



National
Qualifications
2026

2026 Applications of Mathematics

National 5 Paper 1

Question Paper Finalised Marking Instructions

Braille

Braille modifications

Q1
Q4a
Q5a
Q5b
Q8a and b

These marking instructions have been prepared by examination teams for use by Qualifications Scotland appointed markers when marking external course assessments.

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General marking principles for National 5 Applications of Mathematics

Always apply these general principles. Use them in conjunction with the detailed marking instructions, which identify the key features required in candidates' responses.

For each question, the marking instructions are generally in two sections:

generic scheme – this indicates why each mark is awarded

illustrative scheme – this covers methods which are commonly seen throughout the marking

In general, you should use the illustrative scheme. Only use the generic scheme where a candidate has used a method not covered in the illustrative scheme.

- (a) Always use positive marking. This means candidates accumulate marks for the demonstration of relevant skills, knowledge and understanding; marks are not deducted for errors or omissions.
- (b) If you are uncertain how to assess a specific candidate response because it is not covered by the general marking principles or the detailed marking instructions, you must seek guidance from your team leader.
- (c) One mark is available for each O. There are no half marks.
- (d) If a candidate's response contains an error, all working subsequent to this error must still be marked. Only award marks if the level of difficulty in their working is similar to the level of difficulty in the illustrative scheme.
- (e) Only award full marks where the solution contains appropriate working. A correct answer with no working receives no mark, unless specifically mentioned in the marking instructions.
- (f) Candidates may use any mathematically correct method to answer questions, except in cases where a particular method is specified or excluded.
- (g) If an error is trivial, casual or insignificant, for example $6 \times 6 = 12$, candidates lose the opportunity to gain a mark, except for instances such as the second example in point (h) below.

- (h) If a candidate makes a transcription error (question paper to script or within script), they lose the opportunity to gain the next process mark, for example

This is a transcription error and so the mark is not awarded.

This is no longer a solution of a quadratic equation, so the mark is not awarded.

$$x^2 + 5x + 7 = 9x + 4$$

$$x - 4x + 3 = 0$$

$$x = 1$$

The following example is an exception to the above

This error is not treated as a transcription error, as the candidate deals with the intended quadratic equation. The candidate has been given the benefit of the doubt and all marks awarded.

$$x^2 + 5x + 7 = 9x + 4$$

$$x - 4x + 3 = 0$$

$$(x - 3)(x - 1) = 0$$

$$x = 1 \text{ or } 3$$

(i) **Horizontal/vertical marking**

If a question results in two pairs of solutions, apply the following technique, but only if indicated in the detailed marking instructions for the question.

Example:

$$\begin{array}{cc} \bullet^5 & \bullet^6 \\ \bullet^5 & x = 2 \quad x = -4 \\ \bullet^6 & y = 5 \quad y = -7 \end{array}$$

Horizontal: $\bullet^5 x = 2 \text{ and } x = -4$
 $\bullet^6 y = 5 \text{ and } y = -7$

Vertical: $\bullet^5 x = 2 \text{ and } y = 5$
 $\bullet^6 x = -4 \text{ and } y = -7$

You must choose whichever method benefits the candidate, **not** a combination of both.

- (j) In final answers, candidates should simplify numerical values as far as possible unless specifically mentioned in the detailed marking instruction. For example

$\frac{15}{12}$ must be simplified to $\frac{5}{4}$ or $1\frac{1}{4}$

$\frac{43}{1}$ must be simplified to 43

$\frac{15}{0.3}$ must be simplified to 50

$\frac{4}{\cancel{5}}/3$ must be simplified to $\frac{4}{15}$

$\sqrt{64}$ must be simplified to 8*

*The square root of perfect squares up to and including 144 must be known.

