1AO2.3a	

Question		Answer	Marks	Part marks and guidance	
	(b)	$\begin{pmatrix} 3 \\ 1 \end{pmatrix}$	1 1 1AO1.2 1AO1.3a		
18		40	6 1AO1.3b 5AO3.1d	M5 for $(1 - ([1] \times [0].8[0] \times [0].75)) \times 100$ Or M4 for $1 - ([1] \times [0].8[0] \times [0].75)$ Or M3 for $[1] \times [0].8[0] \times [0].75$ or $[0].6$ Or M2 for $[0].8[0]$ and $[0].75$ Or M1 for $[0].8[0]$ or $[0].75$	Accept correct alternative methods e.g. M1 for 20% of 100 [= 20] M1 for $100 - 20$ [= 80] M1 for 25% of 80 = $80 \div 4$ [= 20] M1 for $80 - 20$ [= 60] M1 for $100 - 60$
19		0.64 oe	5 1AO1.3b 4AO3.1d	M4 for $0.4 \times 0.7 + (1 - 0.4) \times 0.6$ Or M3 for fully correct tree diagram with probabilities Or M2 for partially correct tree diagram with one set of correct branches Or M1 for correctly labelled tree diagram with missing or incorrect probabilities	Accept correct equivalent methods and equivalent percentages and fractions for decimals Accept working with expected frequencies
20		77.8[1...] or 77.82	6 1AO1.3a 1AO1.3b 1AO2.1b 3AO3.1d	M5 for $\sqrt{60^2 + 40^2} - 10 + \frac{1}{2} \times \pi \times 10$ Or M4 for $\sqrt{60^2 + 40^2}$ and $\frac{1}{2} \times \pi \times 10$ Or M3 for $60^2 + 40^2$ or 5200 and $(\frac{1}{2} \times \pi \times 10$ or 15.7[...]) Or M2 for $\sqrt{60^2 + 40^2}$ or 72.1[1...] or $\frac{1}{2} \times \pi \times 10$ or 15.7[...] Or M1 for $60^2 + 40^2$ or 5200 or 10π	

Question		Answer	Marks	Part marks and guidance
21		$226[.2]$ or 72π	6 1AO1.3b 1AO2.3a 4AO3.1d	B3 for 678.58 or 216π OR M1 for 9π M1 for <i>their</i> ' 9π ' $\times 24$ soi AND B1 for 113.1 or 113.097 or 36π M1 for <i>their</i> ' 113.1 ' $\times 4$

Assessment Objectives (AO) Grid

Question	AO1	AO2	AO3	Total
1(a)	0	1	0	1
1(b)	0	1	0	1
1(c)	1	0	0	1
1(d)	2	0	0	2
2(a)	1	0	0	1
2(b)	1	0	0	1
2(c)	0	1	0	1
3	2	0	0	2
4(a)(i)	0	1	0	1
4(a)(ii)	0	1	0	1
4(b)	0	1	0	1
5(a)	2	0	0	2
5(b)	1	0	0	1
6	0	2	0	2
7(a)	1	0	0	1
7(b)	2	0	0	2
7(c)	2	0	0	2
8(a)(i)	1	0	0	1
8(a)(ii)	1	0	0	1
8(b)	0	0	1	1
8(c)(i)	1	0	0	1
8(c)(ii)	3	0	0	3
8(d)	3	0	0	3
9(a)(i)	1	0	0	1
9(a)(ii)	1	0	0	1
9(b)	2	0	0	2
9(c)(i)	1	0	0	1
9(c)(ii)	1	0	0	1
9(d)	2	0	0	2
10(a)	1	0	0	1
10(b)	2	0	0	2
10(c)	1	0	3	4
11(a)(i)	0	1	0	1
11(a)(ii)	0	1	0	1
11(b)	2	0	0	2
12	2	0	2	4
13	1	2	0	3
14(a)	1	0	0	1
14(b)	0	2	0	2
14(c)	0	3	0	3
15	1	1	3	5
16	0	4	0	4
17(a)	0	1	0	1
17(b)	2	0	0	2
18	1	0	5	6
19	1	0	4	5
20	2	1	3	6

21	1	1	4	6
Totals	50	25	25	100

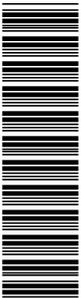
GCSE (9–1) Mathematics

J560/02 Paper 2 (Foundation Tier)

Practice Paper

Date – Morning/Afternoon

Time allowed: 1 hour 30 minutes



You may use:

- Geometrical instruments
- Tracing paper

Do not use:

- A calculator



First name					
Last name					
Centre number					
Candidate number					

INSTRUCTIONS

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INFORMATION

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- This document consists of **24** pages.

Answer **all** the questions

- 1 (a) Write these numbers in order of size, smallest first.

12 -7 -11 -2

(a) [1]
smallest

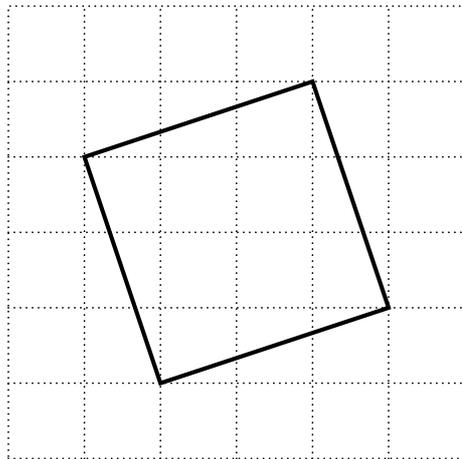
- (b) Insert <, > or = to make each statement true.

(i) $\frac{3}{5}$ 0.47 [1]

(ii) 0.38 $\frac{19}{50}$ [1]

(iii) $\frac{3}{16}$ $\frac{1}{4}$ [1]

- 2 This square is drawn on a one-centimetre square grid.



Work out the area of the square.

..... cm² [3]

3 (a) Work out.

(i) $4 + 6 \times 3 - 5$

(a)(i) [1]

(ii) $30 \div (3 + 2)$

(ii) [1]

(iii) $1 + 2^3$

(iii) [1]

(b) Round 162.645

(i) to 1 decimal place,

(b)(i) [1]

(ii) to 2 significant figures.

(ii) [1]

(c) Estimate the value of $\frac{4.34 \times 19.2}{11.3}$.

(c) [2]

4 Milly has a 12 m length of material.

She uses **four** lengths of 2.3 m to make curtains.

She uses the rest to make cushions.

A cushion needs a length of 0.48 m of the material.

Show that she can make no more than **five** cushions.

[5]

5 Work out.

(a) $926 - 382$

(a) [1]

(b) 517×16

(b) [2]

- 6 (a) Jacob earns £93.20 for 8 hours' work.
He gets the same amount of pay for each hour.

What is his rate of pay per hour?

(a) £ [2]

- (b) Lena works for 34 hours from Monday to Friday at her normal rate of pay.
On Saturdays she gets an overtime rate of pay.
The overtime rate is 1.5 times her normal rate.

She works for 4 hours on a Saturday.
Altogether Lena earns £320 for her week's work.

What is her normal rate of pay per hour?

(b) £ [3]

7 Lemon drinks are made by mixing concentrate with water.

(a) Sian has a lemon drink made by mixing 120 ml of concentrate with 180 ml of water.

What percentage of her lemon drink is concentrate?

(a) % [3]

(b) Sophia has a lemon drink made by mixing 70 ml of concentrate with 180 ml of water.
Tommy has a lemon drink made by mixing 90 ml of concentrate with 270 ml of water.

Who has the stronger drink, Sophia or Tommy?
Show your working.

..... [4]

8 (a) Here is a list of numbers.

32 33 34 35 36 37 38 39 40

From this list, write down

(i) a multiple of 7,

(a)(i) [1]

(ii) a square number,

(ii) [1]

(iii) a prime number.

(iii) [1]

(b) Circle the **two** statements that are **false**.

A If p is an integer then $3p$ is a multiple of 3.

B If q is an even number then $\frac{q}{2}$ is always an even number.

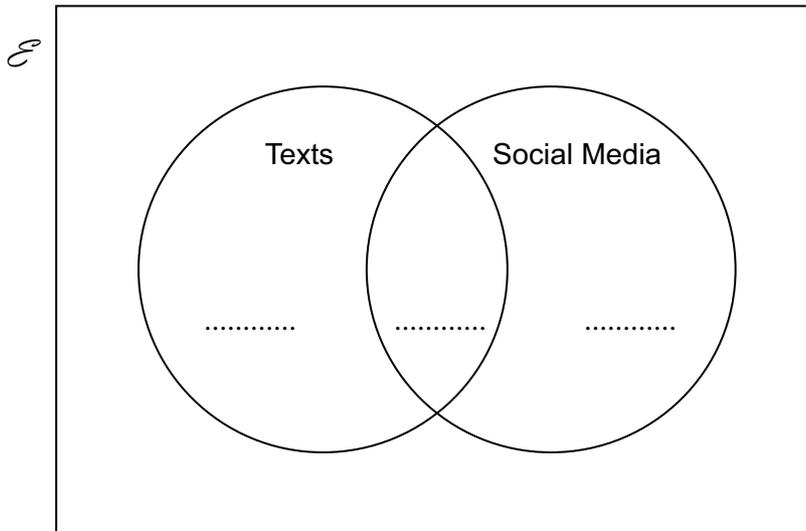
C If s is an integer then $2s + 1$ is an odd number.

D If t is an even number then t^3 is an odd number. [2]

9 50 students were asked in a survey whether they use texts or social media.

- 20 students said they only use texts.
- 8 students said they only use social media.
- 17 students said they use both texts and social media.

(a) Put this information on the Venn diagram.



[1]

(b) How many of the students in the survey do not use texts or social media?

(b) [2]

(c) One of the students in the survey is chosen at random.

What is the probability that this student uses texts?

(c) [2]

- 10** Jason is playing a game.
 He has two sets of cards.
 One set has three red cards, numbered 1, 2 and 3.
 The other set has four green cards, numbered 4, 5, 6 and 8.

Jason chooses a red card and a green card at random.
 He works out his score by adding the numbers on the two cards together.

- (a)** Complete the table to show all the possible scores.

