National Qualifications 2017

2017 Lifeskills Mathematics

National 5 Paper 1

Finalised Marking Instructions

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General marking principles for National 5 Lifeskills Mathematics

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the detailed marking instructions, which identify the key features required in candidate responses.

For each question the marking instructions are generally in two sections, namely Illustrative Scheme and Generic Scheme. The illustrative scheme covers methods which are commonly seen throughout the marking. The generic scheme indicates the rationale for which each mark is awarded. In general, markers should use the illustrative scheme and only use the generic scheme where a candidate has used a method not covered in the illustrative scheme.

(a) Marks for each candidate response must always be assigned in line with these general marking principles and the detailed marking instructions for this assessment.

(b) Marking should always be positive. This means that, for each candidate response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding: they are not deducted from a maximum on the basis of errors or omissions.

(c) If a specific candidate response does not seem to be covered by either the principles or detailed marking instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader.

(d) Credit must be assigned in accordance with the specific assessment guidelines.

(e) One mark is available for each •. There are no half marks.

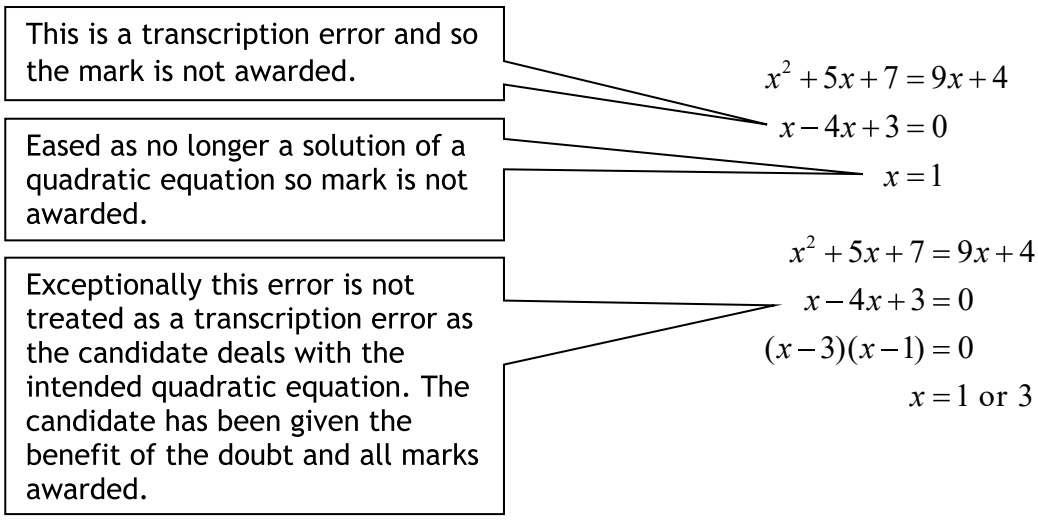
(f) Working subsequent to an error must be **followed through**, with possible credit for the subsequent working, provided that the level of difficulty involved is approximately similar. Where, subsequent to an error, the working for a follow through mark has been eased, the follow through mark cannot be awarded.

(g) As indicated on the front of the question paper, full credit should only be given where the solution contains appropriate working. Unless specifically mentioned in the marking instructions, a correct answer with no working receives no credit.

(h) Candidates may use any mathematically correct method to answer questions except in cases where a particular method is specified or excluded.

(i) As a consequence of an error perceived to be trivial, casual or insignificant, eg $6 \times 6 = 12$ candidates lose the opportunity of gaining a mark. However, note the second example in comment **(j)**.

(j) Where a transcription error (paper to script or within script) occurs, the candidate should normally lose the opportunity to be awarded the next process mark, eg



(k) **Horizontal/vertical marking**
Where a question results in two pairs of solutions, this technique should be applied, but only if indicated in the detailed marking instructions for the question.

Example:

	$\bullet^5$	$\bullet^6$
$\bullet^5$	$x=2$	$x=-4$
$\bullet^6$	$y=5$	$y=-7$

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

Markers should choose whichever method benefits the candidate, but **not** a combination of both.