- (k) Commonly Observed Responses (COR) are shown in the marking instructions to help mark common and/or non-routine solutions. CORs may also be used as a guide when marking similar non-routine candidate responses.
- (l) Do not penalise candidates for any of the following, unless specifically mentioned in the detailed marking instructions:
- working subsequent to a correct answer
 - correct working in the wrong part of a question
 - legitimate variations in numerical answers/algebraic expressions, for example angles in degrees rounded to nearest degree
 - omission of units
 - bad form (bad form only becomes bad form if subsequent working is correct), for example

$(x^3 + 2x^2 + 3x + 2)(2x + 1)$ written as

$(x^3 + 2x^2 + 3x + 2) \times 2x + 1$

$= 2x^4 + 5x^3 + 8x^2 + 7x + 2$

gains full credit

- repeated error within a question, but not between questions or papers
- (m) In any ‘Show that...’ question, where candidates have to arrive at a required result, the last mark is not awarded as a follow-through from a previous error, unless specified in the detailed marking instructions.
- (n) You must check all working carefully, even where a fundamental misunderstanding is apparent early in a candidate’s response. You may still be able to award marks later in the question so you must refer continually to the marking instructions. The appearance of the correct answer does not necessarily indicate that you can award all the available marks to a candidate.
- (o) You should mark legible scored-out working that has not been replaced. However, if the scored-out working has been replaced, you must only mark the replacement working.
- (p) If candidates make multiple attempts using the same strategy and do not identify their final answer, mark all attempts and award the lowest mark. If candidates try different valid strategies, apply the above rule to attempts within each strategy and then award the highest mark.

For example:

Strategy 1 attempt 1 is worth 3 marks.	Strategy 2 attempt 1 is worth 1 mark.
Strategy 1 attempt 2 is worth 4 marks.	Strategy 2 attempt 2 is worth 5 marks.
From the attempts using strategy 1, the resultant mark would be 3.	From the attempts using strategy 2, the resultant mark would be 1.

In this case, award 3 marks.

Marking Instructions for each question

Question			Generic scheme	Illustrative scheme	Max mark
1.			•¹ strategy/communication: mark one pressure correctly on scale •² communication: mark other pressure on scale and conclusion consistent with working	•¹ Braille 8 bar or 110 psi •² Braille 110 psi or 8 bar and not safe	2
Notes:					
Commonly Observed Responses:					

Question			Generic scheme	Illustrative scheme	Max mark
2.			•¹ process: evidence of common denominator •² process: calculate numerators and add fractions •³ process: calculate fraction of sheep who have not yet had their dose of vitamin	•¹ $\frac{\dots}{21}$ or equivalent •² $\left(\frac{3}{21} + \frac{14}{21} = \right) \frac{17}{21}$ •³ $\frac{4}{21}$	3

Notes:

- Correct answer without working. award 0/3
- The final answer does not need to be in its simplest form.
- Do not penalise incorrect simplification of final answer.
- ³ is not available when an improper fraction is calculated for •², with the exception of COR1.

Commonly Observed Responses:

- $\frac{\dots}{21} \rightarrow \left(\frac{6}{7} + \frac{1}{3} = \right) \frac{25}{21} \rightarrow \frac{4}{21}$ award 3/3 ✓✓✓
- $\frac{\dots}{21} \rightarrow \frac{1}{21} + \frac{2}{21} = \frac{3}{21} \rightarrow \frac{18}{21}$ or $\frac{6}{7}$ award 2/3 ✓✕✓
- $\left(\frac{1}{7} \times \frac{2}{3} = \right) \frac{\dots}{21} \rightarrow \frac{2}{21} \rightarrow \frac{19}{21}$ award 2/3 ✓✕✓
- $\frac{\dots}{10} \rightarrow \frac{3}{10} + \frac{14}{10} = \frac{17}{10} \rightarrow$ any final answer award 1/3 ✕✓✕
- $\frac{\dots}{10} \rightarrow \frac{2}{10} + \frac{1}{10} = \frac{3}{10} \rightarrow \frac{7}{10}$ award 1/3 ✕✕✓