	3	.....	.....	.....	.....
Red card	2	.....	.....	.....	10
	1	5	.....	.....	.....
		4	5	6	8
		Green card			

[2]

- (b)** Work out the probability that Jason gets

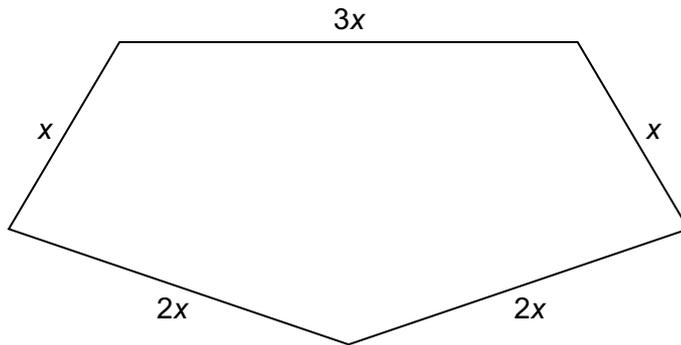
(i) a score of 10,

(b)(i) [1]

(ii) a score of 9 or more.

(ii) [1]

11 (a) Here is a pentagon.



Not to scale

Write down an expression for the perimeter of the pentagon.
Give your answer in its simplest form.

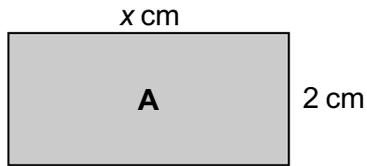
(a) [1]

(b) Simplify fully.

$$4x + 3y - 2 + 2x - 8y - 6$$

(b) [2]

(c) Shape **A** is a rectangle of length x cm and width 2 cm.



Not to scale

The shape below contains two rectangles that are identical to shape **A**.

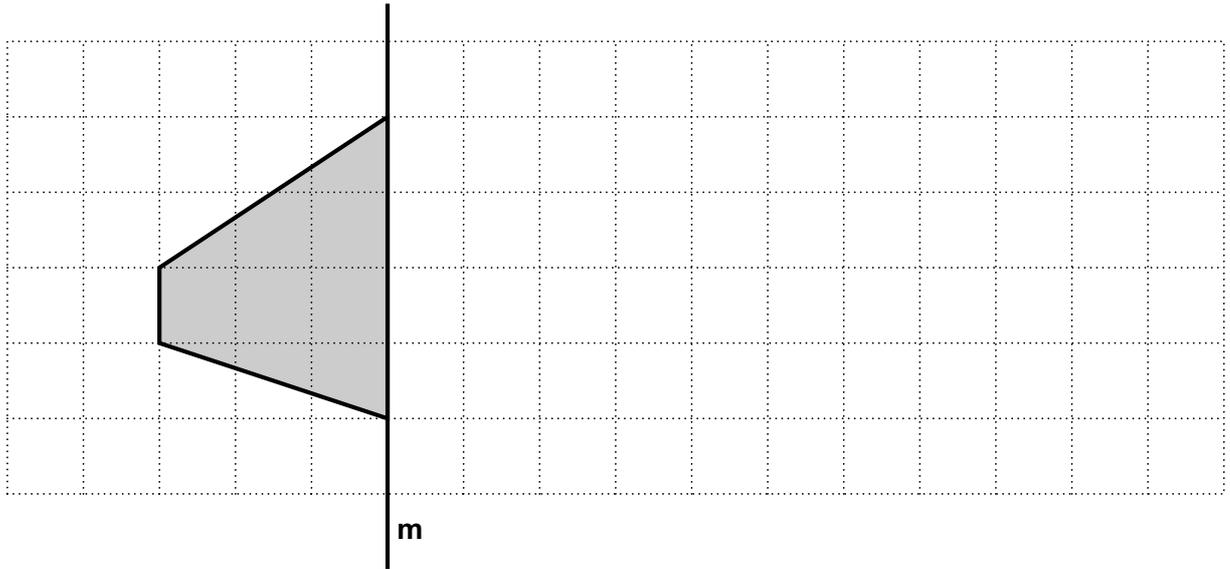


Not to scale

Work out an expression for the perimeter of this shape.
Give your answer in its simplest form.

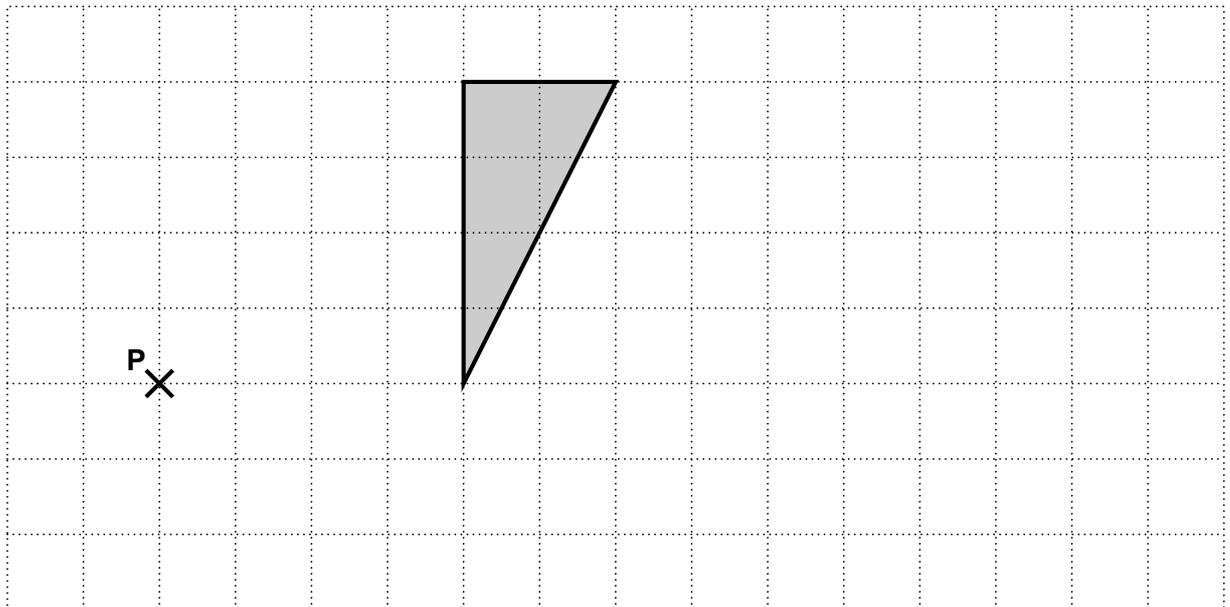
(c) cm [3]

12 (a) Reflect the shape in the line **m**.



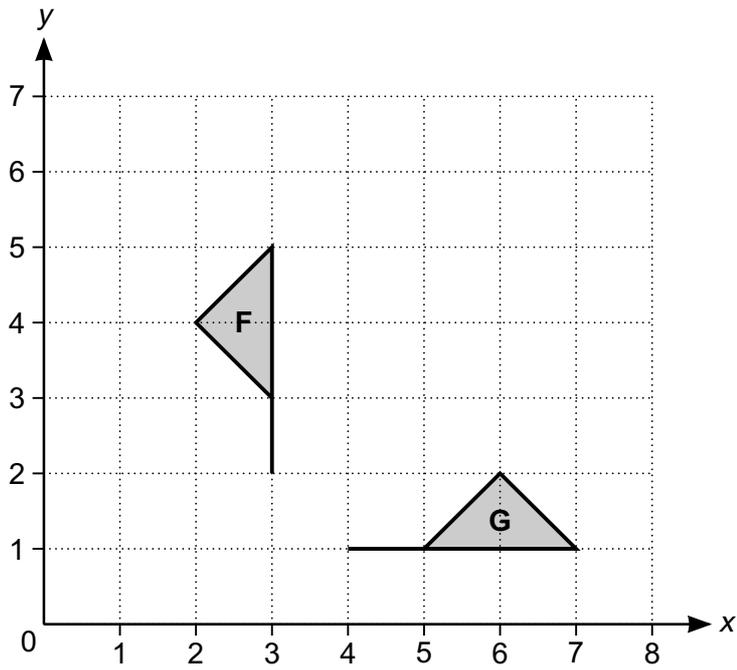
[1]

(b) Enlarge the triangle with centre **P** and scale factor $\frac{1}{2}$.



[2]

(c) Here are two flags.



Flag **F** is rotated onto Flag **G**.

Describe the rotation fully.

.....

..... [2]

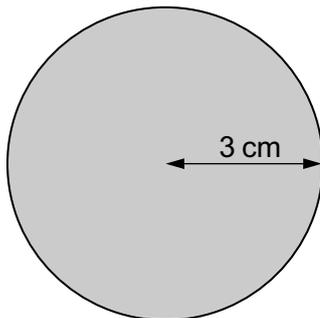
13 (a) Work out.

$$\frac{3}{7} + \frac{4}{5}$$

Give your answer as a mixed number.

(a) [3]

(b) This is a circle with radius 3 cm.



Not to scale

Work out the area of the circle.
Give your answer in terms of π .

(b) cm^2 [2]

14 (a) The n th term of a sequence is given by $2n^2 + 1$.

Write down the first three terms of this sequence.

