OCR

Oxford Cambridge and RSA

F

Date – Morning/Afternoon

GCSE (9-1) MATHEMATICS

J560/03   Paper 3 (Foundation Tier)

PRACTICE PAPER (SET 3) MARK SCHEME

Duration: 1 hour 30 minutes

MAXIMUM MARK   100

Final

Subject-Specific Marking Instructions

1. **M** marks are for <u>using a correct method</u> and are not lost for purely numerical errors.
    A marks are for an <u>accurate</u> answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
    B marks are <u>independent</u> of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
    SC marks are for <u>special cases</u> 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 <u>not from wrong working</u> **full marks** should be awarded.

    Do <u>not</u> award the marks if the answer was obtained from an incorrect method, i.e. incorrect working is seen <u>and</u> 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, e.g. FT 180 × (*their* '37' + 16), or FT 300 − √(*their* '$5^2 + 7^2$'). Answers to part questions which are being followed through are indicated by e.g. 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.

    -   **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point e.g. 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 (i.e. **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.

Question			Answer	Marks	Part marks and guidance	
1	(a)		5	1 1 AO1.3a		
	(b)		110 or 121	1 1 AO1.3a		
2	(a)		[0].625	1 1 AO1.3a		
	(b)		$\dfrac{4}{5}$	2 2 AO1.3a	**B1** for $\dfrac{80}{100}$ **oe**	
	(c)		[0].4 $\dfrac{3}{7}$ 43% $\sqrt{0.2}$	3 3 AO1.3a	**B2** for 3 in common form and correct or 3 in correct order Or **M1** for attempt at correct method to change to common form	Accept 0.4 0.42[8..] 0.43 0.44[7..] for **3** marks
3	(a)		Small size indicated with correct supporting evidence	3 1 AO1.3a 1 AO3.1a 1 AO3.3	**M2** for 421 ÷ 1800 **and** 170 ÷ 750 **oe soi** by [0].23[38..] and [0].22[6...] Or **M1** for 421 ÷ 1800 **or** 170 ÷ 750 **oe soi** by [0].23[38..] or [0].22[6...]	
	(b)		[0].4 [0].36	1 1 1 AO1.3a 1 AO3.1a	If 0 scored **M1** for [ ] $\times$ ($\dfrac{100}{25}$ or 4) or [ ] $\div \dfrac{25}{100}$	
4	(a)	(i)	54	1 1 AO1.3a		
		(ii)	-[0].4	2 2 AO1.3a	**M1** for 6.4 ÷ 4 **soi**	
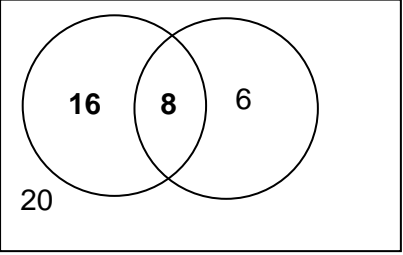
Question			Answer	Marks	Part marks and guidance	
	(b)	(i)	First: $[+] \, a \rightarrow [-] \, a$ Second: $[+] \, b \rightarrow [-] \, b$	**3** 1 AO1.3a 2 AO2.1a	a and b are different numbers **B2** for one correct number machine Or **B1** for a complete number machine, but not + and −, that returns an output of 8 e.g. × 4, ÷ 4	e.g. $[+] \, 2 \rightarrow [-] \, 2$ $[+] \, 3 \rightarrow [-] \, 3$ Ignore repeated machine or wrong machine Candidate ignores given operations (these do not need to be crossed out)
		(ii)	As long as the numbers are the same, the pair is correct **oe**	**1** 1 AO2.4a		
5	(a)	(i)	6	**2** 1 AO1.3a 1 AO3.1c	**B1** for [1 person takes] 24 [hours] or 150 [papers per hour] Or **M1** for $\dfrac{3 \times 8}{4}$	150 may be seen in the method e.g. $\dfrac{3600}{150 \times 4}$ Method may be in stages e.g. 3×8 [= 24] then [24] ÷ 4
		(ii)	One valid reason	**1** 1 AO3.4a		e.g. People may work at different rates. The labels may be longer/shorter and take more/less time Do not reward they may have to do more/fewer labels
	(b)		300	**2** 1 AO1.3a 1 AO3.1c	**M1** for 240 ÷ 4 **soi**	
	(c)		315	**2** 2 AO1.3a	**M1** for 1.26 × 250	

