

**GCSE (9-1) MATHEMATICS**  
**J560/04** Paper 4 (Higher 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 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, i.e. 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, e.g. 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 e.g. 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 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.
  - **nfw** 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		6.25	3 3 AO1.3b	M2 for $\frac{1.19 - 1.12}{1.12}$ oe (or 0.0625) or M1 for $\frac{1.19}{1.12}$ oe (or 1.0625)	
2	(a)	1 : 300	2 2 AO1.3a	B1 for 6 : 1800 or 60 : 180	
	(b)	19.2	3 3 AO1.3b	M1 for $\frac{240}{45}$ oe (or 5.33... oe) M1 for <i>their</i> $5.33... \times \frac{60 \times 60}{1000}$	this can be done in one stage
3	(a)	$y = 5x - 7$	2 1 AO1.2 1 AO2.1a	B1 for $y = 5x + k$ ( $k \neq 3$ ) or $y = kx - 7$ or $5x - 7$	
	(b)	$y = 6x + 1$	3 2 AO1.3b 1 AO2.3b	M1 for $\frac{1 - 17}{0 - 3}$ oe B1 for $y = \textit{their} 6x + k$ ( $k \neq 1$ ) or $y = kx + 1$ or <i>their</i> $6x + 1$	
4		3.5 oe	3 3 AO1.3b	accept any correct method B1 for $18x - 15$ or $6x - 5 = 16$ M1 for <i>their</i> ' $18x$ ' = $48 + \textit{their}$ ' $15$ ' or $6x = 16 + 5$ M1 for $x = \frac{b}{a}$ from <i>their</i> $ax = b$ to a max. of 2 marks	
5	(a)	252	2 1 AO1.3a 1 AO2.3a	M1 for $28 \times 9$	

Question		Answer	Marks	Part marks and guidance
	(b)	14.9[42...]	4 2 AO1.3b 2 AO3.1d	M3 for ( <i>their</i> (a) +41 × 19) ÷ (28 + 41) or M2 for ( <i>their</i> (a) + 41 × 19) or 1031 or M1 for 41 × 19 or 779 or 69
6		53.475 53.485	2 1 AO1.3a 1 AO2.1a	B1 for one correct or both correct but reversed
7	(a)	(i) 8	1 1 AO1.3a	
		(ii) 40	1 1 AO1.3a	
	(b)	$\frac{1}{2}$ 10	1 1 1 AO1.2 1 AO1.3a	
8	(a)	16 42	4 1 AO1.3b 2 AO3.1d 1 AO3.3	B2 for 90 (LCM) identified or M1 for multiples of 15 and 18 up to at least 90  M1 for 15 12 + <i>their</i> LCM in hours and minutes
	(b)	any two different correct assumptions	2 2 AO3.4a	B1 for each one e.g. the trains always run on time or there is no 'hold-up' and the trains stop in the station for less than 3 minutes/a very short time or we use only the arrival time  i.e. if a train is in the station for 4 minutes then the 15 27 will still be there when the 15 30 arrives

Question		Answer	Marks	Part marks and guidance	
9	(a)	47.5 to 47.6 or 48 with correct working	<b>6</b> 1 AO1.3b 1 AO2.1a 4 AO3.1d	accept any correct method e.g. <b>M1</b> for $\pi \times 5^2$ or 78.53... <b>M1</b> for $40^2$ or 1600 <b>M1</b> for $40^2 - \text{their } '\pi \times 5^2'$ or 1521.46... <b>M1</b> for <i>their</i> '1521.46...' $\div 2$ or 760.730... <b>M1</b> for $\frac{\text{their } '760.730...' \times 100}{1600}$ <b>oe</b>	
	(b)	45.7[07...] or 45.71	<b>4</b> 1 AO1.3a 1 AO1.3b 2 AO3.1d	<b>B1</b> for $40 - 10$ or 30 <b>M1</b> for $0.5 \times 2 \times \pi \times 5$ or 15.707... <b>M1</b> for $30 + \text{their } 15.707...$	
10		$\frac{9}{34}$	<b>4</b> 1 AO1.3b 3 AO3.1d	<b>B3</b> for 9 or <b>M2</b> for $(12 + 25 + 6) - 34$ or correct diagram with 3 out of 4 correct elements or <b>M1</b> for $\frac{n}{34}$ where $n < 34$	e.g. G            G' S    n        25 - n S' 12 - n     6
11	(a)	correct translation	<b>2</b> 2 AO2.3b	<b>B1</b> for correct horizontal or vertical translation	