(a) , , [2]

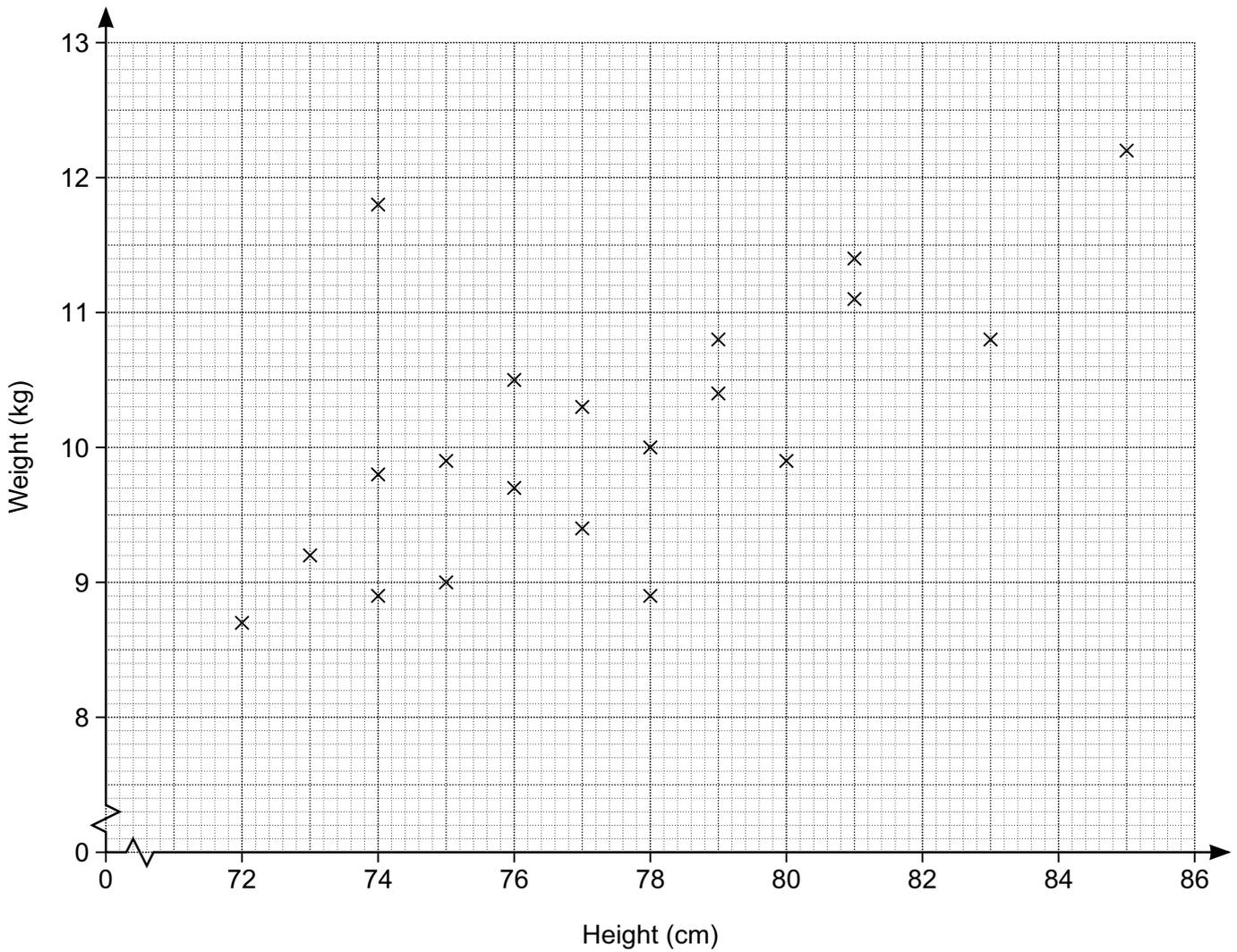
(b) Here are the first four terms of a different sequence.

2 7 12 17

Write an expression for the n th term of this sequence.

(b) [2]

15 The scatter diagram shows the height and weight of twenty babies aged 12 months.



(a) Leila is 12 months old. Her height is 81 cm and she weighs 10.4 kg.

Put a cross on the diagram to represent this.

[1]

(b) Archie is 12 months old. His height is 75 cm.

Draw a line of best fit and use it to estimate Archie's weight.

(b) kg [2]

(c) The height and weight of one of the babies is not typical for babies aged 12 months.

Circle the point on the diagram representing this baby.

[1]

- (d) Josie has a baby who is 15 months old.
Her baby has a height of 82 cm.

Josie is going to use the line of best fit to estimate what her baby's weight should be.

Explain why it may not be sensible for Josie to do this.

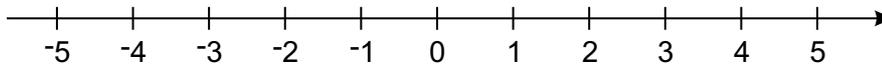
.....
 [1]

- 16 (a) Solve this inequality.

$$3x - 2 \leq 10$$

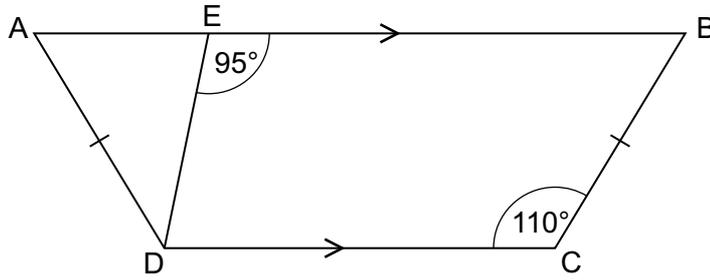
(a) [2]

- (b) Represent your solution to part (a) on the number line.



[1]

- 17 ABCD is a trapezium.
AD = BC.



Not to scale

Work out

- (a) angle EBC,

(a) ° [1]

- (b) angle ADE.

(b) ° [2]

- 18 The angles in a triangle are in the ratio 1 : 2 : 3.
Neil says

This is a right-angled triangle.

Is Neil correct?
Show your reasoning.

..... [3]

19 (a) Work out.

$$7^{-2}$$

(a) [1]

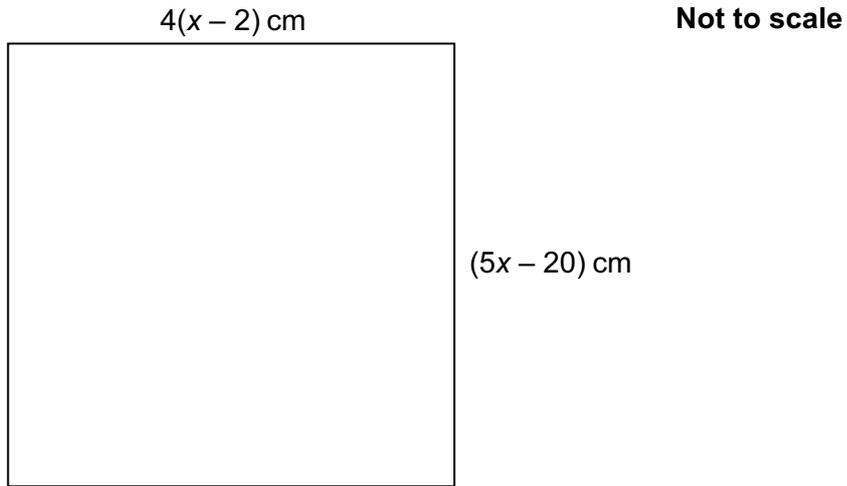
(b) Use numbers from this box to complete the statements.

0	1	$\sqrt{2}$	$\sqrt{3}$
$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{3}}$	$\frac{\sqrt{3}}{2}$

(i) $\tan 45^\circ = \dots\dots\dots$ [1]

(ii) $\cos 30^\circ = \dots\dots\dots$ [1]

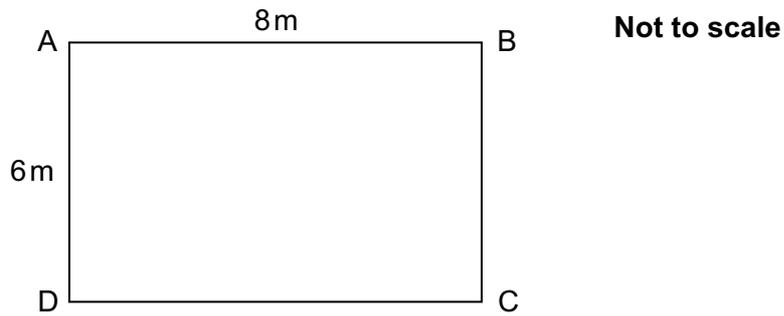
20 This is a square.



Work out the length of the side of the square.

..... cm [5]

21 ABCD is a rectangle.



(a) Sunita calculates the length of AC, but gets it wrong.

$$8^2 - 6^2 = AC^2$$

$$\sqrt{28} = AC$$

$$\sqrt{28} = 5.29 \text{ or } -5.29$$

$$AC = 5.29$$

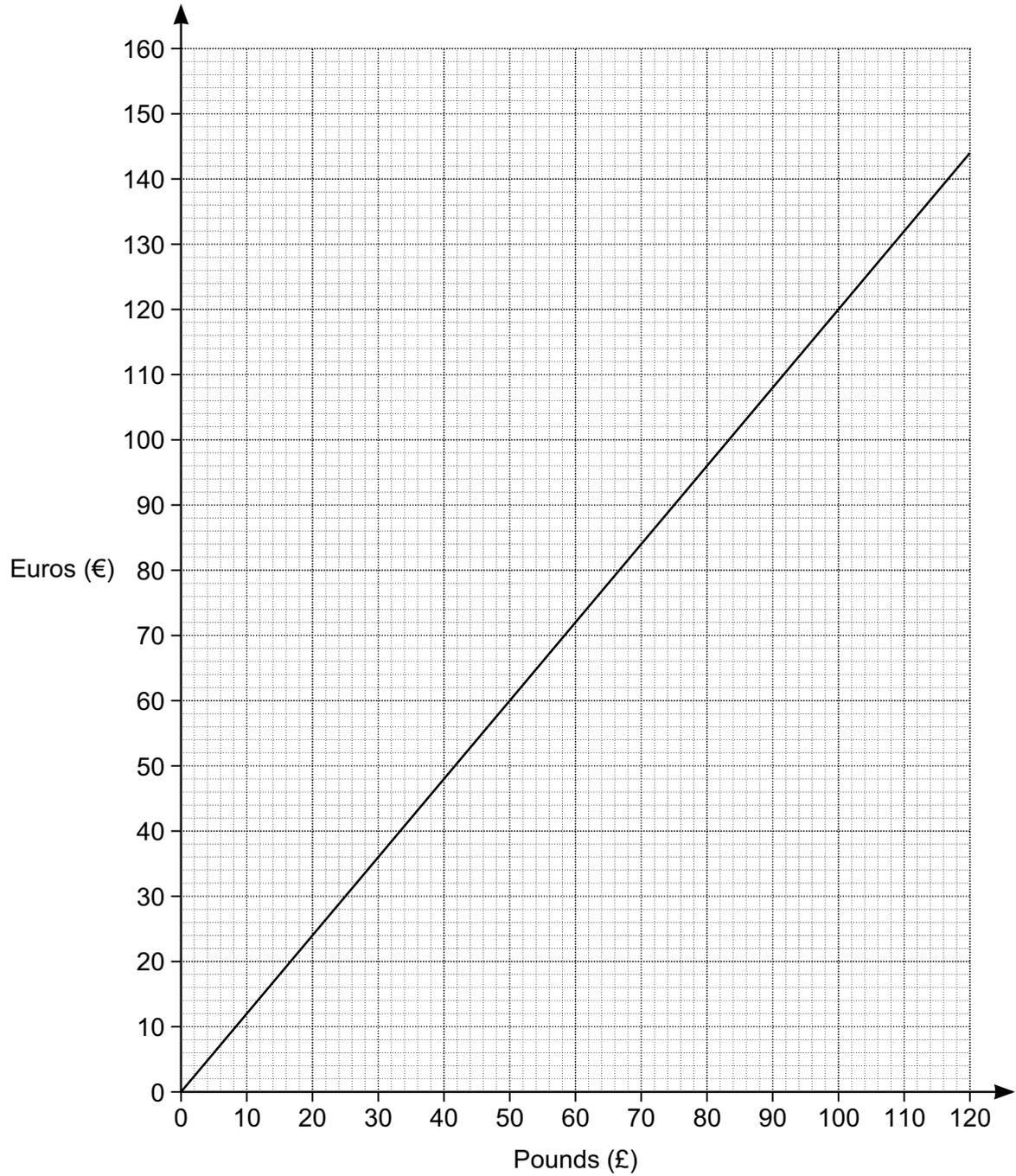
Explain what Sunita has done wrong.

