National
Qualifications
2025

2025 Applications of Mathematics

Paper 2

Question Paper Finalised Marking Instructions

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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 •. There are no half marks.

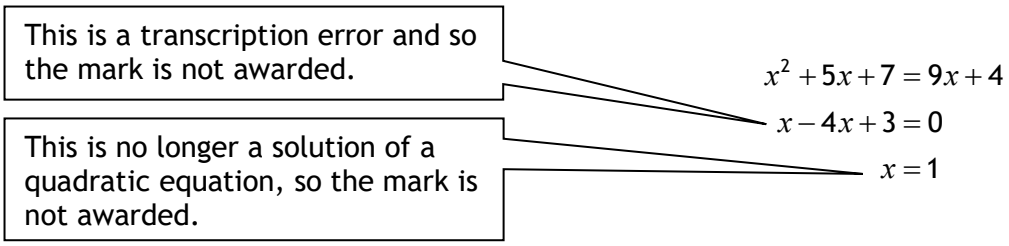
(d) If a candidate's response contains an error, all working subsequent to this error must still be marked. Only award marks if the level of difficulty in their working is similar to the level of difficulty in the illustrative scheme.

(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.

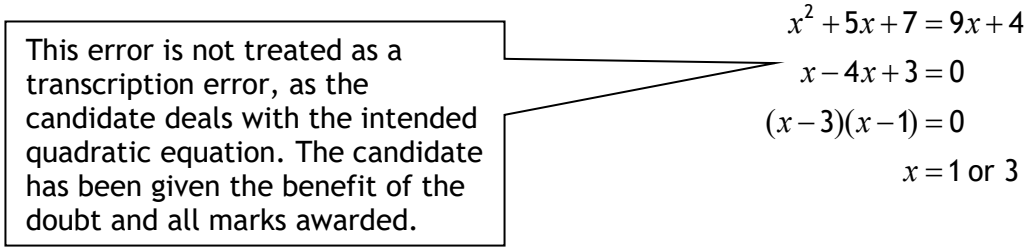
(f) Candidates may use any mathematically correct method to answer questions, except in cases where a particular method is specified or excluded.

(g) If an error is trivial, casual or insignificant, for example 6 × 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



The following example is an exception to the above



(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:

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

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 $y=-7$

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

$\frac{15}{0{\cdot}3}$ 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 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.

Note: Marking from Image (MFI) annotation change from 2025

A double cross-tick is used to indicate correct working which is irrelevant or insufficient to score any marks. In MFI marking instructions prior to 2025 this was shown as **ü₂** or ü2.

From 2025, the double cross-tick will no longer be used in MFI. A cross or omission symbol will be used instead.

Marking Instructions for each question

Question			Generic scheme	Illustrative scheme	Max mark
1.			$\bullet^1$ Process: convert height to metres $\bullet^2$ Process: calculate BMI	$\bullet^1$ 1.82 $\bullet^2$ $\left(\frac{93.5}{1.82^2} =\right) 28.227\ldots$	**2**

Notes:

1. Correct answer without working. award 2/2
2. The final answer must be rounded or truncated to at least 1 significant figure.
3. $\bullet^2$ is available to candidates who leave their answer in standard form, see COR 3.
4. $\bullet^2$ is available to candidates who leave their answer as a fraction in its simplest form, see COR 4.

Commonly Observed Responses:

1. $93.5 \div 182^2 = 0.0028\ldots$leading to 28 award 2/2 ✓✓
2. $93.5 \div 182^2 = 0.0028\ldots$ award 1/2 ×✓
3. $93.5 \div 182^2 = 2.8\ldots \times 10^{-3}$ award 1/2 ×✓
4. $\frac{93.5}{182^2} = \frac{187}{66248}$ award 1/2 ×✓
5. $93.5 \div 18.2^2 = 0.28\ldots$ award 1/2 ×✓
6. $93.5 \div 1.82 = 51.37\ldots$ award 1/2 ✓×
7. $93.5 \div 182 = 0.51\ldots$ award 0/2 ××
8. $93.5 \div 18.2 = 5.13\ldots$ award 0/2 ××
9. $93.5 \div 182^2 = 2.8\ldots$ award 0/2 ××

