National Qualifications 2024

2024 Mathematics

National 5 – Paper 1

Question Paper Finalised Marking Instructions

Marking Instructions for each question

Question	Generic scheme	Illustrative scheme	Max mark
1.	$\bullet^1$ identify common denominator	$\bullet^1$ $3\frac{\cdots}{12}-1\frac{\cdots}{12}$ or $\frac{\cdots}{12}-\frac{\cdots}{12}$	**2**
	$\bullet^2$ consistent answer	$\bullet^2$ $2\frac{5}{12}$ or $\frac{29}{12}$	

Notes:

1. Correct answer without working   award 0/2

2. Do not penalise incorrect conversion of $\frac{29}{12}$ to a mixed number.

3. Treat $2\left(\frac{8}{12}-\frac{3}{12}\right)=2\left(\frac{5}{12}\right)$ as bad form   award 2/2

   However, see COR 2.

Commonly Observed Responses:

1. $\frac{11}{3}\times\frac{5}{4}=\frac{55}{12}$ award 0/2

2. $2\left(\frac{8}{12}-\frac{3}{12}\right)=2\left(\frac{5}{12}\right)=\frac{10}{12}=\frac{5}{6}$ award 1/2 ✓✗

Question			Generic scheme	Illustrative scheme	Max mark
2.			•¹ substitute into $f(x)$ •² evaluate $f(x)$	•¹ $(7+3)^2$ or equivalent •² 100	**2**

Notes:

1. Correct answer without working   award 2/2

2. For subsequent incorrect working •² is not available.

   eg $f(7) = (7+3)^2 \rightarrow f(7) = 100 \rightarrow f = \dfrac{100}{7}$ award 1/2 ✓✗

Commonly Observed Responses:

1. $(7+3)(7+3) = 49 + 21 + 21 + 9 = 100$ award 2/2

2. $(7+3)^2 = 49 + 9 = 58$ (no working necessary)   award 1/2 ✓✗

3. $(7+3)(7-3) = 40$ award 1/2 ✗✓1

4. (a) $7 + 3^2 = 100$ (bad form)   award 2/2
   (b) $7 + 3^2 = 16$ award 0/2

5. (a) $7 = (7+3)^2 \rightarrow 7 = 100$ award 2/2

   (b) $7 = (7+3)^2 \rightarrow 7 = 100 \rightarrow 93$ award 1/2 ✓✗

   (c) $7 = (7+3)^2 \rightarrow 7 = 100 \rightarrow \dfrac{100}{7}$ award 1/2 ✓✗

Question			Generic scheme	Illustrative scheme	Max mark
3.			$\bullet^1$ start to expand	$\bullet^1$ evidence of any 3 correct terms eg $x^3 - 4x^2 + 5x \ldots$	**3**
			$\bullet^2$ complete expansion	$\bullet^2$ $x^3 - 4x^2 + 5x + x^2 - 4x + 5$	
			$\bullet^3$ collect like terms (see Note 3)	$\bullet^3$ $x^3 - 3x^2 + x + 5$	

Notes:

1. Correct answer without working   award 3/3

2. Accept:
   (a) $x^3 - 3x^2 + 1x + 5$ award 3/3
   (b) $x^3 + -3x^2 + 1x + 5$ award 3/3

3. For the award of $\bullet^3$ the evidence at $\bullet^2$ must include a term in x^3. At least one negative term must be collected with another term.

4. Evidence for $\bullet^1$ and $\bullet^2$ may appear in a grid.

5. For subsequent incorrect working, $\bullet^3$ is not available.

Commonly Observed Responses:

Question	Generic scheme	Illustrative scheme	Max mark
4.	$\bullet^1$ calculate $3\mathbf{a}$ $\bullet^2$ solution	$\bullet^1$ $\begin{pmatrix} 9 \\ 12 \\ -3 \end{pmatrix}$ $\bullet^2$ $\begin{pmatrix} 14 \\ 15 \\ -1 \end{pmatrix}$	2

Notes:

1. Correct answer without working   award 2/2

2. Do not award $\bullet^2$ if
    (a) brackets are omitted from the answer
       (omission of brackets should only be penalised once in Qu4, or Qu12(b) or Q12 (c))
    (b) the answer is given in coordinate form.