..... [1]

(b) Calculate the length of AC.

(b) m [2]

22 This is a conversion graph between pounds and euros.



(a) Convert £36 into euros.

(a) € [1]

(b) (i) Convert €400 into pounds.

(b)(i) £ [3]

(ii) State an assumption that you have made in working out your answer to part **(b)(i)**.

..... [1]

(c) Explain how the graph shows that the number of euros is directly proportional to the number of pounds.

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

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F

Date – Morning/Afternoon

GCSE MATHEMATICS

J560/02 Paper 2 (Foundation Tier)

PRACTICE PAPER MARK SCHEME

Duration: 1 hours 30 minutes

MAXIMUM MARK 100

DRAFT

This document consists of 13 pages

Subject-Specific Marking Instructions

1. **M** marks are for using a correct method and are not lost for purely numerical errors.
A marks are for an accurate answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
B marks are independent of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
SC marks are for special cases that are worthy of some credit.
2. Unless the answer and marks columns of the mark scheme specify **M** and **A** marks etc, or the mark scheme is 'banded', then if the correct answer is clearly given and is not from wrong working **full marks** should be awarded.

Do not award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen and the correct answer clearly follows from it.

3. Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct.

Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, eg FT $180 \times (\textit{their} '37' + 16)$, or FT $300 - \sqrt{(\textit{their} '5^2 + 7^2')}$. Answers to part questions which are being followed through are indicated by eg FT $3 \times \textit{their} (a)$.

For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

4. Where dependent (**dep**) marks are indicated in the mark scheme, you must check that the candidate has met all the criteria specified for the mark to be awarded.
5. The following abbreviations are commonly found in GCSE Mathematics mark schemes.
 - **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point eg 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
 - **isw** means **ignore subsequent working** after correct answer obtained and applies as a default.
 - **nfww** means **not from wrong working**.
 - **oe** means **or equivalent**.
 - **rot** means **rounded or truncated**.
 - **seen** means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.
 - **soi** means **seen or implied**.

6. In questions with no final answer line, make no deductions for wrong work after an acceptable answer (ie **isw**) unless the mark scheme says otherwise, indicated by the instruction 'mark final answer'.
7. In questions with a final answer line following working space,
 - (i) if the correct answer is seen in the body of working and the answer given on the answer line is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.
 - (ii) if the correct answer is seen in the body of working but the answer line is blank, allow full marks. Place the annotation ✓ next to the correct answer.
 - (iii) if the correct answer is seen in the body of working but a completely different answer is seen on the answer line, then accuracy marks for the answer are lost. Method marks could still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✕ next to the wrong answer.
8. In questions with a final answer line:
 - (i) If one answer is provided on the answer line, mark the method that leads to that answer.
 - (ii) If more than one answer is provided on the answer line and there is a single method provided, award method marks only.
 - (iii) If more than one answer is provided on the answer line and there is more than one method provided, award zero marks for the question unless the candidate has clearly indicated which method is to be marked.
9. In questions with no final answer line:
 - (i) If a single response is provided, mark as usual.
 - (ii) If more than one response is provided, award zero marks for the question unless the candidate has clearly indicated which response is to be marked.
10. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation. **M** marks are not deducted for misreads.

11. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.
12. Ranges of answers given in the mark scheme are always inclusive.
13. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.
14. Anything in the mark scheme which is in square brackets [...] is not required for the mark to be earned, but if present it must be correct.

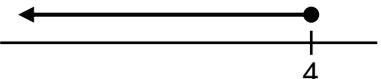
MARK SCHEME

Question			Answer	Marks	Part marks and guidance
1	(a)		-11, -7, -2, 12	1 1AO1.3a	
	(b)	(i)	$\frac{3}{5} > 0.47$	1 1AO1.3a	
		(ii)	$0.38 = \frac{19}{50}$	1 1AO1.3a	
		(iii)	$\frac{3}{16} < \frac{1}{4}$	1 1AO1.3a	
2			10	3 1AO1.3a 2AO3.1a	M2 for $4 + 1.5 \times 4$ or for $4 \times 4 - 4 \times 1.5$ or $\sqrt{3^2 + 1^2}$ Or M1 for area of a triangle = 1.5 soi or $(3^2 + 1^2)$
3	(a)	(i)	17	1 1AO1.3a	
		(ii)	6	1 1AO1.3a	
		(iii)	9	1 1AO1.3a	
	(b)	(i)	162.6	1 1AO1.3a	

Question		Answer	Marks	Part marks and guidance
	(ii)	160	1 1AO1.3a	
	(c)	7 - 8	2 2AO1.3a	M1 for 4×20 or 4×19 seen
4		<p>4×2.3 or 9.2 seen</p> <p>$12 - \text{their } 9.2$</p> <p>2.8</p> <p><i>Their '2.8' $\div 5$ or 0.48×5 or 6</i></p> <p>$2.8 \div 5 = 0.56 > 0.48$ and $2.8 \div 6 = 0.47 < 0.48$ so no more than 5 cushions or $0.48 \times 5 = 2.4$ and $0.48 \times 6 = 2.88$ so no more than 5 cushions</p>	<p>M1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1 1AO1.3b 1AO2.4a 2AO3.1d 1AO3.3</p>	
5	(a)	544	1 1AO1.3a	
	(b)	8272	2 2AO1.3a	M1 for full correct method with one arithmetic mistake
6	(a)	11.65	2 2AO1.3a	M1 for $93.20 \div 8$
	(b)	8.[00]	3 1AO1.3a 2AO3.1c	<p>M1 for $4 \times 1\frac{1}{2}$</p> <p>M1 for $320 \div (34 + \text{their '4' } \times 1\frac{1}{2})$</p>
7	(a)	40	3 1AO1.3a 2AO3.1c	<p>M2 for $\frac{120}{300}$</p> <p>Or M1 for $[120 + 180] = 300$</p>

Question		Answer	Marks	Part marks and guidance
	(b)	Sophia because $28\% > 25\%$ or $35 : 90$ and $30 : 90$ and $35 > 30$ oe	4 1AO1.3a 2AO3.1d 1AO3.3	M1 for one correct fraction equivalent to $\frac{70}{250}$ or $\frac{90}{360}$ or a correct ratio equivalent to $70 : 180$ or $90 : 270$ M1 for attempt to compare fractions with a common denominator or two corresponding values the same in a ratio M1 for two correct equivalent fractions or ratios that can be compared
8	(a) (i)	35	1 1AO1.3a	
	(ii)	36	1 1AO1.3a	
	(iii)	37	1 1AO1.3a	
	(b)	B and D circled	2 2AO2.5a	1 mark for each
9	(a)	20, 8 and 17 in appropriate positions on Venn diagram	1 1AO2.3b	
	(b)	5	2 1AO2.1a 1AO2.3a	M1 for $50 - (20 + 17 + 8)$ oe
	(c)	$\frac{37}{50}$	2 1AO2.3a 1AO3.3	M1 for $[20 + 17] = 37$ seen
10	(a)	10 correct entries	2 2AO2.3b	B1 for 8 or 9 correct entries

Question		Answer	Marks	Part marks and guidance
	(b) (i)	$\frac{1}{12}$	1 1AO2.3a	
	(ii)	$\frac{4}{12}$ or $\frac{1}{3}$	1 1AO2.3a	
11	(a)	$9x$	1 1AO1.3a	
	(b)	$6x - 5y - 8$	2 2AO1.3a	M1 for one correct term
	(c)	$4x + 4$	3 1AO1.3a 2AO3.1c	M2 for $3x + 6 + [x - 2]$ soi Or M1 for $x - 2$ seen
12	(a)	Correct reflection	1 1AO2.3b	
	(b)	Correct enlargement in correct position	2 1AO1.3a 1AO2.3b	M1 for correct enlargement
	(c)	Quarter turn clockwise (or 90° clockwise or 270° anticlockwise) Centre (3, 1)	1 1 1AO2.3a 1AO2.3b	
13	(a)	$1\frac{8}{35}$	3 3AO1.3a	B2 for $\frac{43}{35}$ Or M1 for $\frac{15}{35} + \frac{28}{35}$
	(b)	9π	2 1AO1.1 1AO1.3a	M1 for $\pi \times 3 \times 3$ soi or for an answer between 27.9 and 28.3

Question		Answer	Marks	Part marks and guidance	
14	(a)	3, 9, 19	2 2AO1.3a	B1 for two terms correct	
	(b)	$5n - 3$	2 2AO1.3a	B1 for $5n$ seen	
15	(a)	Cross marked at (81, 10.4)	1 1AO2.3b	Within $\frac{1}{2}$ a small square	
	(b)	Reasonable line of best fit drawn Weight from height of 75 cm on <i>their</i> line of best fit	1 1FT 1AO2.3a 1AO2.3b	Only FT from a straight line with a positive gradient	
	(c)	Outlier at (74, 11.8) circled	1 1AO2.1b		
	(d)	Because the scatter diagram for 12 month old babies may not be appropriate for 15 month old babies	1 1AO3.4a		
16	(a)	$x \leq 4$	2 2AO1.3a	M1 for $3x \leq 10 + 2$ or better or $\frac{their'10+2'}{3}$ Or SC1 for answer 4 or $x \dots 4$ with any incorrect equality or inequality symbol or answer $3 \times 4 - 2 \leq 10$	
	(b)		1FT 1AO2.3b	FT from <i>their</i> inequality in (a)	
17	(a)	70	1 1AO1.3a		