Question			Generic scheme	Illustrative scheme	Max mark
2.			$\bullet^1$ Strategy: know how to calculate percentage increase $\bullet^2$ Strategy: identify power or equivalent $\bullet^3$ Strategy/process: use valid strategy to calculate salary after 3 years $\bullet^4$ Process/communication: round to 3 significant figures	$\bullet^1$ Evidence of 1.017 or equivalent $\bullet^2$ $\ldots^3$ or equivalent $\bullet^3$ 49,332.79…. $\bullet^4$ (£)49,300	**4**

Notes:

1. Correct answer without working. award 0/4
2. $\bullet^3$ can only be awarded for a calculation involving multiplication and a power or equivalent.
3. Candidates using repeated addition must work to a minimum of 4 significant figures, rounded or truncated, to gain $\bullet^3$.
4. Where all calculations are shown, $\bullet^3$ can be implied by $\bullet^4$.

Commonly Observed Responses:

1. $49\,332.79\ldots \rightarrow 49\,300$ with no other working shown — award 4/4 ✓✓✓✓
2. $46\,900 \times 1.017^3 = 49\,300$ with no unrounded answer — award 4/4 ✓✓✓✓
3. $46\,900 \times 1.017^3 = 49\,400$ with no unrounded answer — award 3/4 ✓✓✓×
4. $46\,900 \div 1.017^3 = 44\,587.17\ldots \rightarrow 44\,600$ — award 3/4 ✓✓×✓
5. $46\,900 \times 0.983^3 = 44\,548.53\ldots \rightarrow 44\,500$ — award 3/4 ×✓✓✓
6. $46\,900 \times 1.7^3 = 230\,419.7 \rightarrow 230\,000$ — award 3/4 ×✓✓✓
7. $46\,900 \times 101.7^3 = 4.933\ldots \times 10^{10} \rightarrow 4.93 \times 10^{10}$ — award 3/4 ×✓✓✓
8. $46\,900 + (0.017^3 \times 46\,900) = 46\,900.23\ldots \rightarrow 46\,900$ — award 2/4 ×✓✓×
9. $46\,900 + (0.017 \times 46\,900) \times 3 = 49\,291.9 \rightarrow 49\,300$ — award 2/4 ✓××✓

Question			Generic scheme	Illustrative scheme	Max mark
3.			$\bullet^1$ Process: calculate total number of people	$\bullet^1$ $(20+34+26=)80$	**3**
			$\bullet^2$ Process: calculate any 2 angles	$\bullet^2$ two of 90(white), 153(milk), 117(dark)	
			$\bullet^3$ Communication: draw and label pie chart consistent with previous working	$\bullet^3$ diagram labelled with types of chocolate and consistent with working	

Notes:

1. $\bullet^1$ can be implied by $\bullet^2$.
2. $\bullet^1$ and $\bullet^2$ can be implied by completing the pie chart correctly.
3. Where $\bullet^1$ is not awarded, $\bullet^2$ is only available if the angles calculated are explicitly stated. $\bullet^3$ is not available.
4. $\bullet^3$ is available if any 2 angles are within tolerance $\pm 1°$ leading to third angle being outwith tolerance.
5. $\bullet^3$ is not available if the three calculated angles do not add up to $360°$.

Commonly Observed Responses:

Question			Generic scheme	Illustrative scheme	Max mark
4.	(a)		$\bullet^1$ Strategy/process: calculate amount taxed at 8% $\bullet^2$ Process: calculate National Insurance	$\bullet^1$ $(800-242=)558$ $\bullet^2$ $(558\times 0.08=)(£)44.64$	**2**

Notes:

1. Correct answer without working. award 2/2
2. Where the final answer is not a whole number $\bullet^2$ is only available where final answer is rounded or truncated to 2 decimal places.
3. If 967 or 2% is used in any calculation $\bullet^2$ is not available.
4. If 800 is not used in any calculation. award 0/2
5. Do not penalise candidates who subtract their National Insurance calculation from the annual salary.