Question			Generic scheme	Illustrative scheme	Max Mark
3.			•¹ process: calculate how much Helen will save each month •² process/communication: calculate the minimum number of months and round appropriately	•¹ (20% of 350 =) 70 •² (1250 ÷ 70 = 17.8... =) 18 (months)	2
Notes: - Correct answer without working award 0/2 •² is still available where the working for the division is incomplete eg $1250 \div 70 = 17 \dots$ (or just 17) → 18. •² can be awarded where the working shows $18 \times 70 = 1260$ followed by a final answer of 18. •² is not available where the candidate's answer to •¹ is a factor of 1250. - Ignore errors in calculations after the decimal point or in remainder. - Where a candidate uses a strategy involving repeated addition or subtraction of 70, •² can only be awarded where all calculations are correct. - Ignore omitted or incorrect units.					
Commonly Observed Responses: $70 \rightarrow 1250 \div 70 = 18$ award 2/2 ✓✓ $350 \rightarrow (1250 \div 350 =) 4$ award 1/2 ✕✓					

Question			Generic scheme	Illustrative scheme	Max mark
4.	(a)		¹ strategy/communication: any 5 task letters and times in the correct boxes ² strategy/communication: complete diagram	^{1&2} Braille	2
Notes: Braille (i) A4 (iii) D8 (v) F7 (vii) J5 (ix) I24 (ii) E2 (iv) C3 (vi) B6 (viii) H10 (x) G12 1. C is not interchangeable with D or E. 2. D and E are interchangeable. 3. H and J are interchangeable. 4. If a candidate omits all times, all task letters must be correct to be awarded 1/2. 5. If a candidate omits all task letters, all times must be correct to be awarded 1/2.					
Commonly Observed Responses:					
	(b)		³ process/communication: state minimum time	³ 71 (hours)	1
Notes: 1. Correct answer without working. award 1/1 2. Ignore omitted or incorrect units.					
Commonly Observed Responses:					

Question			Generic scheme	Illustrative scheme	Max mark
5.	(a)		Braille For this data, calculate the lowest number of cars washed and the highest number of cars washed. (2 marks)		2
Notes: Ordered list: 7, 9, 10, 14, 17, 18, 21, 26, 27, 31.					
Commonly Observed Responses:					
	(b)		Braille Describe all the elements of a box plot of this data. (2 marks)		2
Notes:					
Commonly Observed Responses:					
	(c)		Process: calculate interquartile range	26-10=16	1
Notes:					
Commonly Observed Responses:					

Question			Generic scheme	Illustrative scheme	Max mark
6.			•¹ process: convert to consistent units •² process/communication: express gradient as a fraction, and write in its simplest form	•¹ 1.8 (m) or 1200 (cm) •² $\left(\frac{180}{1200} = \right) \frac{3}{20}$	2
Notes: 1. Correct answer without working. award 2/2 2. • ² is not available when an attempt is made to further simplify a fraction already in its simplest form eg $\frac{3}{20} = \frac{1}{4}$. 3. • ² is not available where a candidate only gives their gradient as a decimal or a percentage.					
Commonly Observed Responses: 1. 180 and 120 $\rightarrow \left(\frac{180}{120} = \right) \frac{3}{2}$ award 1/2 ✕✓ 2. 180 and 120 $\rightarrow \left(\frac{120}{180} = \right) \frac{2}{3}$ award 0/2 ✕✕ 3. 180 and 12 $\rightarrow \left(\frac{180}{12} = \right) 15$ award 1/2 ✕✓ 4. 180 and 12 $\rightarrow \left(\frac{180}{12} = \right) \frac{15}{1}$ award 0/2 ✕✕ 5. 180 and 12 $\rightarrow \left(\frac{12}{180} = \right) \frac{1}{15}$ award 0/2 ✕✕					