Question		Answer	Marks	Part marks and guidance
	(b)	25	2 2AO1.3b	M1 for angle EDC = $180 - 95$ or angle DAE = 70 and angle AED = 85
18		$180 \div (1 + 2 + 3) \times 3$ 90° and yes	M2 A1 1AO1.3b 1AO3.1a 1AO3.4b	M1 for $180 \div (1 + 2 + 3)$ soi
19	(a)	$\frac{1}{49}$	1 1AO1.2	
	(b) (i)	1	1 1AO1.1	
	(ii)	$\frac{\sqrt{3}}{2}$	1 1AO1.1	
20		40	5 1AO1.3b 3AO3.1b 1AO3.3	M1 for $4(x - 2) = 5x - 20$ M1 for $4x - 8 = 5x - 20$ AND M2 for $x = 12$ Or M1 for one correct step solving equation
21	(a)	She has calculated $8^2 - 6^2$ when she should have calculated $8^2 + 6^2$	1 1AO3.4a	
	(b)	10	2 2AO1.3b	M1 for $\sqrt{6^2 + 8^2}$
22	(a)	42 to 44	1 1AO2.3a	

Question		Answer	Marks	Part marks and guidance	
	(b) (i)	320 to 340	3 1AO2.1a 1AO2.3a 1AO3.1a	M2 for correct method Or M1 for an appropriate reading from the graph e.g. factor of 400	e.g. read £ conversion for 100 euros and then multiply by 4
	(ii)	Rate stays the same oe	1 1AO3.5		e.g. graph continues as a straight line or exchange rate is constant
	(c)	Straight line oe Passes through origin oe	1 1 2AO2.4a		

Assessment Objectives (AO) Grid

Question	AO1	AO2	AO3	Total
1(a)	1	0	0	1
1(b)(i)	1	0	0	1
1(b)(ii)	1	0	0	1
1(b)(iii)	1	0	0	1
2	1	0	2	3
3(a)(i)	1	0	0	1
3(a)(ii)	1	0	0	1
3(a)(iii)	1	0	0	1
3(b)(i)	1	0	0	1
3(b)(ii)	1	0	0	1
3(c)	2	0	0	2
4	1	1	3	5
5(a)	1	0	0	1
5(b)	2	0	0	2
6(a)	2	0	0	2
6(b)	1	0	2	3
7(a)	1	0	2	3
7(b)	1	0	3	4
8(a)(i)	1	0	0	1
8(a)(ii)	1	0	0	1
8(a)(iii)	1	0	0	1
8(b)	0	2	0	2
9(a)	0	1	0	1
9(b)	0	2	0	2
9(c)	0	1	1	2
10(a)	0	2	0	2
10(b)(i)	0	1	0	1
10(b)(ii)	0	1	0	1
11(a)	1	0	0	1
11(b)	2	0	0	2
11(c)	1	0	2	3
12(a)	0	1	0	1
12(b)	1	1	0	2
12(c)	0	2	0	2
13(a)	3	0	0	3
13(b)	2	0	0	2
14(a)	2	0	0	2
14(b)	2	0	0	2
15(a)	0	1	0	1
15(b)	0	2	0	2
15(c)	0	1	0	1
15(d)	0	0	1	1
16(a)	2	0	0	2
16(b)	0	1	0	1
17(a)	1	0	0	1
17(b)	2	0	0	2
18	1	0	2	3

19(a)	1	0	0	1
19(b)(i)	1	0	0	1
19(b)(ii)	1	0	0	1
20	1	0	4	5
21(a)	0	0	1	1
21(b)	2	0	0	2
22(a)	0	1	0	1
22(b)(i)	0	2	1	3
22(b)(ii)	0	0	1	1
22(c)	0	2	0	2
Totals	50	25	25	100

GCSE (9–1) Mathematics

J560/03 Paper 3 (Foundation Tier)

Practice Paper

Date – Morning/Afternoon

Time allowed: 1 hour 30 minutes



You may use:

- A scientific or graphical calculator
- Geometrical instruments
- Tracing paper



First name					
Last name					
Centre number					
Candidate number					

INSTRUCTIONS

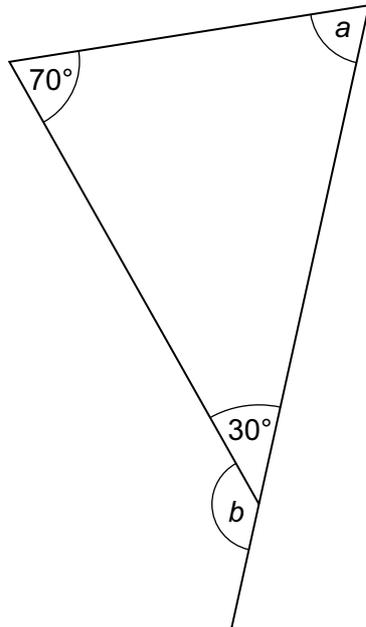
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

INFORMATION

- The total mark for this paper is **100**.
- The marks for each question are shown in brackets [].
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- This document consists of **20** pages.

Answer **all** the questions

1 Here is a diagram.



Not to scale

(a) Work out angle a .

(a) $a = \dots\dots\dots^\circ$ [1]

(b) Work out angle b .

(b) $b = \dots\dots\dots^\circ$ [1]

2 (a) Write down a number between 1.56 and 1.57.

(a) [1]

(b) Write down a prime number between 14 and 22.

(b) [1]

(c) Find a fraction between $\frac{1}{4}$ and $\frac{1}{3}$.

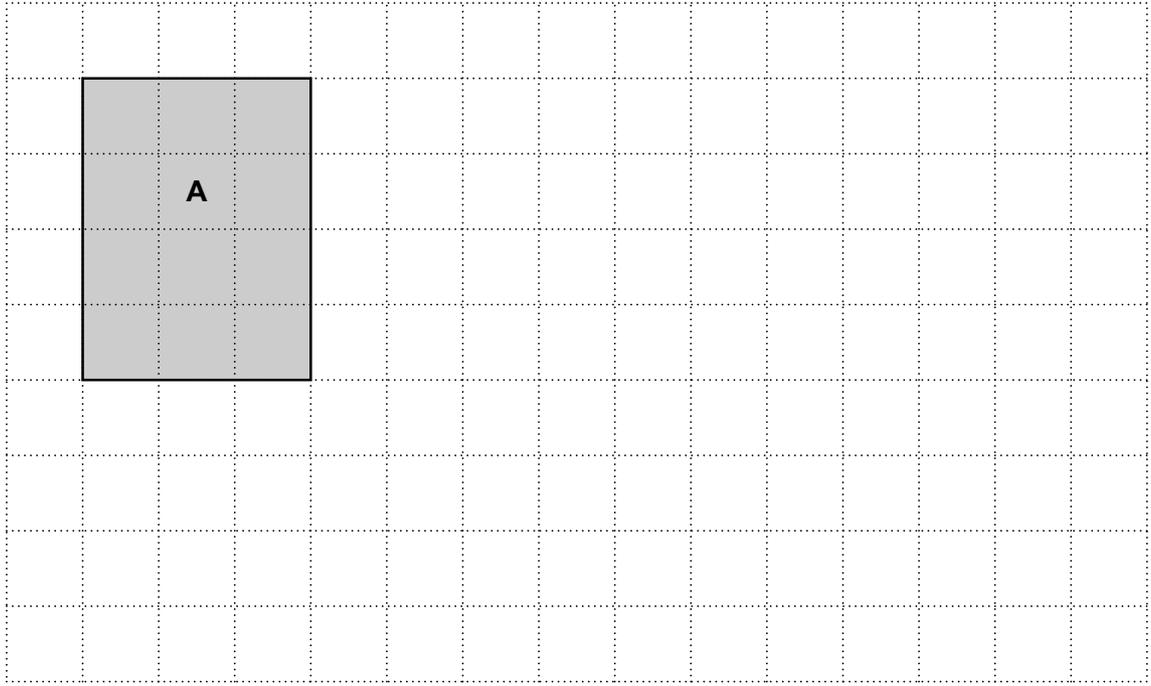
(c) [2]

- 3 (a) (i) Draw a rectangle that is congruent to rectangle **A**.
Label it **B**.

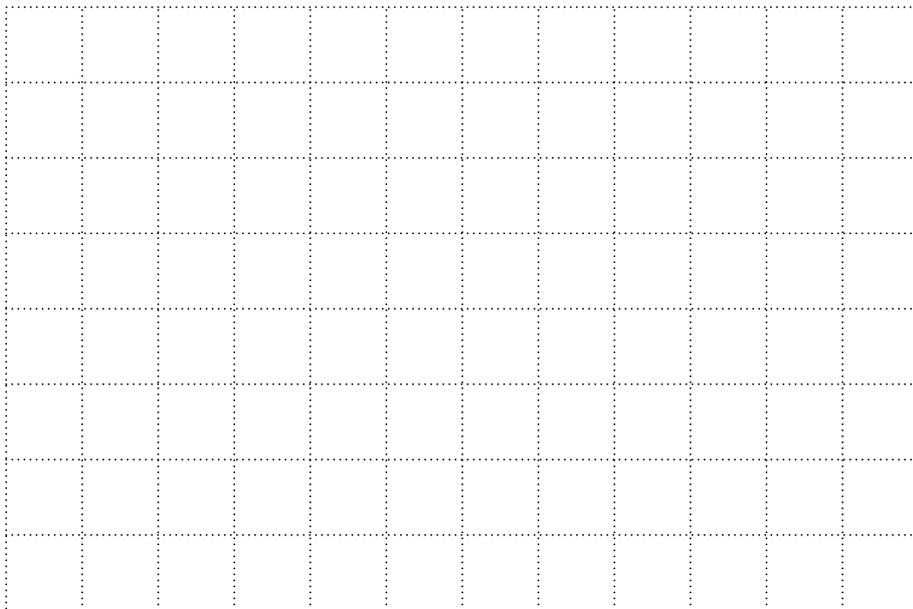
[1]

- (ii) Draw a rectangle that has the same perimeter as rectangle **A**, but a different area.
Label it **C**.