Commonly Observed Responses:

1. 92% of $558=513.36\rightarrow 44.64$ award 2/2 ✓✓
2. 92% of $558=513.36$ award 1/2 ✓×
3. 8% of $800=64$ award 1/2 ×✓
4. 8% of $(967-800)=13.36$ award 0/2 ××

	(b)		$\bullet^3$ Process: calculate pension contribution $\bullet^4$ Process: calculate net pay	$\bullet^3$ $(800\times 0.075=)60$ $\bullet^4$ $(800-60-92.06-44.64=)(£)603.30$	**2**

Notes:

1. Correct answer without working. award 2/2
2. $\bullet^3$ is only available for 60 or 740.
3. $\bullet^3$ may be implied by $\bullet^4$.
4. Where final answer is not a whole number $\bullet^4$ is only available where final answer is rounded or truncated to 2 decimal places.
5. $\bullet^4$ must include a subtraction of a calculated National Insurance, 92.06 and a calculated pension from 800.

Commonly Observed Responses:

1. From COR 3 in (a) $800-(60+92.06+64)=583.94$ award 2/2 ✓✓
2. $800-(60+92.06)=647.94$ award 1/2 ✓×

Question			Generic scheme	Illustrative scheme	Max mark
5.	(a)		$\bullet^1$ Process: calculate the volume of the box $\bullet^2$ Strategy: substitute into formula for volume of a sphere $\bullet^3$ Process: calculate the volume of 2 squash balls $\bullet^4$ Process/communication: calculate the remaining space including units	$\bullet^1$ $(8.6\times4.2\times4.2=)151.704$ $\bullet^2$ $\frac{4}{3}\times\pi\times2^3$ $\bullet^3$ 67.02… $\bullet^4$ $(151.704-67.02\ldots=)84.68\ldots\text{cm}^3$	**4**

Notes:

1. Correct answer without working. award 0/4
2. Candidates must state units for $\bullet^4$ to be awarded.
3. $\bullet^3$ is only available for a calculation involving a fraction, a power and π.
4. $\bullet^3$ can be implied by the use of 33.51 twice in $\bullet^4$.
5. Where candidate uses a decimal approximation for $\frac{4}{3}$, this should be correct to at least 2 decimal places.
6. $\bullet^4$ is only available for subtraction involving two different calculated values.
7. Do not penalise candidates who round or truncate to the nearest whole number throughout.
8. Accept use of π to at least 2 decimal places.
9. $\bullet^4$ is not available where the volume of two spheres is greater than the volume of the cuboid.

Commonly Observed Responses:

1. $151.704\rightarrow\frac{4}{3}\times3.14\times2^3\rightarrow66.98\ldots\rightarrow84.71\ldots\text{cm}^3$ award 4/4 ✓✓✓✓
2. $151.704\rightarrow\frac{4}{3}\times\pi\times2^3\rightarrow67.02\ldots\rightarrow\ 84.68\ldots$ award 3/4 ✓✓✓×
3. $151.704\rightarrow\frac{4}{3}\times\pi\times2^2\rightarrow33.51\ldots\rightarrow118.19\ldots\text{cm}^3$ award 3/4 ✓×✓✓
4. $151.704\rightarrow\frac{3}{4}\times\pi\times2^3\rightarrow37.69\ldots\rightarrow114.00\ldots\text{cm}^3$ award 3/4 ✓×✓✓
5. $151.704\rightarrow\frac{4}{3}\times\pi\times4^3\rightarrow536.16\ldots\rightarrow$ any answer award 2/4 ✓×✓×
6. $151.704\rightarrow\frac{4}{3}\times\pi\times2\rightarrow8.37\ldots\rightarrow143.32\ldots\text{cm}^3$ award 2/4 ✓××✓