3. For subsequent invalid working $\bullet^2$ is not available.

    eg (a) $\begin{pmatrix} 14 \\ 15 \\ -1 \end{pmatrix} \to 14+15-1 = 28$ award 1/2 ✓✗

      (b) $\begin{pmatrix} 14 \\ 15 \\ -1 \end{pmatrix} \to \sqrt{14^2 + 15^2 + (-1)^2} = \sqrt{422}$ award 1/2 ✓✗

Commonly Observed Responses:

1. $\begin{pmatrix} 9 \\ 12 \\ 3 \end{pmatrix} + \begin{pmatrix} 5 \\ 3 \\ 2 \end{pmatrix} = \begin{pmatrix} 14 \\ 15 \\ 5 \end{pmatrix}$ award 1/2 ✗✓1

2. (a) $\begin{pmatrix} 3 \\ 4 \\ -1 \end{pmatrix} + \begin{pmatrix} 5 \\ 3 \\ 2 \end{pmatrix} = \begin{pmatrix} 8 \\ 7 \\ 1 \end{pmatrix} \to \begin{pmatrix} 24 \\ 21 \\ 3 \end{pmatrix} \quad [3(\mathbf{a}+\mathbf{b})]$ award 1/2 ✗✓1

   (b) $\begin{pmatrix} 9 \\ 12 \\ -3 \end{pmatrix} + \begin{pmatrix} 15 \\ 9 \\ 6 \end{pmatrix} = \begin{pmatrix} 24 \\ 21 \\ 3 \end{pmatrix} \quad [3\mathbf{a}+3\mathbf{b}]$ award 1/2 ✓✗

3. $\begin{pmatrix} 3 \\ 4 \\ -1 \end{pmatrix} + \begin{pmatrix} 5 \\ 3 \\ 2 \end{pmatrix} = \begin{pmatrix} 8 \\ 7 \\ 1 \end{pmatrix} \quad [\mathbf{a}+\mathbf{b}]$ award 0/2

Question			Generic scheme	Illustrative scheme	Max mark
5.	(a)		$\bullet^1$ correct median	$\bullet^1$ 200	**3**
			$\bullet^2$ find quartiles	$\bullet^2$ 160, 230	
			$\bullet^3$ calculate IQR	$\bullet^3$ 70	

Notes:

1. (a) Correct median without working award $\bullet^1$.
   (b) Correct IQR without working, do not award $\bullet^2$ or $\bullet^3$.

2. Accept quartiles indicated in the list or on a diagram for $\bullet^2$.

3. Where a candidate calculates the range, award marks as follows:
   (a) median = 200, quartiles = 160 and 230, IQR = $240 - 155 = 85$ award 2/3 ✓✓✗
   (b) median = 200, Q_1 = 155 and Q_3 = 240 (**clearly** labelled as Q_1 and Q_3)
       $\rightarrow$ IQR = $240 - 155 = 85$ award 2/3 ✓✗✓1
   (c) median = 200, IQR = $240 - 155 = 85$ award 1/3 ✓✗✗

4. Where a candidate has calculated SIQR = 35, $\bullet^3$ can only be awarded where the candidate has **explicitly** stated "IQR = 70" eg
   (a) median = 200, quartiles = 160 and 230, **IQR = 70**, SIQR = 35   award 3/3
   (b) median = 200, quartiles = 160 and 230 $\rightarrow$ (IQR =) 35   award 2/3 ✓✓✗

5. Where a candidate has calculated the IQR, but stated SIQR = 70, $\bullet^3$ is available
   eg median = 200, quartiles = 160 and 230, **SIQR = 70**   award 3/3

Commonly Observed Responses:
1. median = 200, IQR = $235 - 157.5 = 77.5(0)$ award 2/3 ✓✗✓1

	Question		Generic scheme	Illustrative scheme	Max mark
5.	(b)		•[4] valid comment comparing medians •[5] valid comment comparing IQRs	•[4] On average, the prices are lower on the website. •[5] The prices in the shop are more consistent.	**2**

Notes:

1. Answers must be consistent with answers to part (a).

2. Comments must clearly distinguish between the **prices** in the **shop** and on the **website** (or equivalent). Accept **"on display"** as evidence of the shop.
   (a) Accept eg On average the **prices** on the **website** are lower and less consistent.
   (b) Do not accept eg On average the prices are lower and less consistent.

3. For the award of •[4]
   (a) Accept eg
      • On average the **prices** in the shop are more.
   (b) Do not accept eg
      • The **median** price in the shop is higher.
      • The **prices** on the website are less (this implies that all prices are less).
      • On average the **results/scores/data** in the shop are more.