[2]



- (b) Draw an isosceles triangle with area 8 cm^2 on the grid below.



[2]

- 4 (a) Ken has a bag containing counters.
2 are white, 3 are black and 4 are red.
He takes one of these counters at random.

What is the probability that the counter is white?

(a) [2]

- (b) Abi has a bag containing black counters and white counters.
The ratio of black to white counters is 1 : 2.
Abi takes one of these counters at random.

What is the probability that it is black?

(b) [1]

- (c) Jemma has a bag containing 24 balls.

- (i) The probability that a ball taken from the bag at random is green is $\frac{1}{3}$.

How many of the 24 balls are green?

(c)(i) [2]

- (ii) 12 of the 24 balls are blue.
Jemma takes a ball from the bag at random and then puts it back.
She then takes a ball again at random.

What is the probability that **both** balls are blue?

(ii) [2]

5 Amy is making a rectangular quilt by sewing together squares of fabric.

Each square is 12 cm by 12 cm.

The finished quilt must be at least 1.5 m wide and at least 2.1 m long.

(a) What is the smallest number of squares that Amy can use?
Show how you decide.

(a) squares [5]

(b) The area of the finished quilt is about 3.4 m^2 .
Amy says

3.4 m^2 is the same as 340 cm^2 .

Show that Amy is wrong.

[3]

6 (a) Show that the highest common factor of 12 and 30 is 6. [2]

(b) Show that 77 is **not** a square number. [2]

7 Helen needs to buy 6 packs of tea.
This table shows the offers available in two shops.

Shop	Offer
A	3 for the price of 2
B	Buy one, get one half price

A single pack of tea costs the same in each shop.

Which shop is cheaper for Helen?
Explain how you decide.

.....
..... [3]

- 8 Hardeep asks 25 people how many portions of fruit and vegetables they ate yesterday. The results are shown in this table.

Number of portions	Frequency	
4	4	
5	6	
6	8	
7	5	
8	2	

- (a) Calculate the mean number of portions.

(a) [3]

- (b) Hardeep ate no portions of fruit and vegetables yesterday. He decides to include this in his results.

Explain how this will affect

- (i) the mode,

.....
 [1]

- (ii) the range.

.....
 [1]

9 (a) Evaluate.

$$\frac{3}{0.4^2}$$

(a) [1]

(b) Find p if $p^3 = 37$.
Give your answer correct to 2 decimal places.

(b) [2]

(c) Find the value of $a - b$ when $a = 3$ and $b = -2$.

(c) [1]

10 (a) Look at this table.

Odd numbers	Total
1	1^2
$1 + 3$	2^2
$1 + 3 + 5$	3^2

The pattern in the table continues.

(i) Complete the next row of the table.

[1]

(ii) What will be written in the Total column of the 100th row?

(a)(ii) [1]

(b) Here is another table.

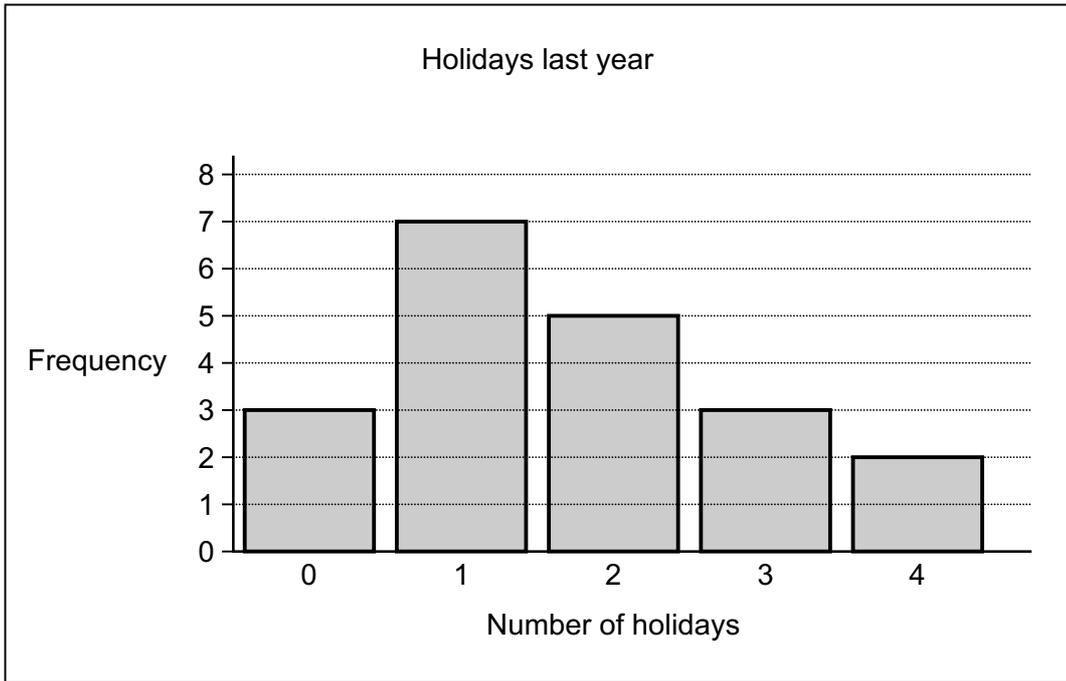
Even numbers	Total
2	$1^2 + 1$
$2 + 4$	$2^2 + 2$
$2 + 4 + 6$	$3^2 + 3$
$2 + 4 + 6 + 8$	$4^2 + 4$

The pattern in this table continues.

Write an expression for the total of the first n even numbers.

(b) [2]

- 11 Noelle asks her friends how many holidays they had last year. Her results are shown in this bar chart.



- (a) Show that Noelle asked 20 friends. [1]

- (b) Find the median number of holidays.

(b) [2]

- (c) Noelle says

Based on my sample, I estimate 10% of people in the UK had 4 holidays last year.

Give two reasons why Noelle should **not** base this estimate on her sample.

Reason 1.....

Reason 2.....
 [2]

12 (a) Solve.

$$3a + 10 = a + 40$$

(a) $a = \dots\dots\dots$ [3]

(b) Factorise.

$$x^2 - 2x - 8$$

(b) $\dots\dots\dots$ [2]

13 A sequence is generated using the rule

- multiply the previous term by 2
- then subtract 30.

The first term of the sequence is 40.

(a) Find the second term.

(a) $\dots\dots\dots$ [2]

(b) Find the fourth term.

(b) $\dots\dots\dots$ [2]

14 (a) Paul invests £500 at a rate of 1.5% per year **compound** interest.

Find the value of the investment after 3 years.
Give your answer correct to the nearest penny.

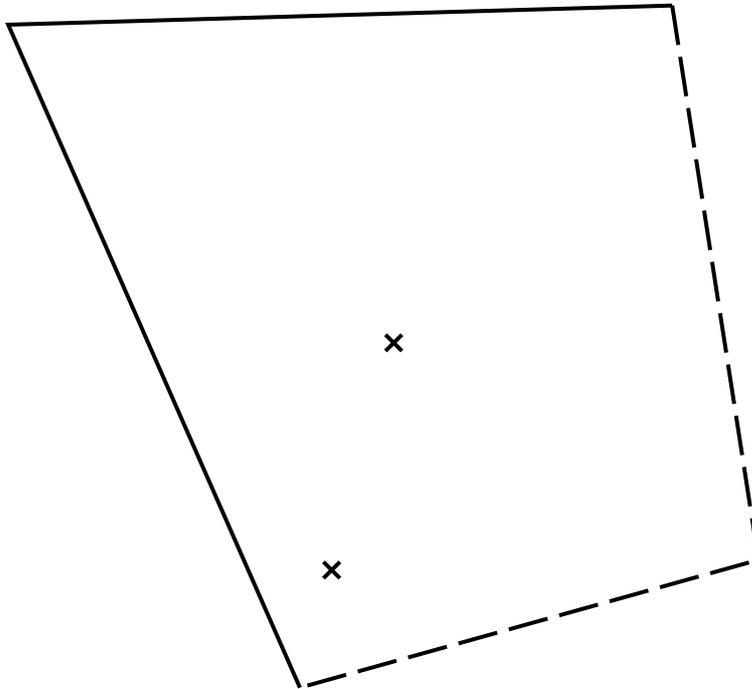
(a) £ [4]

(b) By what percentage has the value of Paul's investment increased after 3 years?

(b) % [3]

- 15 Jez finds a gold coin in a field.
This is a scale drawing of the field.

Scale: 1 cm represents 50 m



Key	
x	Tree
- - -	Wall
— — —	Hedge

Jez says that the coin was

- an equal distance from each hedge
- an equal distance from each tree.

Show by construction that Jez is wrong.