(l) In final answers, unless specifically mentioned in the detailed marking instructions, numerical values should be simplified as far as possible, eg:

$\frac{15}{12}$ must be simplified to $\frac{5}{4}$ or $1\frac{1}{4}$ $\frac{43}{1}$ must be simplified to 43

$\frac{15}{0\cdot3}$ must be simplified to 50 $\frac{4/5}{3}$ must be simplified to $\frac{4}{15}$

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

*The square root of perfect squares up to and including 100 must be known.

(m) 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.

(n) Unless specifically mentioned in the marking instructions, the following should not be penalised:

- Working subsequent to a correct answer
- Correct working in the wrong part of a question
- Legitimate variations in numerical answers/algebraic expressions, eg angles in degrees rounded to nearest degree
- Omission of units
- Bad form (bad form only becomes bad form if subsequent working is correct), eg $(x^3+2x^2+3x+2)(2x+1)$ written as $(x^3+2x^2+3x+2)\times 2x+1$

  $2x^4+4x^3+6x^2+4x+x^3+2x^2+3x+2$ written as $2x^4+5x^3+8x^2+7x+2$ gains full credit

- Repeated error within a question, but not between questions or papers

(o) In any 'Show that…' question, where the candidate has to arrive at a required result, the last mark of that part is not available as a follow-through from a previous error unless specified in the detailed marking instructions.

(p) All working should be carefully checked, even where a fundamental misunderstanding is apparent early in the candidate's response. Marks may still be available later in the question so reference must be made continually to the marking instructions. The appearance of the correct answer does not necessarily indicate that the candidate has gained all the available marks.

(q) Scored-out working which has not been replaced should be marked where still legible. However, if the scored out working has been replaced, only the work which has not been scored out should be marked.

(r) Where a candidate has made multiple attempts using the same strategy and not identified their final answer, mark all attempts and award the lowest mark.

Where a candidate has tried different valid strategies, apply the above ruling to attempts within each strategy and then award the highest resultant 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.

Detailed marking instructions for each question

Question			Generic scheme	Illustrative scheme	Max mark
1.			**Ans: 9600 (mm)** •[1] Strategy: know to calculate minimum length of brick x 50 •[2] Process/communication: answer	•[1] (194 – 2) × 50 •[2] 9600	**2**

Notes:
1. Any attempted unit conversions must be correct for award of •[2]

Commonly Observed Responses :

1. For $(194\times50)-2$ leading to 9698. award 1/2 ×✓

2. For $(194+2)\times50$ leading to 9800. award 1/2 ×✓

3. For 194×50 leading to 9700. award 0/2 ××

Question			Generic scheme	Illustrative scheme	Max mark
2.	(a)		**Ans: (£)2600** • [1] Strategy: know to calculate 2·5% of £6000 • [2] Process: calculate 2·5% of £6000 • [3] Strategy/process: add commission to basic salary	 • [1] evidence • [2] 150 • [3] 2600	**3**

Notes:

1. Accept $6000 \div 2 \cdot 5$ as evidence of knowing to calculate 2·5%.

2. •[3] is only available for adding commission to £2450.

Commonly Observed Responses:

1. For 2·5% of £9000=£225 leading to a final answer of £2675.
award 2/3 ×✓✓

2. For 2·5% of £2450=£61·25 leading to a final answer of £2511·25.
award 2/3 ×✓✓

3. For 2·5% of £3000=£75 leading to a final answer of £2525.
award 2/3 ×✓✓

4. For 2·5% of £(9000-2450)=£163·75 leading to a final answer of £2613·75.
award 2/3 ×✓✓

Question			Generic scheme	Illustrative scheme	Max mark
2.	(b)		**Ans: (£)1870·39** • [1] Strategy: attempt to calculate gross pay – total deductions • [2] Process: calculate net pay	 • [1] evidence • [2] 1870·39	**2**

Notes:

1. For reference: total deductions = 729·61

Commonly Observed Responses:

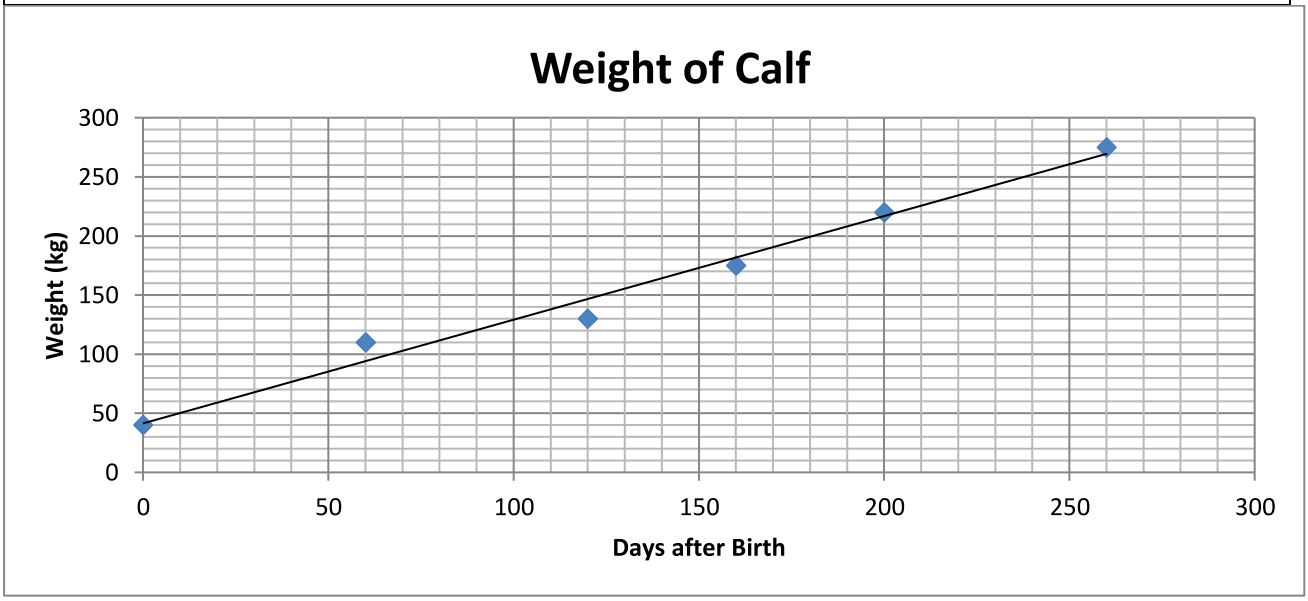
1. For candidates who calculate a gross salary in part (a) of £2675 leading to a net pay of £1945·39. award 2/2 ✓✓

2. For candidates who calculate a gross salary in part (a) of £2511·25 leading to a net pay of £1781·64. award 2/2 ✓✓

3. For candidates who calculate a gross salary in part (a) of £2525 leading to a net pay of £1795·39. award 2/2 ✓✓

4. For candidates who calculate a gross salary in part (a) of £2613·75 leading to a net pay of £1884·14. award 2/2 ✓✓

Question			Generic scheme	Illustrative scheme	Max mark
3.	(a)		**Ans: Points plotted correctly** • [1] Communication: 4 points correct • [2] Communication: all 6 points correct	D 0 60 120 160 200 260 W 40 110 130 175 220 275	2
Notes: 1. If candidate inverts **all** coordinates award 1/2					
Commonly Observed Responses:					
	(b)		**Ans: Line of best fit** • [1] Strategy: consistent line of best fit	• [1]	1
Notes:					
Commonly Observed Responses:					
	(c)		**Ans: (days)** • [1] Communication: answer consistent with line of best fit	• [1]	1
Notes: 1. Accept answer rounded to the nearest 10 days.					
Commonly Observed Responses:					



Question			Generic scheme	Illustrative scheme	Max mark
4.			**Ans: No, supported by working.** •[1] Strategy: know how to calculate gradient •[2] Process: know how to compare gradients of new trail and blue trail •[3] Strategy/ communication: consider the blue gradient and consistent conclusion	 •[1] 1·6/8 •[2] 4/20 (3/20 does not need to be explicitly stated) or 8/40 and 6/40 or 0·2 and 0·15 or equivalent •[3] No, supported by working	**3**

Notes:

1. For 1·6/8 followed by "No" with no other working. award 1/3

2. For 1·6/8 =5 followed by blue gradient 6·666… leading to "Yes". award 2/3

3. •[2] can only be awarded for two gradients with the same denominator, or the same numerator, or for two decimal fractions.