Question			Generic scheme	Illustrative scheme	Max mark
7.			•¹ process: calculate commission •² process: calculate gross pay	•¹ (5% of 16000 =) 800 •² (1765 + 800 =) (£)2565	2
Notes: 1. Correct answer without working. award 2/2 2. • ² is only available for adding 1765 to a previously calculated commission. 3. Where the final answer is not a whole number, • ² is only available where the final answer is rounded or truncated to 2 decimal places.					
Commonly Observed Responses: 1. (5% of 56000 =) 2800 → 4565 award 1/2 ✕✓ 2. (5% of 40000 =) 2000 → 3765 award 1/2 ✕✓ 3. (5% of 1765 =) 88.25 → 1853.25 award 1/2 ✕✓					

Question			Generic scheme	Illustrative scheme	Max mark
8.	(a)		Braille Simplified graph supplied and candidate to use titles/plots taken from there to create braille format table as shown below (leeway required on distances). In the table below, distance (miles) is following by: time (hours) 600: 2 700: 2.5 1100: 3 1800: 4 2000: 4.5 2100: 5.5 3300: 8 3600:7.5		2
Notes: See modified graph below 8(b).					
Commonly Observed Responses:					

Question			Generic scheme	Illustrative scheme	Max mark																			
8.	(b)		Braille David flew 1500 miles. He departed at 10:25am. He did not change time-zone. Estimate the time David arrived at his destination. See supplied graph below.	Flight took 4 hrs Flight arrived at 2.25pm or 1425.	2																			
			distances and times for David's flights <table border="1"><caption>Data points from the scatter plot</caption><thead><tr><th>Distance (miles)</th><th>Flight time (hours)</th></tr></thead><tbody><tr><td>600</td><td>2.0</td></tr><tr><td>750</td><td>2.5</td></tr><tr><td>1100</td><td>3.0</td></tr><tr><td>1800</td><td>4.0</td></tr><tr><td>2000</td><td>4.5</td></tr><tr><td>2100</td><td>5.5</td></tr><tr><td>3400</td><td>8.0</td></tr><tr><td>3600</td><td>7.5</td></tr></tbody></table> ----- line of best fit			Distance (miles)	Flight time (hours)	600	2.0	750	2.5	1100	3.0	1800	4.0	2000	4.5	2100	5.5	3400	8.0	3600	7.5	
Distance (miles)	Flight time (hours)																							
600	2.0																							
750	2.5																							
1100	3.0																							
1800	4.0																							
2000	4.5																							
2100	5.5																							
3400	8.0																							
3600	7.5																							
Notes:																								
Commonly Observed Responses:																								
	(c)		• ⁴ strategy/communication: state estimated distance for 3.4 hours consistent with line of best fit	• ⁴ eg 1400 (miles)	1																			
Notes:																								
1. When the distance falls between 2 divisions, accept either number or any value in between.																								
2. • ⁴ is still available for a candidate who draws a line graph for • ³ .																								
3. • ⁴ is not available where no attempt has been made to draw a line of best fit.																								
Commonly Observed Responses:																								

Question			Generic scheme	Illustrative scheme	Max mark
9.			•¹ process: convert time to seconds •² process/communication: calculate flow rate as a decimal	•¹ 90 •² $(54 \div 90 =) 0.6 \text{ (m}^3/\text{s)}$	2
Notes: 1. Correct answer without working. award 2/2 2. • ² is not available to a candidate who leaves their answer as a fraction.					
Commonly Observed Responses: 1. $1.5 \rightarrow (54 \div 1.5 =) 36$ leading to $(36 \div 60 =) 0.6$ award 2/2 ✓✓ 2. $1.5 \rightarrow (54 \div 1.5 =) 36$ award 1/2 ✗✓ 3. $90 \rightarrow (54 \div 90 =) 0.6^3$ award 1/2 ✓✗					

Question			Generic scheme	Illustrative scheme	Max mark
10.			•¹ strategy/process: calculate cost for a suitable scaling •² process: calculate the cost of 1 kg	•¹ eg 1 g = (£)0.0096 50 g = (£)0.48 100 g = (£)0.96 •² (£)9.60	2

Notes:

- Correct answer without working. award 0/2
- ¹ can only be awarded for calculating the cost for **any** weight that is a factor or multiple of 1000 g.
- Where •¹ is not awarded, •² is only available if it is clear from working which weight is linked with the cost in •¹.
- ² may be awarded for adding an incorrect **calculated** cost for 100 grams to (£)8.64, see COR1.
- Where the final answer is not a whole number, •² is only available where the final answer is rounded or truncated to 2 decimal places.