[5]

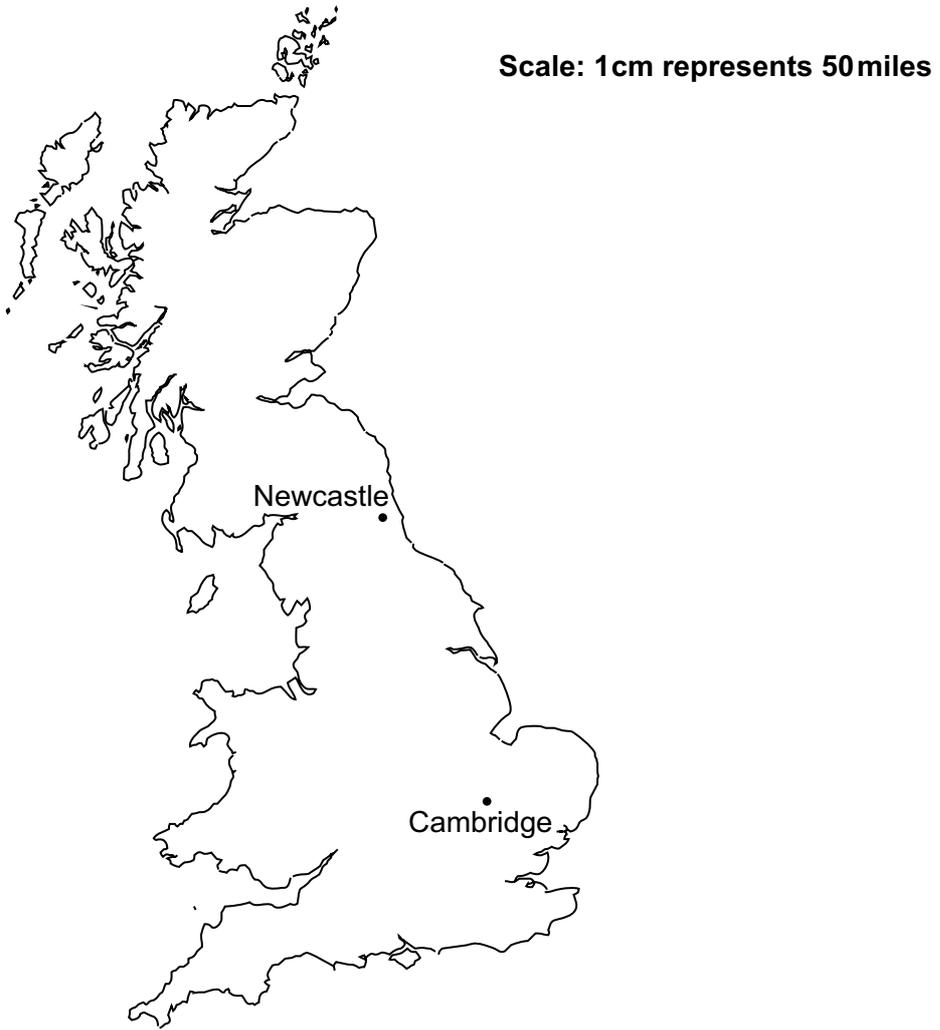
16 A triangle has sides of length 23.8 cm, 31.2 cm and 39.6 cm.

Is this a right-angled triangle?

Show how you decide.

.....
..... [4]

17 John is going to drive from Cambridge to Newcastle.



- (a) John needs to be in Newcastle at 11 am.
He drives at an average speed of 60 miles per hour.

What time does he need to leave Cambridge?

(a) [5]

- (b) State one assumption you have made.
Explain how this has affected your answer to part (a).

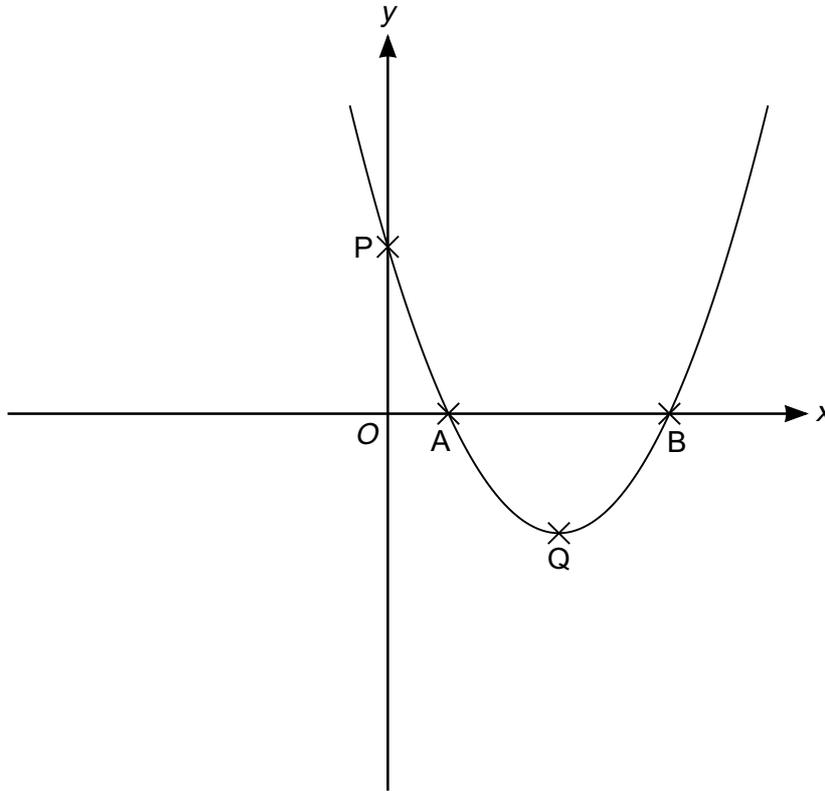
.....
.....
.....
..... [2]

- 18 When water freezes into ice its volume increases by 9%.

What volume of water freezes to make 1962 cm³ of ice?

..... cm³ [3]

19 This is a sketch of the graph of $y = (x - 1)(x - 3)$.



(a) Write down the coordinates of points A and B.

(a) A (..... ,)

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

(b) Work out the coordinates of point P.

(b) P (..... ,) [2]

(c) Work out the coordinates of the turning point Q.

(c) Q (..... ,) [3]

TURN OVER FOR QUESTION 20

- 20 The table shows data for the UK about its population and the total amount of money spent on healthcare in 2002, 2007 and 2012.

Year	Population	Total spent on healthcare (£)
2002	5.94×10^7	8.14×10^{10}
2007	6.13×10^7	1.20×10^{11}
2012	6.37×10^7	1.45×10^{11}

- (a) How much more was spent on healthcare in 2007 than in 2002?
Give your answer in millions of pounds.

(a) £ million [3]

- (b) Marcia says

The amount spent on healthcare **per person** in the UK doubled in 10 years.

Use the information in the table to comment on whether Marcia is correct.

.....
..... [4]

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OCR

Oxford Cambridge and RSA

F

Date – Morning/Afternoon

GCSE MATHEMATICS

J560/03 Paper 3 (Foundation Tier)

PRACTICE PAPER MARK SCHEME

Duration: 1 hours 30 minutes

MAXIMUM MARK 100

DRAFT

This document consists of 12 pages

Subject-Specific Marking Instructions

1. **M** marks are for using a correct method and are not lost for purely numerical errors.
A marks are for an accurate answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
B marks are independent of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
SC marks are for special cases that are worthy of some credit.
2. Unless the answer and marks columns of the mark scheme specify **M** and **A** marks etc, or the mark scheme is 'banded', then if the correct answer is clearly given and is not from wrong working **full marks** should be awarded.

Do not award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen and the correct answer clearly follows from it.

3. Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct.

Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, eg FT $180 \times (\textit{their} '37' + 16)$, or FT $300 - \sqrt{(\textit{their} '5^2 + 7^2')}$. Answers to part questions which are being followed through are indicated by eg FT $3 \times \textit{their} (a)$.

For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

4. Where dependent (**dep**) marks are indicated in the mark scheme, you must check that the candidate has met all the criteria specified for the mark to be awarded.
5. The following abbreviations are commonly found in GCSE Mathematics mark schemes.
 - **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point eg 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
 - **isw** means **ignore subsequent working** after correct answer obtained and applies as a default.
 - **nfww** means **not from wrong working**.
 - **oe** means **or equivalent**.
 - **rot** means **rounded or truncated**.
 - **seen** means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.
 - **soi** means **seen or implied**.

6. In questions with no final answer line, make no deductions for wrong work after an acceptable answer (ie **isw**) unless the mark scheme says otherwise, indicated by the instruction 'mark final answer'.
7. In questions with a final answer line following working space,
 - (i) if the correct answer is seen in the body of working and the answer given on the answer line is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.
 - (ii) if the correct answer is seen in the body of working but the answer line is blank, allow full marks. Place the annotation ✓ next to the correct answer.
 - (iii) if the correct answer is seen in the body of working but a completely different answer is seen on the answer line, then accuracy marks for the answer are lost. Method marks could still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.
8. In questions with a final answer line:
 - (i) If one answer is provided on the answer line, mark the method that leads to that answer.
 - (ii) If more than one answer is provided on the answer line and there is a single method provided, award method marks only.
 - (iii) If more than one answer is provided on the answer line and there is more than one method provided, award zero marks for the question unless the candidate has clearly indicated which method is to be marked.
9. In questions with no final answer line:
 - (i) If a single response is provided, mark as usual.
 - (ii) If more than one response is provided, award zero marks for the question unless the candidate has clearly indicated which response is to be marked.
10. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation. **M** marks are not deducted for misreads.

11. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.
12. Ranges of answers given in the mark scheme are always inclusive.
13. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.
14. Anything in the mark scheme which is in square brackets [...] is not required for the mark to be earned, but if present it must be correct.

MARK SCHEME

Question		Answer	Marks	Part marks and guidance	
1	(a)	80°	1 1AO1.3a		
	(b)	150°	1 1AO1.3a		
2	(a)	Any correct response	1 1AO1.2		
	(b)	17 or 19	1 1AO1.1		Condone both 17 and 19 given
	(c)	Any correct fraction e.g. $\frac{2}{7}$, $\frac{7}{24}$ and $\frac{3}{10}$	2 1AO1.3a 1AO3.1a	M1 for any decimal n where $0.25 < n < 0.3$	Do not accept $\frac{1}{3.5}$
3	(a)	(i) Any rectangle congruent to A	1 1AO1.1		
		(ii) Any rectangle with perimeter = 14 cm which is not congruent to A	2 1AO1.3b 1AO3.1a	M1 for 14 seen	
	(b)	Isosceles triangle with area 8 cm ²	2 1AO1.1 1AO3.1a	M1 for any isosceles triangle or for any triangle with area 8 cm ²	
4	(a)	$\frac{2}{9}$ oe	2 2AO1.3a	M1 for denominator of 9	Accept 0.22... but not 0.2
	(b)	$\frac{1}{3}$ oe	1 1AO1.3a		
	(c)	(i) 8	2 1 AO1.3a 1 AO2.1a	M1 for $\frac{24}{3}$ oe	