Question			Answer	Marks	Part marks and guidance	
6	(a)	(i)	Mark at either (0, 3) or (4, 3)	1 1 AO2.3b	Allow any clear indication	If more than one point marked, allow **1** mark if BOTH are correct
		(ii)	Correct coordinates for *their* C	1 1 AO1.3a		
	(b)		(4, 5) and (4, 1) (0, 5) and (0, 1)	2 1 1 AO1.2 1 AO2.3a 1 AO3.1a	**B1** for either (4, 5) or (4, 1) or for a correct rectangle drawn	Condone P and Q in wrong order Condone freehand if vertices are within 2 mm of correct points
7			6400	3 2 AO1.3b 1 AO3.1b	**M2** for 4000 × 0.2 × 3 **oe** Or **M1** for 4000 × 0.2 **oe** If 0 scored, **SC2** for 6912 or 4000 × 1.2³ **soi**	
8	(a)		$\dfrac{1}{16}$ **oe**	1 1 AO2.1b		Accept equivalent fraction or 0.25 or 25% but not 1 in 4
	(b)		Cannot score 0 on spinner B **oe**	1 1 AO2.4a		
	(c)		5	2 1 AO1.3b 1 AO2.2	**B1** for $\dfrac{4}{16}$	
9	(a)	(i)	$\dfrac{10+8}{10\times[0].6}$ 3	M1 A1 2 AO1.3b		
		(ii)	3.4	2 2 AO1.3b	**B1** for 3.37	

Question			Answer	Marks	Part marks and guidance	
	(b)		450	**2** 2 AO1.3a	**M1** for $100 \div 20$ **soi**	
10			Not similar because the scale factors are different with correct supporting evidence	**3** 2 AO1.3b 1 AO2.4a	**B1** for [SF height =] 1.12[6...] **B1** for [SF width =] 1.16[6...]	Alternative method: **B1** for $56 \div 48 = 1.16[6..]$ (or 71 ÷ 63, etc.) **B1** for $63 \times (56 \div 48) = 73.5$
11	**(a)**	**(i)**	$\sqrt{4^2 - 2^2} = 3.464... = 3.46$	**3** 1 AO1.3a 2 AO2.2	**M2** for $\sqrt{4^2 - 2^2}$ Or **M1** for $2^2 + [\ \ ]^2 = 4^2$ or $4^2 - 2^2$	
		(ii)	6.92, 6.93 or 6.928[2…]	**2** 2 AO1.3b	**M1** for $\frac{1}{2} \times 4 \times 3.46[4...]$	
	(b)		86.7	**4** 3 AO1.3b 1 AO3.1d	**M1** for $\dfrac{\pi \times 8^2}{2}$ **soi** **M1** for *their* '101' − 2 **×** 6.93 **A1** for 86.69 to 87.16	Allow 6.928[2...] from (a)
12	**(a)**		Crompton, Harwood, Astley **nfww**	**4** 2 AO1.3b 1 AO3.1c 1 AO3.3	**M3** for converting all three into comparable forms Or **M2** for converting two into comparable forms Or **M1** for correctly manipulating one into an equivalent alternative form	Condone C, H, A as abbreviations for school names e.g. Working in decimals: H = 0.428… or 0.43 A = 0.44[4…] C = 0.42 or working in fractions: H = $\dfrac{1350}{3150}$, A= $\dfrac{1400}{3150}$, C = $\dfrac{1323}{3150}$ See Appendix for further examples

Question			Answer	Marks	Part marks and guidance	
	(b)		If Beechfield has more pupils than Kenwood the *number* of girls may be more than at Kenwood	**1** 1 AO2.5b		Comments must indicate that the pie charts show proportions, not quantity
13	**(a)**	**(i)**	[Because] other ingredients [are also used so it will] weigh more **oe**	**1** 1 AO3.5		
		(ii)	Mixture B with correct interpretation of gradient	**3** 1 AO2.1a 1 AO3.1b 1 AO3.3	**B1** for $\dfrac{\text{cream}}{\text{dark chocolate}} = \dfrac{200}{300}$ **B1** for $= \dfrac{2}{3}$ [same gradient as B]	Allow for **3** marks: 300 is [1.5 times] more than 200 so not mixture A as in mixture A there is more cream than chocolate **oe** Allow converse case: **B1** for $\dfrac{\text{dark chocolate}}{\text{cream}} = \dfrac{300}{200}$ **B1** for $= \dfrac{3}{2}$ [so not A]
	(b)		[0].5775	**3** 2 AO1.3b 1 AO3.1d	**M2** for 175 × [0].99 ÷ 300 Or **M1** for 175 × [0].99 If 0 scored, **SC1** for [0].583[3...]	
14	**(a)**		2250	**1** 1 AO2.1a		Allow answers in range 2175 to 2325