Commonly Observed Responses:

- | | |
|---|--------------|
| 1. 100 g = 0.43 → (8.64 + 0.43 = £) 9.07 | award 1/2 ✕✓ |
| 2. 900 g = (£)8.64 → no further valid working | award 0/2 ✕✕ |
| 3. 4.32 or 43.2(0) with or without working | award 0/2 ✕✕ |

Question			Generic scheme	Illustrative scheme	Max mark																																										
11.			Method 1 • ¹ strategy/communication: identify and label all the possible combinations • ² process: identify all winning combinations • ³ communication: state probability of winning	 • ¹ eg <table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>T (or 1)</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>H (or 2)</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> • ² eg <table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>T (or 1)</td><td></td><td></td><td>✓</td><td></td><td></td><td>✓</td></tr><tr><td>H (or 2)</td><td>✓</td><td></td><td>✓</td><td></td><td>✓</td><td></td></tr></table> • ³ $\frac{5}{12}$		1	2	3	4	5	6	T (or 1)							H (or 2)								1	2	3	4	5	6	T (or 1)			✓			✓	H (or 2)	✓		✓		✓		3
	1	2	3	4	5	6																																									
T (or 1)																																															
H (or 2)																																															
	1	2	3	4	5	6																																									
T (or 1)			✓			✓																																									
H (or 2)	✓		✓		✓																																										
			Method 2 • ¹ strategy/communication: identify and label fraction of winning combinations for Tails and Heads • ² strategy/communication: identify the four fractions that need to be combined • ³ process: state probability of winning	 • ¹ $\frac{2}{6}$ labelled with '1.', 'T' or 'Tails' AND $\frac{3}{6}$ labelled with '2.', 'H' or 'Heads' • ² $\frac{2}{6}$ with $\frac{1}{2}$ and $\frac{3}{6}$ with $\frac{1}{2}$ • ³ $\left(\frac{2}{6} \times \frac{1}{2} + \frac{3}{6} \times \frac{1}{2}\right) \frac{5}{12}$																																											

Notes:

- $\frac{5}{12}$ with no other working. award 0/3 ***
- Where a 6×6 table is used. award 0/3 ***
- The final answer does not need to be in its simplest form.
- ¹ is only available with appropriate labelling ('T'/'H', 'Tails'/'Heads', '1.'/'2.'). Where labels are omitted, •² is still available. See CORs 4 and 5.
- For •³:
 - Accept: 5 out of 12 5 in 12
 - Do not accept: 5:12 5 to 12 5-12
- ³ is not available where a candidate gives their answer as **both** a fraction and a ratio, see COR1.
- In method 1, •² can be awarded for listing the 5 winning combinations (eg Tails 3&6, Heads 1,3&5). See CORs 2&3.
- In method 1, •¹ may be implied by •³. See COR2.

Question			Generic scheme	Illustrative scheme	Max mark											
11.			(continued)													
Commonly Observed Responses:																
1.	$\frac{5}{12}$ and 5:12 both stated (following appropriate working)				award 2/3 ✓✓x											
2.	Tails 3, 6 Heads 1, 3, 5			leading to $\frac{5}{12}$	award 3/3 ✓✓✓											
3.	Tails 3, 6 Heads 1, 3, 5			with no further valid working	award 1/3 x✓x											
4.	Insufficient labelling for • ¹ leading to correct answer (method 1)															
	1	2	3	4	5	6	→	1	2	3	4	5	6	→	$\frac{5}{12}$	award 2/3 x✓✓
										✓				✓		
								✓		✓		✓				
5.	Insufficient labelling for • ¹ leading to correct answer (method 2)															
	$\frac{2}{6}$	and	$\frac{3}{6}$	with no labelling	→	$\frac{2}{6}$	with	$\frac{1}{2}$	and	→	$\frac{5}{12}$	award 2/3 x✓✓				
						$\frac{3}{6}$	with	$\frac{1}{2}$								
6.	Tails: $\frac{2}{6}$ Heads: $\frac{3}{6}$					→	$\frac{2}{6} + \frac{1}{2} = \dots$ and	→	any answer			award 2/3 ✓✓x				
							$\frac{3}{6} + \frac{1}{2} = \dots$									