Question		Answer	Marks	Part marks and guidance	
	(ii)	$\frac{1}{4}$ oe	2 2AO1.3a	M1 for $\frac{1}{2} \times \frac{1}{2}$ oe or correct sample space e.g. BX XB BB XX or tree diagram with any two sets of two branches labelled	
5	(a)	234	5 2AO1.3b 3AO3.1d	M3 for 13 and 18 soi e.g. by 33 696 ($13 \times 12 \times 18 \times 12$) OR M1 for 150 or 210 or 0.12 seen M1 for <i>their</i> '150' $\div 12$ (= 12.5) and <i>their</i> '210' $\div 12$ (= 17.5) oe M1 for rounding up (<i>their</i> 13 and <i>their</i> 18) AND M1 for <i>their</i> 13 \times <i>their</i> 18 or $\frac{\textit{their}(156 \times 216)}{144}$	If area approach taken, max M3 : M1 for 150 or 210 or 0.12 seen M1 for $(150 \times 210) \div (12 \times 12)$ oe [= 218.75] M1 for rounding up <i>their</i> 219
	(b)	$1 \text{ m}^2 = 10\,000 \text{ cm}^2$ 34 000 or 0.034 seen	M2 B1 1AO1.1 1AO1.3b 1AO2.2	M1 for any appropriate representation of area M1 for 1 m = 100 cm conversion used	
6	(a)	Showing that 6 is a common factor of 12 and 30 Showing there is no greater common factor	1 1 1AO1.3a 1AO2.2		e.g. $6 \times 2 = 12$ and $6 \times 5 = 30$ or both 12 and 30 can be divided by 6 e.g. stating that 6 is the highest number common to the lists 1, 2, 3, 4, 6, 12 and 1, 2, 3, 4, 6, 10, 15, 30
	(b)	Explanation based on $\sqrt{77}$ or 8^2 and 9^2 , e.g. $8 < \sqrt{77} < 9$	2 2AO2.2	M1 for 8.77... or 8^2 and 9^2 seen	

Question		Answer	Marks	Part marks and guidance																						
7		Shop A based on a correct argument	3 2AO2.1a 1AO3.1c	M1 for showing that she pays for 4 packs in shop A or $\frac{2}{3}$ oe M1 for showing that she pays for 4.5 packs in shop B or $\frac{3}{4}$ oe	May use symbols e.g. $4p$ and $4.5p$ seen scores M2																					
8	(a)	5.8	3 3AO1.3b	M1 for at least 3 frequency × number correct M1 for <i>their</i> 'total portions' ÷ 25	<table border="1"> <thead> <tr> <th>Number</th> <th>Frequency</th> <th>Freq × number</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>4</td> <td>16</td> </tr> <tr> <td>5</td> <td>6</td> <td>30</td> </tr> <tr> <td>6</td> <td>8</td> <td>48</td> </tr> <tr> <td>7</td> <td>5</td> <td>35</td> </tr> <tr> <td>8</td> <td>2</td> <td>16</td> </tr> <tr> <td></td> <td>25</td> <td>145</td> </tr> </tbody> </table>	Number	Frequency	Freq × number	4	4	16	5	6	30	6	8	48	7	5	35	8	2	16		25	145
Number	Frequency	Freq × number																								
4	4	16																								
5	6	30																								
6	8	48																								
7	5	35																								
8	2	16																								
	25	145																								
	(b) (i)	Mode stays the same (at 6)	1 1AO2.3a																							
	(ii)	Range increases (to 8)	1 1AO2.3a																							
9	(a)	18.75	1 1AO1.3a																							
	(b)	3.33	2 2AO1.3a	M1 for 3.332[221...] or 3.3 or $\sqrt[3]{37}$ seen																						
	(c)	5	1 1AO1.3a																							
10	(a) (i)	<table border="1"> <tr> <td>$1 + 3 + 5 + 7$</td> <td>4^2</td> </tr> </table>	$1 + 3 + 5 + 7$	4^2	1 1AO2.1a																					
$1 + 3 + 5 + 7$	4^2																									
	(ii)	100^2	1 1AO2.1a																							

Question		Answer	Marks	Part marks and guidance	
	(b)	$n^2 + n$ oe	2 1AO2.3a 1AO2.3b	M1 for n^2 or $+n$	
11	(a)	$3 + 7 + 5 + 3 + 2 = 20$	1 1AO2.1a		
	(b)	1.5	2 1AO1.3a 1AO2.3a	M1 for 10.5 oe seen	
	(c)	Two correct statements e.g. 20 is not a large enough sample; sample might be biased	2 2AO2.5a	B1 for each correct statement	
12	(a)	15	3 3AO1.3a	M2 for $3a - a = 40 - 10$ or better Or M1 for $3a - a = k$ or $ma = 40 - 10$	
	(b)	$(x - 4)(x + 2)$ oe	2 2AO1.3a	M1 for $(x + a)(x + b)$ where $ab = -8$ or $a + b = -2$	
13	(a)	50	2 2AO1.3a	M1 for 80 seen or $40 \times 2 - 30$	
	(b)	110	2 2AO1.3b	M1 for 70 seen or <i>their</i> '50' $\times 2 - 30$	
14	(a)	522.84 oe	4 1AO1.3a 3AO1.3b	M2 for 500×1.015^3 OR M1 for 507.5 or 1.015 soi M1 for <i>their</i> '507.5' $\times 1.015$ and 515.11×1.1015 oe (= 522.839....) AND M1 for correct rounding of <i>their</i> 522.839...	Do not accept (£)522.84p

Question		Answer	Marks	Part marks and guidance	
	(b)	<i>Their</i> correct % (= 4.6 or 4.568)	3FT 1AO1.3a 2AO3.1c	M2 for denominator of 500 and numerator of <i>their</i> 522.84 or <i>their</i> '522.84 – 500' Or M1 for denominator of 500 or numerator of <i>their</i> 522.84 or <i>their</i> '522.84 – 500'	Do not accept 4.5
15		Fully correct construction, showing that Jez is wrong	5 2AO2.3b 3AO3.1d	B1 for angle bisector $\pm 1^\circ$ drawn B1 for arcs seen B1 for perpendicular bisector $\pm 1^\circ$, ± 1 mm B1 for arcs seen	Accept statement or indication on diagram
16		No with correct argument e.g. In a right-angled triangle $a^2 + b^2 = c^2$ $23.8^2 + 31.2^2 = 1539.88$ $39.6^2 = 1568.16$ $1539.88 \neq 1568.16$	4 1AO1.3b 1AO2.1a 2AO3.1b	M1 for statement or use of Pythagoras' theorem M1 for appropriate method e.g. $23.8^2 + 31.2^2$ M1 for comparison with correct value e.g. 1539.88 with 39.6^2 or 39.24 with 39.6	Alternative method: M1 for sketch of triangle and correct trig statement for this triangle seen M1 for angle calculated correctly using one trig ratio M1 for same angle calculated correctly using a different trig ratio A1 for comparison and concluding statement Allow equivalent marks for other complete methods e.g. use of cosine rule Do not accept a scale drawing method

Question		Answer	Marks	Part marks and guidance	
17	(a)	07.40 oe Or for <i>their</i> time earlier than 07.40 with correct supporting working and justification	5 1AO1.3b 2AO3.1d 2AO3.2	B1 for 4.0 ± 0.1 soi M1 for <i>their</i> '4.0' $\times 50$ (= 200) M1 for <i>their</i> '200' $\div 60$ (= 3.33..) M1 for <i>their</i> 3.33 converted correctly to hours and minutes (= 3 hours 20 mins) M1 for <i>their</i> correct leaving time Maximum 4 marks if answer incorrect	Accept 07.35 - 07.45 May be implied by correct leaving time
	(b)	Any sensible assumption about speed, distance or time Under/overestimate and correct effect on time	1 1 2AO3.5		e.g. route is a straight line, no rest breaks e.g. speed overestimated or distance underestimated so time will be longer Allow if assumptions and effects are stated in (a)
18		1800	3 1AO1.3a 2AO3.1c	M1 for 1.09 soi M1 for $1962 \div 1.09$ oe	
19	(a)	A (1, 0) B (3, 0)	2 1AO2.1a 1AO2.3a	M1 for identifying 1 and 3 or for $y = 0$ in both coordinates	
	(b)	(0, 3)	2 1AO1.3a 1AO2.3a	M1 for $x = 0$ or $y = 3$	
	(c)	(2, -1)	3 2AO1.3a 1AO2.1a	M1 for $x = 2$ (allow FT from (a)) M1 for attempt to substitute <i>their</i> 2 into $(x - 1)(x - 3)$	

Question		Answer	Marks	Part marks and guidance
20	(a)	38 600	3 2AO1.3b 1AO3.3	B2 for answer figs 386 OR M1 for $1.20 \times 10^{11} - 8.14 \times 10^{10}$ oe M1 for 1 million = 10^6 soi
	(b)	Correct statement comparing years 2002 and 2012 with correct supporting calculations showing that spending per person is not doubled	4 1AO1.3b 1AO2.4a 1AO3.1d 1AO3.3	M2 for total healthcare \div population calculated for 2002 and 2012 with years identified Or M1 for total healthcare \div population calculated for any year AND B1 for £1370 in 2002 or £2280 in 2012 Year need not be identified Values given to at least 3sf Exact values: 2002 £1370.37[0...] 2007 £1957.58[5...] 2012 £2276.29[5...]

Assessment Objectives (AO) Grid

Question	AO1	AO2	AO3	Total
1(a)	1	0	0	1
1(b)	1	0	0	1
2(a)	1	0	0	1
2(b)	1	0	0	1
2(c)	1	0	1	2
3(a)(i)	1	0	0	1
3(a)(ii)	1	0	1	2
3(b)	1	0	1	2
4(a)	2	0	0	2
4(b)	1	0	0	1
4(c)(i)	1	1	0	2
4(c)(ii)	2	0	0	2
5(a)	2	0	3	5
5(b)	2	1	0	3
6(a)	1	1	0	2
6(b)	0	2	0	2
7	0	2	1	3
8(a)	3	0	0	3
8(b)(i)	0	1	0	1
8(b)(ii)	0	1	0	1
9(a)	1	0	0	1
9(b)	2	0	0	2
9(c)	1	0	0	1
10(a)(i)	0	1	0	1
10(a)(ii)	0	1	0	1
10(b)	0	2	0	2
11(a)	0	1	0	1
11(b)	1	1	0	2
11(c)	0	2	0	2
12(a)	3	0	0	3
12(b)	2	0	0	2
13(a)	2	0	0	2
13(b)	2	0	0	2
14(a)	4	0	0	4
14(b)	1	0	2	3
15	0	2	3	5
16	1	1	2	4
17(a)	1	0	4	5
17(b)	0	0	2	2
18	1	0	2	3
19(a)	0	2	0	2
19(b)	1	1	0	2
19(c)	2	1	0	3
20(a)	2	0	1	3
20(b)	1	1	2	4
Totals	50	25	25	100