Question			Answer	Marks	Part marks and guidance	
	(b)	(i)	12 750	**3** 1 AO1.3b 1 AO2.1a 1 AO3.1a	**M2** for 17 × k **oe** where 725 ≤ k ≤ 775 Or **M1** for 1 [tonne] = [£]750 **soi** or 17 × their 'k' **oe** where k is their weight per tonne	Allow answers in range 12 325 to 13 175 May be in parts read from the graph, e.g. 4 [tonnes] = [£]3000 1 [tonne] = [£]750 17 [tonnes] = 4 × 3000 + [1 ×] 750 Attempt at unitary method Accept 725 – 775
		(ii)	The unit cost is the same for all amounts bought	**1** 1 AO3.4b		See Appendix for further examples
15	(a)		0.45 **oe**	**2** 1 AO1.3a 1 AO2.1a	**M1** for 1 – (0.3 + 0.25) If 0 scored, **SC1** for 0.72	
	(b)	(i)	9	**2** 1 AO1.3a 1 AO2.1b	**M1** for 0.3 × 30 **oe**	
		(ii)	Correct explanation	**1** 1 AO3.4b	e.g. May need to play more times or she may not be very good at this game	
16	(a)		1400	**3** 1 AO1.3a 1 AO2.3a 1 AO3.1c	**M2** for $\frac{24}{60} \times 3500$ **oe** Or **B1** for $\frac{24}{60}$ **oe** or $\frac{36}{60}$ **oe** If **0** scored, **SC1** for 2100 as final answer	

Question			Answer	Marks	Part marks and guidance	
	(b)		Different age groups may not have the same opinion	**1** 1 AO3.5		
17	**(a)**			**2** 1 AO2.3b	**B1** for 8 or 16 correctly placed If 0 scored, **SC1** for numbers in circles that total 30	
	(b)		$\dfrac{\textit{Their } 8}{\textit{Their } (6+8)}$ **oe**	**2FT** 1 AO1.3a 1 AO2.3a	**M1** for each	**FT** from *their* Venn diagram Accept decimals to two or more placed (0.57[1...])and percentages to 2sf (57 or 57[.1]%) but not ratios
18	**(a)**		One of: $a = 2$ and $b = {}^-1$ or $a = 1$ and $b = 0$	**3** 1 AO1.3b 1 AO2.3a 1 AO3.1d	**B1** for $a + b = 1$ **B1** for $5 + b = 4$ and $a + 3 = 5$ or for $5 + b = 5$ and $a + 3 = 4$	*a* and *b* are the values on the reverse side of disc A and disc B respectively. Accept any clear notation
	(b)		$[a =] 2$, $[b =] {}^-2$, $[c =] 4$	**5** 2 AO1.3b 1 AO2.1a 2 AO3.1a	**B1** for $[a =] 2$ **M1** for correct substitution of *their a* in 3rd equation **B1** for $[b =] {}^-2$ **M1** for substitution of *their a* and *their b* in 2nd equation	
	(c)		$f^{\,6}$	**1** 1 AO1.3a		

Question	Answer	Marks	Part marks and guidance	
19	$$\dfrac{(x)+(x+1)+(x+2)+(x+3)+(x+4)}{5}$$ $$=\dfrac{5x+10}{5}$$ $= x + 2$, which is the median	**4** **2 AO2.4a** **1 AO3.1a** **1 AO3.2**	**M1** for $x, x + 1, x + 2, x + 3, x + 4$ **seen** **M1** for $(x) + (x + 1) + (x + 2) + (x + 3)$ $+ (x + 4)$ **M1** for *their* $(5x + 10) \div 5$ If **0** scored, allow **SC2** for a numerical example of any 5 consecutive numbers with mean clearly evaluated, and median identified as the same value Or **SC1** for a numerical example of any 5 consecutive numbers with mean clearly identified, or median clearly identified, or both identified with no conclusion	Or equivalent algebraic representation of 5 consecutive numbers Alternative (non-algebraic) arguments also accepted for full marks e.g. **M1** for "The numbers are the first number, 1 more, 2 more, 3 more and 4 more." **M1** for "So the mean of the differences is $(1 + 2 + 3 + 4) \div 5 =$ 2." **M1** for "So the mean is the first number plus 2." And the final mark for concluding this with "Which is the median".

APPENDIX

Exemplar responses for Q12(a)

Working in fractions:

	1 mark	1 mark	Still only 1 mark	2 marks	2 marks	2 marks	3 marks
$H = \dfrac{3}{7}$				$\dfrac{27}{63}$		$\dfrac{150}{350}$	$\dfrac{1350}{3150}$
A	$\dfrac{4}{9}$		$\dfrac{4}{9}$	$\dfrac{28}{63}$	$\dfrac{200}{450}$		$\dfrac{1400}{3150}$
C		$\dfrac{21}{50}$	$\dfrac{21}{50}$		$\dfrac{189}{450}$	$\dfrac{147}{350}$	$\dfrac{1323}{3150}$

Working in ratios:

	1 mark	1 mark	Still only 1 mark	2 marks	2 marks	2 marks	2 marks	2 marks	2 marks	3 marks	3 marks
H	3 : 4		3 : 4	12 : 16	21 : 28		15 : 20	87 : 116		84 : 112	435 : 580
A = 4 : 5				12 : 15		84 : 105	16 : 20		116 : 145	84 : 105	464 : 580
C		21 : 29	21 : 29		21 : 29	84 : 116		84 : 116	105 : 145	84 : 116	420 : 580

Exemplar responses for Q14(b)(ii)

Response	Mark
There are no discounts for buying more	1
There is enough aluminium	0

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