Question		Answer	Marks	Part marks and guidance
	(b)	reflection in $x = 0$ oe	<b>3</b> 1 AO2.1a 1 AO2.3b 1 AO3.1a	<b>B2</b> for reflection <b>B1</b> for $x = 0$ oe or <b>M2</b> for a correct double transformation on the grid or <b>M1</b> for a correct single transformation on the grid
12		$2x^2 + 5x - 4x - 10$ or better  <i>their</i> expansion = 35  <i>their</i> expansion rearranged = 0  $(2x - 9)(x + 5) [= 0]$  4.5	<b>M1</b>  <b>M1</b>  <b>M1</b>  <b>M2</b>        <b>A2</b> 1 AO1.3b 2 AO2.3b 2 AO3.1b 1 AO3.2 1 AO3.3	Condone one term incorrect        or <b>M2FT</b> for brackets that give three correct terms for <i>their</i> quadratic equation or <b>M1FT</b> for brackets that give two correct terms for <i>their</i> quadratic equation or <b>M2FT</b> for use of the formula for <i>their</i> quadratic equation with at most one error or <b>M1FT</b> if two errors  4.5 and -5 as answer scores <b>A1</b>



Question		Answer	Marks	Part marks and guidance	
13		angle BCA = angle CAE alternate angles  angle CBA = angle CAE alternate segment theorem  angle BCA = angle CBA therefore isosceles	1 1  1 1  1 3 AO2.4b 1 AO3.1a 1 AO3.3		
14	(a)	7 13 21 28 32	2 2 AO1.3a	<b>B1</b> for consistent frequencies with one error	
	(b)	(i) 12	1 1 AO2.1a		
		(ii) correct graph	2 2 AO2.3b	<b>B1</b> for 5 correct points plotted <b>FT</b> <i>their</i> table	tolerance $\pm 2$ mm
	(c)	correct box plot	3 1 AO2.1a 2 AO2.3b	<b>B1</b> for ends of 5.4 and 6.2 <b>B1</b> for UQ = 6.05 and LQ = 5.8 <b>B1</b> for median = 6.0	tolerance $\pm 2$ mm
	(d)	(i) Fran and she has a higher median <b>oe</b>	1 1 AO2.1b		
		(ii) Fran and she has a lower range/IQR	1 1 AO2.1b		

Question		Answer	Marks	Part marks and guidance
	(iii)	accept any correct answer	<b>1</b> 1 AO2.4a	e.g. Fran and she has a higher median <b>oe</b> or Jenny and she has a higher jump than any of Fran's <b>oe</b>
15		$\frac{885}{40.5}$ or 21.8...  Orientation that accommodates 21 (or 22) boxes identified e.g. $\frac{110}{50}$ and $\frac{90}{30}$ and $\frac{180}{40}$  2, 3 and 4 or 24  21	<b>M2</b>  <b>B1</b>  <b>B1</b>  <b>A1</b> 2 AO2.3a 2 AO3.1d 1 AO3.3	<b>M1</b> for $\frac{885\text{to}895}{39.5\text{to}40.5}$  if <b>0</b> scored then allow <b>B1</b> for any valid orientation correctly interpreted e.g. $\frac{110}{40}$ and $\frac{90}{30}$ and $\frac{180}{50}$ <b>and</b> 2, 3 and 3 or 18