4. For the award of •[5]
   (a) Accept eg
      • The **spread** of prices is **more** on the **website**.
      • The prices in the **shop** are **less varied**.
   (b) Do not accept eg
      • The **IQR** in the shop is less.
      • The **range** of prices on the website is more.
      • **On average** the prices on the website are more varied.
      • The **IQR of the prices** in the shop is more consistent.
      • The **results/scores/data** in the shop are more consistent.

5. Numbers are not required for marks •[4] and •[5]. However, where they appear they must be consistent with the statement.

   eg (i) for answers in parts (a) and (b) award as follows:
       (a) median = 200, IQR = 230 − 160 = 70   award 3/3
       (b) On average the prices are lower on the website as 70 < 73.
           The prices in the shop are more consistent as 200 > 195.   award 0/2 **✗✗**

      (ii) for answers in parts (a) and (b) award as follows:
       (a) median = 200, IQR = 230 − 160 = 70   award 3/3
       (b) On average the prices are lower on the website as 200 < 195.
           The prices in the shop are more consistent as 70 > 73.   award 0/2 **✗✗**

Commonly Observed Responses:

For answers in parts (a) and (b) award as follows:
1. (a) median = 200, IQR = 230 − 160 = 70   award 3/3
   (b) On average the prices in the **second shop** were lower
       The prices in the **first shop** were less varied   award 0/2 **✗✗**

Question			Generic scheme	Illustrative scheme	Max mark
6.			$\bullet^1$ simplify surd	$\bullet^1$ $5\sqrt{3}$	**2**
			$\bullet^2$ complete simplification	$\bullet^2$ $4\sqrt{3}$	

Notes:

1. Correct answer without working   award 0/2

2. For subsequent incorrect working $\bullet^2$ is not available.

Commonly Observed Responses:

1. (a) $5\sqrt{3} - \sqrt{3} = 5$ award 1/2 ✓✗
   (b) $\sqrt{25}\sqrt{3} - \sqrt{3} = \sqrt{25} = 5$ award 0/2

2. (a) $\sqrt{72} = 6\sqrt{2}$ award 1/2 ✓1✗
   (b) $\sqrt{72} = 3\sqrt{8}$ award 0/2

Question	Generic scheme	Illustrative scheme	Max mark
7.	**Method 1** $\bullet^1$ correct scaling $\bullet^2$ value for p $\bullet^3$ value for r **Method 2** $\bullet^1$ correct scaling $\bullet^2$ value for r $\bullet^3$ value for p	**Method 1** $\bullet^1$ $\quad 4p - 14r = 22$ $\quad\quad 21p + 14r = 28$ $\bullet^2$ $\quad p = 2$ $\bullet^3$ $\quad r = -1$ **Method 2** $\bullet^1$ $\quad 6p - 21r = 33$ $\quad\quad 6p + 4r = 8$ $\bullet^2$ $\quad r = -1$ $\bullet^3$ $\quad p = 2$	3

Notes:

1. Correct answers without working $\hspace{6cm}$ award 0/3

2. For a solution obtained by repeated substitution $\hspace{3cm}$ award 0/3

3. Following an earlier error
   (a) accept rounded answers given to at least 1 decimal place.
   (b) for $\bullet^3$ do not penalise incorrect conversion of a fraction to a mixed number or decimal.

4. Where candidate uses separate scaling to obtain each variable, award $\bullet^1$ if either is correct.
   See CORs 1 to 4.

Commonly Observed Responses:

1. $\quad 4p - 14r = \mathbf{20}$ (incorrect scaling) $\hspace{1.5cm}$ $6p - 21r = 33$ (correct scaling)
   $\quad 21p + 14r = 28$ $\hspace{4.5cm}$ $6p + 4r = 8 \quad \bullet^1$ ✓

   $\hspace{2cm} p = \dfrac{48}{25} \quad \bullet^3$ ✗ $\hspace{3cm} r = -1 \quad \bullet^2$ ✓ $\hspace{2cm}$ award 2/3 ✓✓✗

2. $4p - 14r = \mathbf{20}$ (incorrect scaling) $\hspace{1.5cm}$ $6p - 21r = 33$ (correct scaling)
   $\quad 21p + 14r = 28$ $\hspace{4.5cm}$ $6p + 4r = 8 \quad \bullet^1$ ✓

