OCR
Oxford Cambridge and RSA

F

GCSE (9–1)

Mathematics

J560/03: Paper 3 (Foundation tier)

General Certificate of Secondary Education

Mark Scheme for June 2019

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

Annotations used in the detailed Mark Scheme.

Annotation	Meaning
✓	Correct
×	Incorrect
BOD	Benefit of doubt
FT	Follow through
ISW	Ignore subsequent working (after correct answer obtained), provided method has been completed
M0	Method mark awarded 0
M1	Method mark awarded 1
M2	Method mark awarded 2
A1	Accuracy mark awarded 1
B1	Independent mark awarded 1
B2	Independent mark awarded 2
MR	Misread
SC	Special case
^	Omission sign

These should be used whenever appropriate during your marking.

The **M**, **A, B**, etc annotations must be used on your standardisation scripts for responses that are not awarded either 0 or full marks. It is vital that you annotate these scripts to show how the marks have been awarded.

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 × (*their* '37' + 16), or FT 300 – $\sqrt{}$(*their* '$5^2 + 7^2$'). Answers to part questions which are being followed through are indicated by eg FT 3 × *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.

   - **cao** means **correct answer only**.
   - **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).
   - **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. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise, indicated for example by the instruction 'mark final answer'.

7. As a general principle, if two or more methods are offered, mark only the method that leads to the answer on the answer line. If two (or more) answers are offered, mark the poorer (poorest).

8. 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.

9. 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.

10. If the correct answer is seen in the body and the answer given in the answer space is a clear transcription error allow full marks unless the mark scheme says 'mark final answer' or 'cao'. Place the annotation ✓ next to the correct answer.

If the answer space is blank but the correct answer is seen in the body allow full marks. Place the annotation ✓ next to the correct answer.

If the correct answer is seen in the working but a completely different answer is seen in the answer space, then accuracy marks for the answer are lost. Method marks would still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.

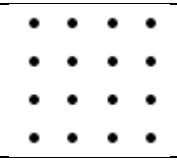
11. Ranges of answers given in the mark scheme are always inclusive.

12. 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.

13. 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.

Throughout mark scheme, accept missing non-critical zeroes such as .28 for 0.28 or £1.3 for £1.30 unless otherwise stated.

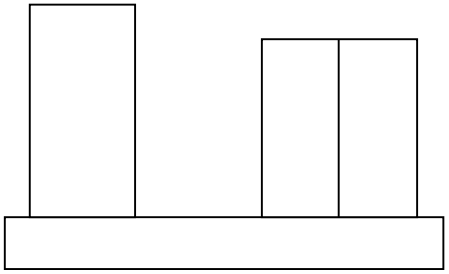
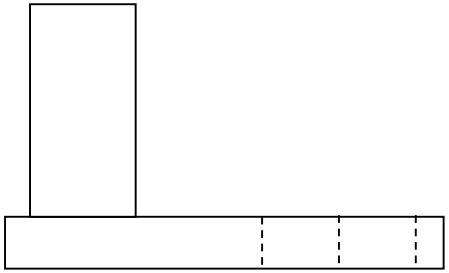
Question			Answer	Marks	Part marks and guidance	
1	**a**		Obtuse	**1**	May be indicated in list	Condone poor spelling
	b		45	**1**	Accept 43 to 47	
2	**a**		3 : 7	**1**		Condone 3:7 written in one of the answer spaces
	b		2.5 or $2\frac{1}{2}$	**2**	**B1** for 2:5 or 4:10 or 10:25 or 1:2.5 or 0.4:1 or 50 ÷ 20 seen	For B1 ratio must have colon and not "to" or comma
3			$5 \times (3 - 1) = 10$ $(3 + 6 - 2) \div 2 = 3.5$	**1** **1**		If multiple attempts • mark a clear final pair (eg others lighter) • if no clear selection then regard as choice for 0 marks
4			8	**2**	**M1** for 40 × 0.2 oe	For **M1** oe may be 40 ÷ 10 × 2 or 40 ÷ 100 × 20 Multiplication may be repeated addition
5	**a**		10	**1**		
	b		1	**1**		
6	**a**		30 60 90 120 150	**2**	**B1** for four correct	For B1 ignore wrong values Condone extra correct values for 2 marks
	b		30 cao	**1**		