Question			Generic scheme	Illustrative scheme	Max mark
5.	(b)		•[5] Process: calculate the number of boxes along the length and breadth of the crate for one arrangement •[6] Process: calculate the number of boxes along the length and breadth of the crate for second arrangement •[7] Process/communication: calculate the number of boxes in each arrangement and state maximum	•[5&6] $(100 \div 8.6 =)11 \cdot \ldots$ $(75 \div 4.2 =)17 \cdot \ldots$ $(100 \div 4.2 =)23 \cdot \ldots$ $(75 \div 8.6 =)8 \cdot \ldots$ •[7] $(40 \div 4.2 = 9)$ $(11 \times 17 \times 9 =)1683$ $(23 \times 8 \times 9 =)1656$ Maximum: 1683	**3**

Notes:

1. Correct answer without working. award 0/3
2. Where the candidate only considers volume. award 0/3
3. Where the candidate considers more than 2 distinct arrangements do not award •[6].

Question			Generic scheme	Illustrative scheme	Max mark
5.	**(b)**		**Continued**		

Commonly Observed Responses:

1. $(100 \div 4.2 =) 24$ $(100 \div 8.6 =) 12$
   $(75 \div 8.6 =) 9$ $(75 \div 4.2 =) 18$
   $(40 \div 4.2 = 10)$ $(40 \div 4.2 = 10)$
   2160 2160
   maximum 2160

   award 2/3 ✓✓×

2. $(100 \div 4.2 =) 24$ $(100 \div 8.6 =) 12$
   $(75 \div 4.2 = 18)$ $(75 \div 4.2 = 18)$
   $(40 \div 8.6 =) 5$ $(40 \div 4.2 =) 10$
   2160 2160
   maximum 2160

   award 1/3 ××✓

3. $(100 \div 4.2 = 24)$ $(100 \div 4.2 = 12)$
   $(75 \div 8.6 =) 9$ $(75 \div 4.2 =) 18$
   $(40 \div 4.2 =) 10$ $(40 \div 8.6 =) 5$
   2160 2160
   maximum 2160

   award 1/3 ××✓

4. $(100 \div 4.2 =) 23$
   $(40 \div 8.6 =) 4$
   $(75 \div 4.2 =) 17$
   maximum 1564

   award 1/3 ××✓

Question			Generic scheme	Illustrative scheme	Max mark
5.	(c)	(i)	•[8] Process: calculate mean	•[8] 55	**1**
Notes:					
Commonly Observed Responses:					
		(ii)	Method 1 •[9] Process: calculate $(x-\bar{x})^2$ •[10] Process: calculate $\sum(x-\bar{x})^2$ and substitute into formula •[11] Process: calculate standard deviation	 •[9] 9, 169, 100, 9, 9 •[10] $\sqrt{\frac{296}{5-1}}$ •[11] 8.6…	**3**
			Method 2 •[9] Process: calculate $\sum x$ and $\sum x^2$ •[10] Strategy: substitute into formula •[11] Process: calculate standard deviation	 •[9] 275, 15421 •[10] $\sqrt{\frac{15421-\frac{275^2}{5}}{5-1}}$ •[11] 8.6…	

Notes:

1. Correct answer without working. award 0/3
2. Do not accept rounding or truncating to the nearest whole number for final answer.
3. For •[10] do not penalise a square root sign that does not extend to the denominator.
4. •[11] can only be awarded for a calculation involving at least 2 steps including a division followed by a square root, with the exception of COR 1.