   $\hspace{2cm} p = \dfrac{8}{17} \quad \bullet^3$ ✗ $\hspace{3cm} r = -1 \quad \bullet^2$ ✓ $\hspace{2cm}$ award 2/3 ✓✓✗

3. $4p - 14r = \mathbf{20}$ (incorrect scaling) $\hspace{1.5cm}$ $6p - 21r = 33$ (correct scaling)
   $\quad 21p + 14r = 28$ $\hspace{4.5cm}$ $6p + 4r = 8 \quad \bullet^1$ ✓

   $\hspace{2cm} p = \dfrac{48}{25} \quad \bullet^3$ ✗ $\hspace{3cm} r = -\dfrac{41}{17} \quad \bullet^2$ ✗ $\hspace{1.5cm}$ award 1/3 ✓✗✗

4. $4p - 14r = \mathbf{20}$ (incorrect scaling) $\hspace{1.5cm}$ $6p - 21r = 33$ (incorrect scaling)
   $\quad 21p + 14r = 28$ $\hspace{4.5cm}$ $6p - 4r = 8 \quad \bullet^1$ ✗

   $\hspace{2cm} p = \dfrac{8}{17} \quad \bullet^3$ ✗ $\hspace{3cm} r = -\dfrac{25}{17} \quad \bullet^2$ ✓¹ $\hspace{1.5cm}$ award 1/3 ✗✓¹✗

Question			Generic scheme	Illustrative scheme	Max mark
8.	(a)		$\bullet^1$ state value of a	$\bullet^1$ 7	**1**

Notes:

1. For $y = 7\cos\ldots x$ award 1/1 ✓

2. For 7, –7   award 0/1 ✗

Commonly Observed Responses:

	(b)		$\bullet^2$ state value of b	$\bullet^2$ 2	**1**

Notes:

1. For $y = \ldots \cos 2x$ award 1/1 ✓

2. For $a = 2$ in (a) and $b = 7$ in (b)   award 0/1 in (a) ✗ and award 1/1 in (b) ✓1

Commonly Observed Responses:

Question			Generic scheme	Illustrative scheme	Max mark
9.	(a)		**Method 1** $\bullet^1$ find gradient $\bullet^2$ substitute gradient and a point into $y - b = m(x - a)$ $\bullet^3$ state equation in terms of D and T in simplest form (remove brackets and collect constants) **Method 2** $\bullet^1$ find gradient $\bullet^2$ substitute gradient and a point into $y = mx + c$ $\bullet^3$ state equation in terms of D and T in simplest form (remove brackets and collect constants)	$\bullet^1$ -2 $\bullet^2$ $y - 26 = -2(x-3)$ or $\quad\ y - 12 = -2(x - 10)$ $\bullet^3$ $D = -2T + 32$ or equivalent $\bullet^1$ -2 $\bullet^2$ $26 = -2 \times 3 + c$ or $\quad\ 12 = -2 \times 10 + c$ $\bullet^3$ $D = -2T + 32$ or equivalent	3

Notes:

1. Correct answer without working   award 0/3

2. (a) For the award of $\bullet^1$ accept $-\dfrac{14}{7}$. However see Note 3(a).

    (b) BEWARE $\bullet^1$ is not available for $\dfrac{26 - 12}{3 - 10} = \dfrac{-14}{7} = -2$ or $\dfrac{12 - 26}{10 - 3} = \dfrac{14}{-7} = -2$

3. For an incorrect simplification of a gradient, a mark is not awarded at the point where the error occurs eg

    (a) $-\dfrac{14}{7} = 2 \rightarrow 26 = 2 \times 3 + c \rightarrow D = 2T + 20$ award 2/3 ✗✓1✓1

    (b) $-\dfrac{14}{7} \rightarrow 26 = 2 \times 3 + c \rightarrow D = 2T + 20$ award 2/3 ✓✗✓1

    (c) $-\dfrac{14}{7} \rightarrow 26 = -\dfrac{14}{7} \times 3 + c \rightarrow D = 2T + 20$ award 2/3 ✓✓✗

Commonly Observed Responses:

Working must be shown
1. $y = -2x + 32$ award 2/3 ✓✓✓2

2. $D = -\dfrac{2}{1}T + 32$ award 2/3 ✓✓✓2

3. $-\dfrac{7}{14} \rightarrow y - 26 = -\dfrac{7}{14}(x - 3) \rightarrow D = -\dfrac{1}{2}T + 27.5$ award 2/3 ✗✓1✓1