Question			Answer	Marks	Part marks and guidance	
7	a		(2, 3)	1		
	b		Correct line	1		Condone freehand or broken line, mark intention Line to be at least 2 cm long slide overlay to judge length If multiple lines and none chosen, mark the worst
8			7	2	**M1** for $3 \times 4 - 5$	May be in steps Allow $12 - 5$ for M1
9	a			1	Four rows of four dots roughly in a square pattern	
	b		64 and 8 rows of 8 oe	2	**B1** for 64 **M1** for 8×8 oe seen or The differences increase by 2 oe with at least $49 + 15$ shown	Ignore any drawings oe = 8^2 or $8 + 8 + ...8$ (eight times) or 1, 4, 9, 16, 25, 36, 49, 64 seen or the pattern number squared Do not accept *Square numbers* alone as a justification but accept It is the 8^{th} square number for M1
	c		14 cao	1		Do not accept $\sqrt{196}$ alone or 14^2

Question			Answer	Marks	Part marks and guidance	
10	a		Gaming	1		
	b		A correct calculation or $\frac{150}{360}$ oe or $\frac{360}{150}$ oe	M1	150 ÷ 360 or 360 ÷ 150 or 360 ÷ 3 or $\frac{1}{3}$ of 360 or 150 × 3	For M1 oe is equivalent fraction eg $\frac{5}{12}$
			Justify rejecting Jack's assertion	A1	Must be comparison between • two fractions with common denominator or values or • two angles or • two values	Match answer to calculation or statement $\frac{150}{360}$ oe and $\frac{1}{3}$ oe with common denominator or 0.4[...] and 0.3[...] or 2.4 and 3 or *their* 450 and 360 See appendix
	c		1 [h] 15[min]	4	**B3** for 1.25 [hours] or $1\frac{1}{4}$ [hours] or 75 [minutes] OR **B1** for [Reading =] 90 **M2** for (5 or 300) × $\frac{their\ 90}{360}$ oe or (5 or 300) ÷ $\frac{360}{their\ 90}$ or **B1** for $\frac{their\ 90}{360}$ soi $\frac{1}{4}$ or $\frac{360}{their\ 90}$ soi 4	Working may be in hours or minutes May be seen on diagram. Allow symbol oe **M2** for (5 or 300) ÷ 4
					ALTERNATIVE METHODS **M1** for [150 + 30 =] 180 **M1** for (5 or 300) ÷ 2 **M1** for *their* (5 or 300) ÷ 2 ÷ 2 **B1** for [reading =] 90 **M1** for 360 ÷ 5 soi 72 **M1** for 90 ÷ their (360 ÷ 5) **B1** for [reading =] 90 **M1** for 300 ÷ 360 or 360 ÷ 300 **M1** for *their* (300 ÷ 360) × 90 or 90 ÷ *their* (360 ÷ 300)	