Commonly Observed Responses:

1. $\frac{\sqrt{296}}{4} \rightarrow 4.301\ldots$ award 2/3 ✓×✓
2. $\sqrt{\frac{296}{4}} \rightarrow \sqrt{8.60}\ldots$ award 2/3 ✓✓×
3. $\sqrt{\frac{296}{5}} \rightarrow 7.694\ldots$ award 2/3 ✓×✓
4. $\sqrt{\frac{296}{55-1}} \rightarrow 2.341\ldots$ award 2/3 ✓×✓
5. $\frac{296}{4} \rightarrow 74$ award 1/3 ✓××

Question			Generic scheme	Illustrative scheme	Max mark
5.	(d)		•[12] Communication: comment regarding mean •[13] Communication: comment regarding standard deviation	•[12] eg on average the amateur matches are shorter •[13] eg the length of professional matches is less varied	**2**

Notes:

1. Answer must be consistent with answer to part (c).
2. Comments **must** refer to the context as well as professional and/or amateur.
3. For the award of •[12]
   Accept eg
   a) On average the professional matches last longer.
   b) The average length of match was lower for amateurs.
   c) Professional matches have higher average times.
   d) On average the amateur match was quicker.

   Do not accept eg
   e) On average amateur matches are less.
   f) Professional matches are longer.
   g) On average the **mean** length of amateur matches was less.
   h) On average the length of amateur matches was **better**.

4. For the award of •[13]
   Accept eg
   a) Amateur matches have less consistent times.
   b) The length of the amateur matches were more spread out.
   c) There is less variation in the length of professional matches.
   d) The spread of the length of matches was higher for amateurs.
   e) The minutes in professional matches were more consistent.
   f) The data for times of amateur matches is less consistent.

   Do not accept eg
   g) **"On average"** contained in any statement.
   h) The **numbers** in amateur matches is more varied.
   i) The **standard deviation** in professional matches was more consistent.
   j) The professional matches were more consistent.
   k) The data for amateur matches is less consistent.

Commonly Observed Responses:

Question			Generic scheme	Illustrative scheme	Max mark
6.			$\bullet^1$ Strategy/communication: correct substitution into Pythagoras' theorem	$\bullet^1$ 6^2+9^2	**4**
			$\bullet^2$ Process: calculate hypotenuse	$\bullet^2$ 10.8…	
			$\bullet^3$ Process: calculate arc length	$\bullet^3$ $\left(\frac{1}{2}\times\pi\times 10.8\ldots=\right)16.9\ldots$	
			$\bullet^4$ Process: calculate perimeter	$\bullet^4$ $\left(6+9+16.9\ldots=\right)31.99\left(\text{cm}\right)$	

Notes:

1. Correct answer without working. award 0/4
2. Where the candidate does not use Pythagoras $\bullet^3$ and $\bullet^4$ are still available.
3. Where the candidate does not use πd $\bullet^3$ and $\bullet^4$ are not available.
4. $\bullet^3$ can be implied by $\bullet^4$.
5. $\bullet^4$ is only available for $9+6$ added to a previously calculated arc length.
6. Do not penalise candidates who round or truncate to the nearest whole number throughout.

Commonly Observed Responses:

1. $6^2+9^2\rightarrow 10.8$ rounded to $11\rightarrow 17.27\ldots\rightarrow 32.27\ldots$ award 4/4 ✓✓✓✓
2. $6^2+9^2\rightarrow 10.8\ldots\rightarrow 33.9\ldots\rightarrow 48.9\ldots$ award 3/4 ✓✓×✓
3. $9^2-6^2\rightarrow 6.7\ldots\rightarrow 10.5\ldots\rightarrow 25.5\ldots$ award 3/4 ×✓✓✓
4. $6^2+9^2\rightarrow 10.8\ldots\rightarrow\left(\pi\times 5.4^2\div 2=\right)45.80\ldots\rightarrow$ any answer award 2/4 ✓✓××

Question			Generic scheme	Illustrative scheme	Max mark
7.	(a)		$\bullet^1$ Process: calculate sail time in days	$\bullet^1$ $(180 \div 24 =)\ 7.5$ or 7 days 12 hours	**3**
			$\bullet^2$ Strategy/process: deal with 5 hour time difference	$\bullet^2$ eg $(04:00 + 5\text{hours} =)\ 09:00$ **OR** $(16:00 + 5\text{hours} =)\ 21:00$ **OR** $(7\text{ days }12\text{ hours} - 5\text{hours} =)$ 7 days and 7 hours	
			$\bullet^3$ Process/communication: subtract sail time and state date and time of departure	$\bullet^3$ 21:00 on 10 (November) **OR** 9pm on 10 (November)	

Notes:

1. Correct answer without working. award 3/3
2. $\bullet^2$ is available for a relevant calculation at any point in the question.
3. For $\bullet^3$, "November" does not need to be explicitly stated.
4. $\bullet^3$ is not available where sail time is calculated to be a whole number of days or a time less than 1 day.
5. For $\bullet^3$ accept 09:00pm or 21:00pm.