4. $\dfrac{7}{14} \rightarrow y - 26 = \dfrac{7}{14}(x - 3) \rightarrow D = \dfrac{1}{2}T + 24.5$ award 2/3 ✗✓1✓1

Question			Generic scheme	Illustrative scheme	Max mark
9.	(b)		$\bullet^4$ calculate distance remaining	$\underline{\bullet^4}$ 18 (km)	**1**

Notes:

1. Consistent answer without working   award 1/1

2. $\underline{\bullet^4}$ is not available if the gradient is ± 1.

Commonly Observed Responses:

No working necessary
1. $D = 2T - 8$ in part (a) leading to $2 \times 7 - 8 = 6$ (km)   award 1/1✓**1**

2. (a) $D = -2T - 8$ in part (a) leading to $-2 \times 7 - 8 = -22$ (km)   award 1/1✓**1**
   (b) $D = -2T - 8$ in part (a) leading to $-2 \times 7 - 8 = -22 \rightarrow 22$ (km)   award 1/1✓**1**
   (c) $D = -2T - 8$ in part (a) leading to $-2 \times 7 - 8 = 22$ (km)   award 0/1 ✗

Question	Generic scheme	Illustrative scheme	Max mark
10.	•¹ calculate size of angle OFD	•¹ 55	**3**
	•² calculate size of angle BOD or FED	•² BOD = 110 or FED = 20	
	•³ calculate size of angle BCD	•³ 70	

Notes:

1. Correct answer without working   award 0/3

2. Degree signs are not required

3. Full marks may be awarded for information marked on the diagram.

4. For the award of •² accept BAG = 20

5. Where information is not marked on the diagram then working must clearly attach calculations to **named** angles. The final answer must be **clearly** indicated.

6. Where a candidate marks an answer on the diagram but then writes a different answer outwith the diagram, award marks for the angles indicated on the diagram.

7. Disregard incorrect angles which are not on the valid pathway followed by the candidate.

8. For the award of •³ BCD must be less than 90.

9. Where angle BOD is assumed, •³ is not available.
   eg BOD = 140 → BCD = 40   award 0/3

Commonly Observed Responses:

1. OFD = 55 → FOD = 55 → BOD = 125 → BCD = 55   award 2/3   ✓×✓1

2. OFD = 55 → FOD (= FDO) = 62.5 → BOD = 117.5 → BCD = 62.5   award 2/3   ✓×✓1

3. (a) OFD = FDO = FOD = 60 → BOD = 120 → BCD = 60   award 1/3   ×✓2✓1
   (b) OFD = FDO = FOD = 60 → FED = 30 → BCD = 60   award 1/3   ×✓2✓1

4. (a) FDE = 27.5 → FDO = OFD = 62.5 → BOD = 125 → BCD = 55   award 2/3   ×✓1✓1
   (b) OFD = 55, FDE = 27.5 → FDO = 62.5 → BOD = 125 → BCD = 55   award 2/3   ✓×✓1

5. (a) FED = 27.5 → BCD = 62.5   award 1/3   ××✓1
   (b) OFD = 55, FED = 27.5 → BCD = 62.5   award 2/3   ✓×✓1

Question			Generic scheme	Illustrative scheme	Max mark
11.			$\bullet^1$ isolate term in y or divide throughout by 4	$\bullet^1$ eg $4y = -x + 24$ or $x - 24 = -4y$ or $\dfrac{1}{4}x + y - \dfrac{24}{4} = 0$	2
			$\bullet^2$ state gradient explicitly	$\bullet^2$ $-\dfrac{1}{4}$ or -0.25	

Notes:

1. Correct answer without working award 2/2

2. For the award of $\bullet^2$:

   (a) accept $\dfrac{-1}{4}$ or $\dfrac{1}{-4}$

   (b) do **not** accept $x = -\dfrac{1}{4}$ or $y = -\dfrac{1}{4}$

   (c) do not penalise incorrect or no simplification of constant term

      eg (i) $4y = -x + 24 \rightarrow y = -\dfrac{1}{4}x + 8 \rightarrow -\dfrac{1}{4}$ award 2/2