Question			Answer	Marks	Part marks and guidance	
11	**a**		12	**1**		
	b		24 41 14	**2**	**B1** for one or two correct	No FT from wrong 41 as this can be achieved from final totals
	c		(V) 4 + 12 + 9 + 1 soi 26 (L) 10 + 15 + 10 [+ 0] soi 35 (C) 10 + *their* 14 + 11 + 4 soi 39 Chocolate from 26, 35, 39 cao	**M2** **A1**	or **M1** for one correct sum or two correct totals	A sum is eg 4 + 12 + 9 + 1 May be seen as 35 out of 100 oe *Their* 14 must match diagram For (C) allow 100 – *their* V – *their* L
12			7.5 or $7\frac{1}{2}$ or $\frac{15}{2}$ final answer	**2**	**M1** for first correct step $4x = 35 - 5$ or better or $x + \frac{5}{4} = \frac{35}{4}$ or better	Do not accept embedded answers Accept a fully correct flowchart or working for **M**1 eg $x \rightarrow \times 4 \rightarrow + 5 \rightarrow 35$ $x \leftarrow \div 4 \leftarrow - 5 \leftarrow 35$ or (35 – 5) ÷ 4 may be in stages
13			35.1[0]	**4**	**M1** for 240 ÷ 40 soi 6 [gallons] AND **M2** for *their* (240 ÷ 40) × 1.3[0] × 4.5 or **M1** for *their* (240 ÷ 40) × 1.3[0] soi 7.8[0] or *their* (240 ÷ 40) × 4.5 soi 27 or 1.3[0] × 4.5 soi 5.85 If 0 scored, **SC1** for any number of litres × 1.3 correct	Alternative method **M1** for 40 ÷ 4.5 soi 8.88… oe **M1** for 240 ÷ *their* (40 ÷ 4.5) soi 27 **M1** for *their* (240 ÷ *their* (40 ÷ 4.5)) × 1.3

Question			Answer	Marks	Part marks and guidance	
14			3 with correct full method	**5**	**B4** for 2.3 to 2.4 as final answer or **B3** for figs 23 to 24 final answer OR **B1** for correct unit conversion of a value at some stage (not just 1000ml = 1 litre) **M1** for 56 × 250 soi 14 000 **M1** for *their* 14 000 – *their* 10 000 soi 4 000 **M1** for $\frac{\textit{their}\ 14\,000 - \textit{their}\ 10\,000}{\textit{their}\ 1700}$ oe soi 2.35... <u>ALTERNATIVE METHOD</u> **M1** for 10 000 ÷ 250 or 10 ÷ 0.25 soi 40 [cups] **M1** for 56 – *their* 40 soi 16 **M1** for 1700 ÷ 250 or 1.7 ÷ 0.25 soi 6.8 [cups] or 6 cups 200 ml or 6 or 7 **M1** for *their* 16 ÷ *their* 6.8 oe soi 2.3 to 2.4	**B4** and **B3** Must be sure this is number of kettles oe and not a faulty unit conversion Conversion may be implied by values of consistent order eg 56 × .25 or 14 000 – 10 000 or 56 × [0].25 soi 14 or *their* 14 – 10 soi 4 or $\frac{\textit{their}14 - \textit{their}\ 10}{1.7}$ **Use of kettle only** **B4** for answer 9 or **B3** for 8.2 to 8.3 or **B2** for figs 82 to 83 OR **B1** for correct unit conversion at some stage AND **M1** for 56 × 250 soi 14 000 **M1** for $\frac{\textit{their}\ 14\,000}{\textit{their}\ 1700}$ oe OR **M1** for 1700 ÷ 250 or 1.7 ÷ 0.25 soi 6.8 [cups] or 6 cups 200 ml or 6 or 7 **M1** for 56 ÷ *their* 6.8 oe

Question			Answer	Marks	Part marks and guidance	
15	**a**		28 nfww	**2**	**M1** for $\frac{200}{50}$ [× 7] oe soi by 4 or $\frac{7}{50}$ [× 200] soi 0.14 or [200 ÷] $\frac{50}{7}$ soi 7.14[…]	Note 200 ÷ 7 = 28.5[7…] is wrong method and scores 0 even if truncated to give an answer of 28
	b		11.25 oe	**2**	**M1** for $\frac{9}{8}$[×10] oe soi 1.125 or $\frac{10}{8}$ [× 9] oe soi 1.25	Inverse methods eg [9 ÷] $\frac{8}{10}$ are oe
	c		Not straight oe or it's curved oe	**1**		Mark the best part if no contradiction or wrong statement
16			Correct side view eg 	**2**	For 2 marks: Second column any height but wider than, and right of, first with roughly middle vertical and flat top **B1** for roughly rectangular column width ± 2 mm (between inner and outer overlay circles) and no oblique top and **B1** for approx vertical line approx central	If **B0** second **B1** still possible Mark intention, ruler desirable but not required If no column drawn, must be a hole with dotted lines with same constraints eg  Use overlay