Commonly Observed Responses:

1. $(180 - 5 =)\ 175 \rightarrow (175 \div 24 =)\ 7.29166\ldots \rightarrow 21:00 \text{ on } 10(\text{November})$ award 3/3 ✓✓✓
2. $(180 - 5 =)\ 175 \rightarrow (175 \div 24 =)\ 7.3 \rightarrow$ any correct answer award 2/3 ✓✓×
3. $7.5 \rightarrow (04:00 - 5 \text{ hours} =)\ 23:00 \rightarrow 11\text{am on } 10\ (\text{November})$ award 2/3 ✓×✓
4. 9:00 on 10(November) with or without working award 2/3 ✓✓×

	(b)		$\bullet^4$ Process: calculate amount of US dollars received	$\bullet^4$ $(1500 \times 1.28 =)\ 1920$	**3**
			$\bullet^5$ Process: calculate remaining US dollars	$\bullet^5$ $(1920 - 130 \times 7 =)\ 1010$	
			$\bullet^6$ Process: calculate exchange rate from US Dollars to Canadian Dollars	$\bullet^6$ $(1363.50 \div 1010 =)\ 1.35$	

Notes:

1. Correct answer without working. award 3/3
2. $\bullet^4$ and $\bullet^5$ can be rounded or truncated to a whole number or any number of decimal places.
3. $\bullet^6$ must be rounded or truncated to a minimum of 2 decimal places.

Question			Generic scheme	Illustrative scheme	Max mark
7.	**(b)**		**Continued**		**2**

Commonly Observed Responses:

1. $1920 \rightarrow (130 \times 7 =) 910 \rightarrow (1363.50 \div 910 =) 1.498...$ award 2/3 ✓×✓
2. $(1500 - 130 \times 7 =) 590 \rightarrow (1363.50 \div 590 =) 2.31$ award 2/3 ×✓✓
3. $1363.50 \div 1.28$ award 0/3 ×××

Question			Generic scheme	Illustrative scheme	Max mark
8.			•[1] Process: calculate scale distances •[2] Process/communication: measure correct bearing from start •[3] Process/communication: draw correct length from start, measure correct bearing, and draw correct length from first location	•[1] 4 (cm) and 3.2 (cm) •[2] Bearing of 335° (±1°) measured correctly from start point •[3] 4 cm (±0.1 cm) drawn and a bearing of 030° (±1°) measured and 3.2 cm (±0.1 cm) drawn	**3**

Notes:

1. •[1] can be implied by drawing 2 lines of the correct length.
2. Candidates who draw 2 lines from the start point can receive a maximum mark of 2/3.
3. Bearing for both legs must be $\pm 1°$ relative to the original North line.

Commonly Observed Responses:

1. 4cm line with bearing of $335°$ and 3.2cm line with bearing of $030°$ both drawn from start point award 2/3 ✓✓×

Question			Generic scheme	Illustrative scheme	Max mark
9.	(a)		•[1] Process: calculate tolerance •[2] Process/communication: calculate upper limit and state conclusion consistent with working	•[1] $(0.05\% \text{ of } 800 =) 0.4$ •[2] 800.4, no	**2**

Notes:

1. For award of •[2] lower limit is not required.
2. •[2] is still available where candidate has calculated lower limit incorrectly.