        (ii) $4y = -x + 24 \rightarrow y = -\dfrac{1}{4}x + 24 \rightarrow -\dfrac{1}{4}$ award 2/2

3. Where gradient formula is used with two points which
   (a) lie on the line $x + 4y - 24 = 0$,
      (i)   award $\bullet^1$ for correct substitution into gradient formula.
      (ii)   award $\bullet^2$ for correct calculation of gradient.
   (b) do not lie on the line $x + 4y - 24 = 0$ award 0/2

Commonly Observed Responses:

1. $-\dfrac{1}{4}x$ or $-0.25x$ award 1/2 ✓✗

Question			Generic scheme	Illustrative scheme	Max mark
12.	(a)		$\bullet^1$ correct bracket with square	$\bullet^1$ $(x-3)^2 \ldots$	**2**
			$\bullet^2$ complete process consistently	$\bullet^2$ $(x-3)^2 - 1$	

Notes:

1. Correct answer without working   award 2/2

2. Answer for $\bullet^2$ must be consistent with $\bullet^1$

  eg (a) $(x+3)^2 - 1$ award 1/2 ✗✓1

   (b) $(x \pm 6)^2 - 28$ award 1/2 ✗✓1

   (c) $(x \pm 6)^2 - 1$ award 0/2

Commonly Observed Responses:

No working necessary.

1. Award 2/2 for   (a) $(x-3)^2 + -1$ or $(x-3)^2 + (-1)$

             (b) $(x-3)(x-3) - 1$

2. Award 1/2 ✗✓1 for   (a) $(x^2 \pm 3) - 1$

             (b) $(x^2 \pm 3)^2 - 1$

             (c) $(x \pm 3x)^2 - 1$

             (d) $(x^2 \pm 3x)^2 - 1$

| | (b) | | $\bullet^3$ state coordinates of turning point | $\bullet^3 (3, -1)$ | **1** |

Notes:

1. Answer must be consistent with (a) unless candidate uses method in note 2.

2. Accept correct answer obtained by factorising, finding roots and using symmetry.
   ie $x^2 - 6x + 8 = 0 \rightarrow (x-2)(x-4) = 0 \rightarrow x = 2, 4 \rightarrow x = 3$ (x coordinate of turning point) $\rightarrow y = -1$

3. Coordinates of turning point may appear on diagram or **clearly** labelled in part (c).

4. Accept $x = 3, y = -1$.

5. $\bullet^3$ is not available where brackets are omitted, unless answer is in the form shown in note 4 or omission of brackets has already been penalised in Qu4.

Commonly Observed Responses:

Question			Generic scheme	Illustrative scheme	Max mark
12.	(c)		$\bullet^4$ find x coordinate	$\bullet^4$ $(6,...)$	2
			$\bullet^5$ find y coordinate	$\bullet^5$ $(...,8)$	

Notes:

1. Correct answer or answer consistent with part (b) without working   award 2/2

2. Do not award $\bullet^4$ if:
   (a) the x-coordinate in (b) and (c) are the same. However, see Note 3.
   (b) the x-coordinate is less than the x-coordinate of the turning point.

3. For the award of $\bullet^4$ answer must be consistent with part (b) unless there is evidence of an alternative valid strategy in part (c)
   eg finding roots and using symmetry: $x^2 - 6x + 8 = 0 \rightarrow (x-2)(x-4) = 0 \rightarrow x = 2, 4 \rightarrow x_Q = 6$

4. Do not award $\bullet^5$ if the y-coordinate in (b) and (c) are the same unless there is evidence of an alternative valid strategy in part (c)
   eg $y_Q = 0^2 - 6 \times 0 + 8 = 8$

5. $\bullet^5$ is not available where brackets are omitted, unless answer is in the form shown in note 6 or omission of brackets has already been penalised in Qu4 or Qu12(b).