Question			Answer	Marks	Part marks and guidance	
17	**a**		5400 or 5401 or 5402 final answer	**2**	**M1** for figs 35 ÷ figs 648, soi by figs 540[1…] or for 0.0000648 seen	
	b		Any reference to average/inexact weight oe [in packet weight or weight of a grain] or recognising that the number of grains of salt must be integer oe	**1**		Condone any mention of • average for variation and/or • size for weight Mark the best part if no contradiction or wrong statement See appendix

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Part marks and guidance</th><th></th></tr>
<tr><td>18</td><td></td><td></td><td>Poppy, Sesame, Pumpkin with correct comparable values shown</td><td>4</td><td>B3 for all 3 quantities seen <u>correct in comparable form</u>

or
B2 for 8.4×10^{-5} or 8.4×10^{-2} seen
or
seen <u>correct in comparable form</u>:
• pumpkin with poppy
eg implied by [250 poppy =] 0.075
or
• pumpkin with sesame
eg implied by [250 sesame =] 0.91
or
B1 poppy and sesame seen <u>correct in comparable form</u>
or [pumpkin =] 0.084 or 0.000 084 seen

or [250 poppy =] 0.000 075 oe seen
or [250 sesame =] 0.000 91 oe seen</td><td>Condone weights as answer

Quantities given in the question (bold in table) need not be rewritten

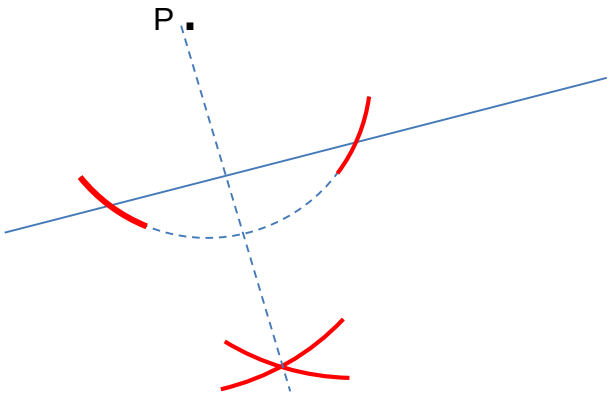
Comparable forms include:
<table><tr><td colspan="3">In kilograms:</td></tr><tr><td>Pop</td><td>0.000 000 3</td><td>3×10^{-7}</td></tr><tr><td>Pum</td><td>0.000 084</td><td>8.4×10^{-5}</td></tr><tr><td>Ses</td><td>0.000 003 64</td><td>3.64×10^{-6}</td></tr></table>
<table><tr><td colspan="3">In grams:</td></tr><tr><td>Pop</td><td>0.000 3</td><td>3×10^{-4}</td></tr><tr><td>Pum</td><td>0.084</td><td>8.4×10^{-2}</td></tr><tr><td>Ses</td><td>0.003 64</td><td>3.64×10^{-3}</td></tr></table>
Must not be a mix of standard and ordinary form

Accept consistent multiples for full marks. eg.
250 poppy = 0.075 and
250 sesame seeds = 0.91