Commonly Observed Responses:

1. When no working is shown
   - 800.4, no — award 2/2 ✓✓
   - no — award 0/2 ××
2. 800.05, no — award 1/2 ×✓
3. 840, yes — award 1/2 ×✓
4. 804, yes — award 1/2 ×✓

Question			Generic scheme	Illustrative scheme	Max mark
9.	(b)		**Method 1** •^{3} Process: calculate unit price for option A or B •^{4} Process/communication: calculate other unit price and state conclusion consistent with working	•^{3} (1 litre =) 1.25 or equivalent **OR** (1 litre =) 1.178… or equivalent •^{4} (1 litre =) 1.178… or equivalent, **OR** (1 litre =) 1.25 or equivalent, option B	**2**
			Method 2 •^{3} Process: calculate number of ml for option A or B •^{4} Process/communication: calculate number of ml for other option and state conclusion consistent with working	•^{3} (£1=) 800 or equivalent **OR** (£1=) 848… or equivalent •^{4} (£1=) 848… or equivalent, **OR** (£1=) 800 or equivalent, option B	
			Method 3 •^{3} Process: calculate scaling •^{4} Process/communication: calculate equivalent price for other option and state conclusion consistent with working	•^{3} $(6000 \div 3300 =) 1.8\ldots$ **OR** $(3300 \div 6000 =) 0.55$ •^{4} $(£) 7.0 (72\ldots)$ **OR** $(£) 4 (.125)$, option B	

Notes:

1. Correct answer without working. award 0/2
2. Where a candidate uses an incorrect method •^{4} is only available if all calculations are carried out correctly and conclusion is consistent with working. See CORs 1, 2 and 3.

Commonly Observed Responses:

1. $6000 \times 7.50 = 45000$ and $3300 \times 3.89 = 12837$, option B — award 1/2 ×✓
2. $7.50 \div 250 = 0.03$ and $3.89 \div 330 = 0.01\ldots$, option B — award 1/2 ×✓
3. $7.50 \div 24 = 0.3125$ and $3.89 \div 10 = 0.389$, option A — award 1/2 ×✓

Question			Generic scheme	Illustrative scheme	Max mark
9.	(c)		$\bullet^5$ Process: calculate time taken for 8 workers $\bullet^6$ Process/communication: calculate time taken in hours and minutes	$\bullet^5$ $(6\times5\div8=)3.75$ $\bullet^6$ 3hours 45minutes	**2**

Notes:

1. Correct answer without working. award 2/2
2. For candidates who round or truncate $\bullet^6$ is not available.
3. Where a candidate calculates a whole number of hours $\bullet^6$ is not available.

Commonly Observed Responses:

1. $(5\div8=)0.625, (5-0.625-0.625=)3.75 (30\div8=)3.75 \rightarrow$ 3 hours and 45 minutes award 2/2 ✓✓
2. $5\div6\times8=6.66\ldots\rightarrow$ 6 hours and 40 minutes award 1/2 ×✓
3. $6\div5\times8=9.6\rightarrow$ 9 hours and 36 minutes award 1/2 ×✓

	(d)		**Method 1** $\bullet^7$ Process: calculate overtime pay $\bullet^8$ Process: calculate gross pay	 $\bullet^7$ $(4.5\times2\times10.60=)95.4$ $\bullet^8$ $(35\times10.6+95.4=)(£)466.40$	**2**
			Method 2 $\bullet^7$ Process: calculate number of hours worked $\bullet^8$ Process: calculate gross pay	 $\bullet^7$ $(35+2\times4.5=)44$ $\bullet^8$ $(44\times10.6=)(£)466.40$	

Notes:

1. Correct answer without working. award 2/2
2. Where answer is not a whole number $\bullet^8$ is only available where final answer is rounded or truncated to 2 decimal places.
3. In method 1, $\bullet^8$ is only available for adding overtime to 371.