Question			Generic scheme	Illustrative scheme	Max mark
12.			•¹ process: calculate the arc length of the quarter circle •² process: calculate the length of the fence	•¹ 15.7 •² $(15.7 + 10 + 10 + 10 + 9 =) 54.7$ (m)	2
Notes: 1. Correct answer without working. award 0/2 2. Where candidate uses πr^2 . award 0/2 3. • ² is only available for adding 39 to a previously calculated arc length.					
Commonly Observed Responses: 1. $3.14 \times 5 = 15.7 \rightarrow 54.7$ award 2/2 ✓✓ 2. $(3.14 \times 20 =) 62.8 \rightarrow 101.8$ award 1/2 ✗✓ 3. $(3.14 \times 20 \div 2 =) 31.4 \rightarrow 70.4$ award 1/2 ✗✓ 4. $(3.14 \times 10 \div 4 =) 7.85 \rightarrow 46.85$ award 1/2 ✗✓ 5. $(3.14 \times 5 \div 4 =) 3.925 \rightarrow 42.925$ award 1/2 ✗✓					

Question			Generic scheme	Illustrative scheme	Max mark
13.			Method 1: comparing proportions •¹ strategy/communication: state fraction for 'dislike' in one survey •² strategy/process: express both 'dislike' fractions in comparable form •³ communication: state conclusion consistent with working	•¹ $\frac{60}{360}$ or $\frac{70}{480}$ or equivalent •² eg $\frac{8}{48}$ and $\frac{7}{48}$ OR 0.16(66...) and 0.14(58...) •³ 'yes' or 'decreased'	3
			Method 2: comparing number of people •¹ strategy/communication: state fraction of 'dislike' in first survey •² process: calculate fraction of 480 •³ communication: state conclusion consistent with working	•¹ $\frac{60}{360}$ or equivalent •² $(480 \div 6 =) 80$ •³ 'yes' or 'decreased', with evidence of comparing with 70	
			Method 3: comparing angles •¹ strategy/communication: state fraction of 'dislike' in second survey or calculate the angle per person •² process: calculate angle for 'dislike' in second survey •³ communication: state conclusion consistent with working	•¹ $\frac{70}{480}$ or $(360 \div 480 =) 0.75(^{\circ})$ •² $(0.75 \times 70 =) 52.5(^{\circ})$ •³ 'yes' or 'decreased' with evidence of comparing with $60(^{\circ})$	
Notes: 'Yes' or 'decreased' with no working. award 0/3 - In all methods, •¹ can still be awarded when additional fractions are also stated. •¹ can be implied by •² in all methods. - Where candidate selects the incorrect angle from the pie chart, •³ is still available. •³ can be awarded where the candidate states a calculated decrease, eg 10 (in method 2) or 7.5 (in method 3). •³ can only be awarded where the candidate makes a conclusion based on comparing 'like with like'.					
Commonly Observed Responses: 70 → 70 (people) and $60(^{\circ}) \rightarrow$ 'Yes' or 'decreased' or '10 fewer' award 0/3 ***					
Special case: $480 \div 70$ and $360 \div 60 \rightarrow 6.8(57...)$ and 6 → 'Yes' or 'decreased' award 3/3 ✓✓✓ $480 \div 70$ and $360 \div 60 \rightarrow 6.8(57...)$ and 6 → No conclusion award 2/3 ✓✓×					

[END OF MARKING INSTRUCTIONS]