May be all fractions with common denominator</td></tr>
</table>

Question			Answer	Marks	Part marks and guidance	
19	**a**		Correct answer based on angle or area/arc length	**1**	The angle [for black] • is too small oe or • is less than a fifth oe or • should be 72 oe The area/arc length [for black] • is too small oe or • is less than a fifth oe	Accept 26 to 30 for "the angle" Accept "not equal to" for "too small" or "less than" See appendix
	b		Any comment recognising limitations in range of the vertical scale	**1**		EG It does not start at zero or It starts at 113 See appendix
20			[expected profit is £] 80 with 200 and 120 seen	**4**	**B1** for [£] 200 or 20 000[p] AND **M2** for 0.1 × 400 × 3 soi 120 or **M1** for 0.1 × 400 soi 40 Alternative method **B1** for [£] 200 or 20 000[p] **M1** for $\frac{\textit{their}\ 200-100}{3}$ [prizes] soi 33[.3…] **M1** for 0.1 × 400 soi 40 **A1** for she is giving away too many prizes oe Alternative method **B1** for [£] 200 or 20 000[p] **M1** for $\frac{\textit{their}\ 200-100}{3}$ [prizes] soi 33[.3…] **M1** for $\frac{\textit{their}\ 33[.3...]}{400}$ soi 0.08[3…] **A1** for the probability of winning the game is too great oe	Apply scheme to consistent working in pence rather than £.

Question			Answer	Marks	Part marks and guidance	
21			108 nfww	**4**	**B3** for $\frac{108}{300}$ OR **M3** for $(300 - \frac{23}{50} \times 300) \div 3 \times 2$ oe or **M2** for $300 - \frac{23}{50} \times 300$ soi 162 or **M1** for $\frac{23}{50} \times 300$ oe soi 138 <u>Alternative method</u> **M1** for [p(white or red) =] $1 - \frac{23}{50}$ soi $\frac{27}{50}$ **M1** for *their* $\frac{27}{[50]} \div 3 \times 2$ soi $\frac{18}{[50]}$ **M1** for *their* 18×6 or *their* $\frac{18}{50} \times 300$	May use percentages or decimals for M marks May use 23 : 18 : 9 for M2

Question			Answer	Marks	Part marks and guidance	
22			Ruled perpendicular constructed with correct arcs (one pair intersecting AB)	**2**	Condone dashed line **B1** for correct arcs (one pair intersecting AB) only but no line or correct ruled line but no, or incomplete construction arcs 	Set protractor to 90° and check 88° to 92° at AB Correct construction arcs as shown (may be two pairs of arcs used to draw line through P) Ignore other arcs if correct arcs clearly used to construct line Condone perpendicular extending beyond AB but must pass through P and reach AB (no daylight) **Alternative arcs**. One centred on A length AP and one centred on B length BP meeting below AB (may also pass through P). Use overlay as check Candidates may use points on AB other than A and B for this construction. In such cases check radii of arcs using on-line ruler to judge.

Question			Answer	Marks	Part marks and guidance	
23	**a**		60 or 30 seen as angle $10 \times \sin 60$ or $10 \times \cos 30$ 8.660[...] <u>Alternative method by Pythagoras</u> 5 seen as side $\sqrt{10^2 - 5^2}$ 8.660[...]	**B1** **M2** **A1 dep** **B1** **M2** **A1 dep**	May be correctly marked on diagram **M1** for $\sin 60 = \frac{AC}{10}$ oe or $\cos 30 = \frac{AC}{10}$ **Dep** on at least M1 May be correctly marked on diagram or **M1** for $10^2 - 5^2$ **Dep** on at least M1	Reverse method using 8.66... **scores 0** 10^2 may be 100 and 5^2 may be 25
	b	**i**	$\frac{1}{2} \times \frac{1}{2} \times 10 \times 8.66$[0..] oe 21.65[...]	**M1** **A1**		Reverse method using 21.7 **scores 0** May be in stages
		ii	260	**2**	**M1** for 12×21.7 or **B1** for 259.8 to 260.4	Award **M1** for alternative complete methods