Commonly Observed Responses:

1. $(4.5\times10.6\times1.5=)71.55\rightarrow442.55$ award 1/2 ×✓
2. $(39.5\times10.6\times2=)837.40\rightarrow1208.40$ award 1/2 ×✓
3. $(39.5\times10.6\times2=)837.40$ award 0/2 ××
4. 418.70 with or without working award 0/2 ××
5. $371+4.5=375.50$ award 0/2 ××

Question			Generic scheme	Illustrative scheme	Max mark
10.	(a)		**Method 1** •[1] Process: convert miles into kilometres •[2] Process: convert minutes into hours •[3] Process: calculate speed in kilometres per hour	•[1] $(3.4\times1.609=)5.4706$ •[2] $(33\div60=)0.55$ •[3] $(5.4706\div0.55=)9.946...$	**3**
			Method 2 •[1] Process: calculate speed in miles per minute •[2] Process: convert speed into kilometres per minute •[3] Process: convert speed into kilometres per hour	•[1] $(3.4\div33=)0.103...$ •[2] $(0.103...\times1.609=)0.165...$ •[3] $(0.165...\times60=)9.946...$	

Notes:

1. Correct answer without working. award 0/3
2. Do not penalise candidates who round or truncate to at least 2 significant figures throughout.

Commonly Observed Responses:

1. $3.4\times1.609\times60\div33=9.94...$ award 3/3 ✓✓✓
2. $3.4\times1.609=5.5\rightarrow33\div60=0.55\rightarrow5.5\div0.55=10$ award 3/3 ✓✓✓
3. $3.4\div1.609=2.11\rightarrow33\div60=0.55\rightarrow2.11\div0.55=3.84$ award 2/3 ×✓✓
4. $3.4\times1.609=5.4706\rightarrow5.4706\div33=0.165...$ award 2/3 ✓×✓
5. $\dfrac{3.4\times1.609}{(33\times60=)1980}=0.00276...$ award 2/3 ✓×✓
6. $3.4\div0.33=10.303...$ award 1/3 ××✓

Question			Generic scheme	Illustrative scheme	Max mark
10.	(b)		•[4] Process: calculate vertical distance •[5] Process/communication: state gradient •[6] Process/communication: express gradient as a decimal and state conclusion consistent with working	•[4] $(71-48=)23$ •[5] $\frac{23}{250}$ •[6] 0.09…, no	**3**

Notes:

1. For any gradient greater than 1, •[6] is not available.

Commonly Observed Responses:

1. $\frac{23}{250} \rightarrow 0.1,$ no — award 3/3 ✓✓✓
2. $\frac{71}{250} \rightarrow 0.284,$ yes — award 2/3 ×✓✓
3. $\frac{48}{250} \rightarrow 0.192,$ yes — award 2/3 ×✓✓
4. $\frac{(48+71=)119}{250} \rightarrow 0.476,$ yes — award 2/3 ×✓✓
5. $\frac{250}{23} \rightarrow 10.86\ldots,$ yes — award 1/3 ✓××

	(c)		•[7] Process: calculate the increase •[8] Process: calculate percentage increase	•[7] $(7.2-5.6=)1.6$ •[8] $\left(\frac{1.6}{5.6}\times 100=\right)28.57\ldots(\%)$	**2**

Notes:

1. Correct answer without working. — award 2/2
2. Accept answers rounded or truncated to at least 2 significant figures.
3. With the exception of the correct answer and listed CORs, •[8] is only available for a calculation of the form $\frac{\text{calculated increase}}{5.6}\times 100.$
4. For •[8] multiplication by 100 can be implied by the answer.

Question			Generic scheme	Illustrative scheme	Max mark
10.	(c)		**Continued**		**2**

Commonly Observed Responses:

1. $\left(\frac{7.2}{5.6}\times 100\right)-100=28\cdot\ldots$ award 2/2 ✓✓
2. $\left(\frac{7.2}{5.6}\times 100\right)=128\cdot\ldots$ award 1/2 ×✓
3. $\left(\frac{1.6}{7.2}\times 100\right)$ or $100-\left(\frac{5.6}{7.2}\times 100\right)\rightarrow 22.2\ldots$ award 1/2 ✓×
4. $\left(\frac{5.6}{7.2}\times 100\right)=77.7\ldots$ award 0/2 ××

[END OF MARKING INSTRUCTIONS]