Question		Answer	Marks	Part marks and guidance
16		140.76... or 140.8 or 141	5 1 AO1.3b 3 AO3.1b 1 AO3.2	<p><b>M2</b> for <math>\frac{12.4 \times \sin 63}{\sin 58}</math> <b>oe</b> (13.028...) or</p> <p><b>M1</b> for <math>\frac{12.4}{\sin 58} = \frac{[\dots]}{\sin 63}</math> <b>oe</b></p> <p><b>M2</b> for [cos x = ] <math>8.2^2 + 5.6^2 - (their\ 13.028)^2 \div (2 \times 8.2 \times 5.6)</math> or</p> <p><b>M1</b> for <math>(their\ 13.028)^2 = 8.2^2 + 5.6^2 - 2 \times 8.2 \times 5.6 \times \cos x</math></p>
17	(a)	accept any correct reasoning	2 2 AO2.2	<p>e.g. show all three 'points' satisfy <math>y = 3x^2</math> or</p> <p><math>\left(\frac{4}{2}\right)^2 = \frac{48}{12}</math> and <math>\left(\frac{5}{2}\right)^2 = \frac{75}{12}</math> or</p> <p><b>B1</b> for showing that two 'points' satisfy a correct reasoning</p>
	(b)	$b = \frac{36}{\sqrt{a}}$	3 2 AO1.3b 1 AO2.3b	<p><b>M1</b> for <math>b = \frac{k}{\sqrt{a}}</math> <b>oe</b></p> <p><b>A1</b> for <math>k = 36</math></p>
18		<p>denominator <math>(n + 3)(n - 1)</math> <b>oe</b></p> <p><math>5(n - 1)</math> or <math>2(n + 3)</math> or better</p> <p><math>5n - 5 + 2n + 6 = 7n + 1</math> with denominator <math>(n + 3)(n - 1)</math></p>	<p>1</p> <p>1</p> <p>1 1 AO1.3b 2 AO2.2</p>	

Question		Answer	Marks	Part marks and guidance
19		$x^2 - 3x - 4 = 2 - 2x$ $x^2 - x - 6 = 0$	<b>6</b> 6 AO1.3b	<b>M1</b> for $x^2 - 3x - 4 = 2 - 2x$ oe <b>M1</b> for $x^2 - x - 6 = 0$ <b>M2</b> for $(x - 3)(x + 2) [=0]$ or <b>M1</b> for two brackets which gives three correct terms from their quadratic equation <b>A1</b> for $x = 3$ and $-2$

### Assessment Objectives (AO) Grid

Question	AO1	AO2	AO3	Total
1	3	0	0	3
2(a)	2	0	0	2
2(b)	3	0	0	3
3(a)	1	1	0	2
3(b)	2	1	0	3
4	3	0	0	3
5(a)	1	1	0	2
5(b)	2	0	2	4
6	1	1	0	2
7(a)(i)	1	0	0	1
7(a)(ii)	1	0	0	1
7(b)	2	0	0	2
8(a)	1	0	3	4
8(b)	0	0	2	2
9(a)	1	1	4	6
9(b)	2	0	2	4
10	1	0	3	4
11(a)	0	2	0	2
11(b)	0	2	1	3
12	1	2	4	7
13	0	3	2	5
14(a)	2	0	0	2
14(b)(i)	0	1	0	1
14(b)(ii)	0	2	0	2
14(c)	0	3	0	3
14(d)(i)	0	1	0	1
14(d)(ii)	0	1	0	1
14(d)(iii)	0	1	0	1
15	0	2	3	5
16	1	0	4	5
17(a)	0	2	0	2
17(b)	2	1	0	3
18	1	2	0	3
19	6	0	0	6
<b>Totals</b>	<b>40</b>	<b>30</b>	<b>30</b>	<b>100</b>