4. •[3] can only be awarded where two gradients with the same denominator, or the same numerator, or for two decimal fractions have been compared.

5. **Special case**: If a candidate's answer for new trail is a top heavy fraction only •[3] is available. This mark is only available if reference is made to a gradient from the table.

Commonly Observed Responses:

Question			Generic scheme	Illustrative scheme	Max mark
5.	(a)		**Ans: Bands D and A** •[1] Communication: state bands required	•[1] 10 × 14 +1 = 141, she needs bands D and A	**1**
Notes: 1. Bands D and A without working — award 1/1 2. For 140 lbs leading to bands D and A — award 1/1 3. D and A circled on the table — award 1/1 4. Accept 10 x 14 =141 bands D and A (treat as bad form) — award 1/1 5. For any incorrect calculation leading to bands D and A — award 0/1					
Commonly Observed Responses:					
	(b)		**Ans: Shop 2** •[1] Process: calculate cost for shop 1 •[2] Process: calculate cost for shop 2 •[3] Communication: conclusion consistent with working	•[1] 49·50 •[2] 45·48 •[3] Shop 2	**3**
			Alternative Strategy: •[1] Process: calculate discount for 1 shop •[2] Process: calculate discount for other two shops •[3] Communication: conclusion consistent with working	•[1] 26·30 or 30·32 or 27·81 •[2] remaining two •[3] Shop 2	
Notes: **1.** •[3] can only be awarded for comparing 3 costs or 3 discounts.					
Commonly Observed Responses: **1.** Shop 1 £49·50, Shop 2 £30·32, Shop 3 £47·99 leading to conclusion Shop 2 — award 1/3 ✓××					

Question			Generic scheme	Illustrative scheme	Max mark
6.			**Ans: (£)6 286 500** •[1] Strategy/process: calculate one(£1)share •[2] Process: calculate total number of shares •[3] Process: calculate total amount	 •[1] 2 794 000 ÷ 4 = 698 500 •[2] 2·50 + 2·00 + 4·00 + 0·50 = 9 •[3] 9 × 698 500 = 6 286 500	**3**
			Alternative Strategy 1 •[1] Strategy/process: calculate one (50p) share •[2] Process: calculate total number of shares •[3] Process: calculate total amount	 •[1] 2 794 000 ÷ 8 = 349 250 •[2] 1 + 4 + 5 + 8 = 18 •[3] 18 × 349 250 = 6 286 500	
			Alternative Strategy 2 •[1] Strategy/process: calculate the amount for any teacher other than Mr Young •[2] Process: calculate the amount for another teacher •[3] Process: calculate amount for final teacher and total amount	 •[1] Miss Smith 1 397 000 or Mr Jones 349 250 or Mr Ross 1 746 250 •[2] either of remaining two •[3] 1 397 000 + 349 250 + 1 746 250 + 2 794 000 = 6 286 500	

Notes:

1. •[2] can be implied by subsequent working.

Commonly Observed Responses:

1. For 2 7940 00 ÷ 9 = 310444·44
310444·44 × 4 = 1241777·76. award 2/3 ×✓✓

Question			Generic scheme	Illustrative scheme	Max mark
7.	(a)		**Ans: 20 (cm^2)** •[1] Strategy: know how to calculate composite area •[2] Process: calculate area	 •[1] Evidence of any valid strategy •[2] eg $24-4=20$	**2**
Notes: **1.** Accept $8+2\times2=20$ as bad form.					
Commonly Observed Responses: **1.** For $2\times8+1\times4+1\times4=24$. **award 1/2 ✓×** **2.** For calculation of two rectangles eg $4\times3+4\times2=20$ **award 1/2 ×✓**					
	(b)		**Ans: (£)30** •[1] Process: calculate the number of badges per pack •[2] Process: calculate the cost of enamel for 1 badge •[3] Process: calculate selling price	 •[1] 180 ÷ 20 = 9 •[2] 90 ÷9 = 10 •[3] 10 + 3 + 17 = 30	**3**
			Alternative Strategy: •[1] Process: calculate the number of badges per pack •[2] Process: calculate the total cost of 9 badges •[3] Process: calculate selling price	 •[1] 180 ÷ 20 = 9 •[2] $9\times3 + 9\times17 + 90=270$ •[3] 270 ÷ 9 = 30	
Notes: 1. If the cost of the enamel is not considered then only •[1] is available. 2. In the alternative strategy, if the candidates answer to •[2] is not divisible by 9, •[3] is only available for an answer rounded or truncated to 2 decimal places.					
Commonly Observed Responses:					