Question			Answer	Marks	Part marks and guidance	
24			$y = 6x + 2$ oe final answer	**4**	**B3** for $6x + 2$ final answer or $y = 6x + 2$ oe but spoiled to final answer OR **B2** for $y = 6x + k$ oe $0 < k < 7$ or for $y = mx + 2$, $m > 0$ and $m \neq 6$ or **B1** for gradient or $m = 6$ stated or for $y = 6x$ or for $[y =] 6x + k$ $k \neq 0$ or 7 oe or for $mx + 2$, $m > 0$ and $m \neq 6$ **B0** for $y = 6x + 7$ (as given)	Accept $y - 26 = 6(x - 4)$ as equivalent Do not allow other letters for x <u>Alternative methods</u> **M1** for $6 \times 4 + 7$ soi 31 **M1** for *their* 31 – 26 soi 5 **M1** for 7 - *their* 5 OR **M1** for $[\pm]6 \times 4$ soi 24 or -24 **M1** for 26 – *their* 24 soi 2 **M1** for $6x$ + *their* 2

Question			Answer	Marks	Part marks and guidance	
25			Two correct corresponding ratios evaluated correctly eg $\frac{6}{10} = 0.6$ and $\frac{11}{15} = 0.7[...]$ or	**M2**	**M1** for one correct ratio evaluated	$\frac{11}{6}$ = 1.8[...] and $\frac{15}{10}$ = 1.5 $\frac{6}{11}$ = 0.5[...] and $\frac{10}{15}$ = 0.6 to 0.7 $\frac{10}{6}$ = 1.6 to 1.7 and $\frac{15}{11}$ = 1.3 to 1.4 Note. Ratios between 6 and 10 and between 15 and 11 may be seen as tangents. These give angles in left triangle of 30.9 to 31.0 or 59.0 to 59.1 and angles in right triangle of 36.2 to 36.3 or 53.7 to 53.8
			A side calculated correctly using one ratio or scale factor and the other side			$(\frac{15}{10} \times 6$ or $\frac{6}{10} \times 15) = 9$ $(\frac{10}{15} \times 11$ or $\frac{11}{15} \times 10) = 7.3[...]$ $\frac{11}{6} \times 10 = 18.3[...]$ or $\frac{6}{11} \times 15 = 8.1$ to 8.2
			No + the [corresponding] ratios or sides are not the same oe or No + the 11 should be 9 oe	**A1dep**	**Dep** on M2	**A0** for "the sides are 5 cm longer"

Question			Answer	Marks	Part marks and guidance	
26	**a**		4.045 and 4.055	**2**	**B1** for each or for both correct but reversed	
	b		4 cao	**1**		Do not accept 4.0
27			$(x + 5)(x – 2)$ $^{-}5$ and 2 final answer	**M2** **B1FT**	or **M1** for $(x \pm a)(x \pm b)$ where $(a + b) = 3$ or $(ab) = {}^{-}10$ for correct solutions from *their* quadratic factors If 0 scored **SC1** for -5 and 2 as answers	Eg $(x + 1)(x + 2)$ giving $x^2 + 3x + 2$ or $(x – 1)(x + 10)$ giving $x^2 – 9x – 10$ Eg FT $x = –1$ and $–2$ FT $x = 1$ and $– 10$
28	**a**	**i**	h^0 or 1 final answer	**1**		
		ii	f^6 final answer	**1**		
	b		$\frac{4}{a}$ or $4a^{-1}$ final answer	**4**	**M1** for $2a \times 2a \times 2a$ soi by $8a^3$ **M1** for $\frac{32a^2}{their(2a \times 2a \times 2a)}$ **A1** for 4 as numerator or coefficient of a **A1** for a as denominator	*Their* $2a \times 2a \times 2a$ must be algebraic and three dimensional
			g per mm^3 cao	**1**		Accept correct forms for 1 mark eg grams/mm^3 or g mm^{-3} or $\frac{g}{mm^3}$ etc

Question 10b

A	$\frac{1}{3} \times 360 = 120$ and he has done 150 which is more than that	**2** Correct calculation for **M1** and **A1** recognises 150 is not 120
B	Jack's incorrect as $\frac{1}{3}$ of 360 is 120 and he has done 150	**2** Correct statement of a third of 360 for **M1** and **A1** recognises 150 is not 120
C	$360 \div 150 = 2.4$	**1** Correct calculation ($360 \div 150$) for **M1** but **A0** as no comparison of 2.4 with 3
D	$\frac{1}{3} \times 360 = 120$. The angle is supposed to be 120 if he spent a third.	**1** Correct calculation ($\frac{1}{3} \times 360$) for **M1** but **A0** as no mention of 150
E	$\frac{150}{360} = \frac{5}{12}$ which is more than $\frac{1}{3}$	**1** Correct fraction ($\frac{150}{360}$) for **M1** but **A0** as no common form to compare fractions
F	She is incorrect as $3 \times 150 = 450$.	**1** Correct calculation for **M1 A0** as no comparison with 360
G	As 150 angle is not equivalent to a third	**0** True but no 150×3 or $360 \div 3$ to support so M0
H	The gaming angle is 150 that's nearly half of his time	**0** No calculation so M0

Question 17b

A	Because it is a decimal and you can't have a decimal of a grain of salt.	**1** Reference to requiring integer value
B	They might have rounded the 0.35kg up.	**1** Equivalent to "figures not exact"
C	Some grains can be lighter or heavier than this.	**1** "this" is "the average"?
D	The weight of each grain is an average.	**1** True; mention of average
E	The weight given is an average weight.	**1** True; mention of average
F	As it is an average amount of salt.	**1** True; mention of average. Read amount for weight
G	Some grains of salt may be heavier.	**1** Implies variation
H	It's an average	**1** Minimum case
I	It's not exact	**1** Minimum case
J	It's a decimal	**1** Minimum case
K	Because it is hard to exactly measure that finite amount consistently.	**0** It may be "hard to measure" but doesn't say they are not exact.
L	It's an estimate because in some packets there will be slightly more or less grains as they are too small to count.	**0** Refers to the number of grains and does not

		reference the weight of a grain.
M	There could be a fraction of a grain of salt.	**0** Implies number of grains can be non-integer.
N	They all weigh the same but could be different sizes	**0** Choice One incorrect statement and one correct

Question 19a

A	The black section does not cover 1/5 of the spinner	**1** "covering" implies area
B	The angle is 28˚. It should be 72˚.	**1**
C	1/5 is 72 ˚ and the black section is less than this	**1**
D	The angle is **only** 28.	**1** Implied comparison with correct angle BOD Minimum case
E	Because 30/360 is 1/12	**1** comparing angle as fraction with common numerator with 1/5 (which is given) (3/36 is not enough to compare)
F	Because 28/360 = 0.07[…] not 0.2	**1** Correct comparison (but (26 to 30)/360 needed for evidence of working with angle)
G	The angle is 28˚.	**0** Does not say that it should be 72 or is too small
H	The sections are not of equal area	**0**
I	The sections are not of equal width	**0**
J	The black section is the smallest section	**0**
K	The spinner is unequal and some spaces are the same colour but different size	**0**
L	It's more like a tenth	**0** No angle used to justify

Question 19b

A	The graph starts at 113	**1** Recognises limitation in scale
B	The y-axis is only from 113 to 121	**1** Recognises limitation in scale
C	Because you don't see anything below 113	**1** Recognises limitation in scale
D	You can't read between the numbers on the scale	**0** Does not recognise limitations in the **range** of the scale
E	It doesn't start from the bottom of the graph and the units go up in an unusual pattern.	**0** Too vague.
F	It looks as though there has been a drastic increase in price when there hasn't.	**0** Not explained why the scale causes this
G	There are lines joining the points.	**0** Irrelevant

H	Because the cost varies throughout the month.	**0** True but describing patterns
I	Because it would have fluctuated.	**0** True but describing patterns
J	You don't see the bottom of the graph	**0** Too vague

OCR (Oxford Cambridge and RSA Examinations)
The Triangle Building
Shaftesbury Road
Cambridge
CB2 8EA

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553