Question	Generic scheme	Illustrative scheme	Max mark
8.	**Ans:** $\frac{12}{100}\left(=\frac{3}{25}\right)$		**3**
	• [1] Strategy: evidence of identifying the blood groups that B+ can help	• [1] eg AB+ and B+	
	• [2] Communication: interpret stacked bar chart	• [2] 3 people AB+ and 9 people B+	
	• [3] Process: calculate fraction	• [3] $\frac{3+9}{100}=\frac{12}{100}\left(=\frac{3}{25}\right)$	

Notes:

1. Correct answer with no working. award 3/3
2. Accept 0·12, 12% or any fraction equivalent to $\frac{12}{100}$
3. For any answer **other** than $\frac{12}{100}, \frac{62}{100}, \frac{15}{100}, \frac{9}{100}$ & $\frac{3}{100}$, with no working award 0/3

Commonly Observed Responses:

1. For an answer of $\frac{62}{100}$ (B+ row is taken from the chart instead of the B+ column) (with no working) award 2/3 ×✓✓

2. For an answer of $\frac{15}{100}$ (the complete bars for AB and B are taken from the chart) (with no working) award 2/3 ×✓✓

3. For an answer of $\frac{9}{100}$ (B+ only) award 1/3

4. For an answer of $\frac{3}{100}$ (AB+ only) award 1/3

Question			Generic scheme	Illustrative scheme	Max mark
9.	(a)		**Ans: 27·42 (cm)**		**4**
			•[1] Strategy: correct substitution in Pythagoras' Theorem	•[1] eg $10^2 - 6^2$	
			•[2] Process: calculate the missing side	•[2] $x = 8$	
			•[3] Process: calculate length of the semi-circle	•[3] 3·14 x 6 ÷ 2 = 9·42	
			•[4] Process: calculate the perimeter of the shape	•[4] 10 + 8 + 9·42 = 27·42	

Notes:

1. •[1] and •[2] are available for correct answer without working (Pythagorean triple).

2. •[1] cannot be awarded if candidate writes $6^2 - 10^2$.

3. •[2] can be awarded if candidate writes $6^2 - 10^2$ leading to x = 8.

4. •[4] is only available for adding 10 to two previously **calculated lengths**.

5. •[4] is not available if the candidate states that they are adding calculated **areas**.

Commonly Observed Responses:

1. For 3·14 x 6+10+ 8 leading to a final answer of 36·84. award 3/4 ✓✓×✓

2. For $\frac{1}{2}$ x 3·14 x 3^2 +10+ 8 leading to a final answer of 32·31. award 3/4 ✓✓×✓

3. For 3·14 x 3^2 +10+ 8 leading to a final answer of 46·26. award 3/4 ✓✓×✓

4. For $\frac{1}{2}$ x 3·14 x 6 +10 + 8 + 6 + 6 leading to a final answer of 39·42 award 3/4 ✓✓✓×

Question			Generic scheme	Illustrative scheme	Max mark
9.	(b)		**Ans: 13·56 (cm^2)** •[1] Strategy: know how to calculate area of rectangular strip •[2] Process: calculate the area of the strip	•[1] evidence •[2] $(27{\cdot}42 - 0{\cdot}3) \times \frac{1}{2} = 13{\cdot}56$	**2**

Notes:

1. •[1] is available for evidence of subtracting 0·3 and then multiplying by 0·5

Commonly Observed Responses:

1. For $27{\cdot}42 \times \frac{1}{2} = 13{\cdot}71$ award 1/2 ×✓

2. For $0{\cdot}3 \times 0{\cdot}5 = 0{\cdot}15$ award 0/2 ××

[END OF MARKING INSTRUCTIONS]