6. Accept answer in the form $x = ..., y = ...$

7. Coordinates of Q may appear on diagram.

Commonly Observed Responses:

1. $(8, 6)$ (coordinates in wrong order but consistent with part (b))   award 1/2 ✗✓1

2. For answers in parts (a), (b) and (c) award as follows:
   (a) $(x-3)^2 - 1$ award 2/2 ✓✓
   (b) $(6, 8)$ award 0/1 ✗
   (c) $(12, 8)$ in part (c) (no working)   award 1/2 ✓1✗

3. For answers in parts (a), (b) and (c) award as follows:
   (a) $(x-6)^2 - 28$ award 1/2 ✗✓1
   (b) $(6, 8)$ award 0/1 ✗
   (c) $(12, 80)$ in part (c) (no working)   award 2/2 ✓1✓1

4. For answers in parts (a), (b) and (c) award as follows:
   (a) $(x-6)^2 + 8$ award 0/2 ✗✗
   (b) $(6, 8)$ award 1/1 ✓1
   (c) $y_Q = 0^2 - 6 \times 0 + 8 = 8 \rightarrow (6, 8)$ award 1/2 ✗✓

Question	Generic scheme	Illustrative scheme	Max mark
13.	$\bullet^1$ apply $x \times x^{\frac{m}{n}}$ or $x \times x^{-1}$ $\bullet^2$ apply $x \times x^{\frac{m}{n}}$ **and** $x \times x^{-1}$ **and** simplify	$\bullet^1$ $x^{\frac{3}{2}}\ldots$ or $\ldots + x^0$ (or $\ldots + 1$) $\bullet^2$ $x^{\frac{3}{2}} + 1$	2

Notes:

1. Correct answer without working   award 2/2

2. Accept $x^{1\frac{1}{2}} + 1$ or $x^{1.5} + 1$ as bad form.

3. Accept $\sqrt{x^3} + 1$.

4. (a) For subsequent incorrect working $\bullet^2$ is not available.

    eg $x^{\frac{3}{2}} + 1 = 2x^{\frac{3}{2}}$ award 1/2 ✔✗

  (b) However, do **not** penalise $x^{\frac{3}{2}} + 1 = \sqrt[3]{x^2} + 1$ award 2/2

5. Where terms in the brackets have been reduced to one term, $\bullet^1$ is not available for subsequently applying the rule $x \times x^{\frac{m}{n}}$.

    eg $x\left(x^{-\frac{1}{2}}\right) = x^{\frac{1}{2}}$ award 0/2

Commonly Observed Responses:

1. $x^{\frac{3}{2}} + x^0$ award 1/2 ✔✔2

2. $x^{\frac{3}{2}} + x = \sqrt[3]{x^2} + x$ award 1/2 ✔✗

3. $x\left(x^{-2}\right) = x^{-1}$ award 0/2

Question	Generic scheme	Illustrative scheme	Max mark
14.	$\bullet^1$ valid scale factor $\bullet^2$ consistent scaling of AD $\bullet^3$ calculate BD	$\bullet^1$ $\dfrac{3}{7}$ or $\dfrac{7}{3}$ $\bullet^2$ 4.5 stated or implied by $\bullet^3$ $\bullet^3$ 6 (cm)	3

Notes:

1. Correct answer without working   award 0/3

2. For the award of $\bullet^1$ accept $\dfrac{10.5}{7}\times 3$ or $\dfrac{AB}{3}=\dfrac{10.5}{7}$.

3. For an incorrect calculation of AB leading to a negative length for BD, $\bullet^3$ is not available

   eg $10.5\times\dfrac{7}{3}=24.5\rightarrow 10.5-24.5=-14$ (cm)   award 1/3 ✓✗✗

4. For a rounded decimal approximation to $\dfrac{3}{7}$ or $\dfrac{7}{3}$, $\bullet^2$ is not available

   eg (a) $\dfrac{3}{7}=0.43\rightarrow 0.43\times 10.5=4.515\rightarrow 10.5-4.515=5.985$ (cm)   award 2/3 ✓✗✓1

   (b) $\dfrac{3}{7}=0.4\rightarrow 0.4\times 10.5=4.2\rightarrow 10.5-4.2=6.3$ (cm)   award 2/3 ✓✗✓1

5. $\bullet^3$ is only available for subtracting AB from 10.5 where AB is calculated within a valid strategy and AB is less than 10.5.

6. For the award of $\bullet^2$ disregard mislabelling of AB as BD

   eg $BD=\dfrac{3}{7}\times 10.5=4.5$ award 2/3 ✓✓^

7. Where an incorrect scale factor is a unitary fraction, $\bullet^2$ is not available

   eg scale factor $=\dfrac{1}{4}\rightarrow 10.5\times\dfrac{1}{4}=2.625\rightarrow 10.5-2.625=7.875$ award 1/3 ✗✗✓1

Commonly Observed Responses:

1. (a) $10.5\times\dfrac{7}{3}=24.5\rightarrow 24.5-10.5=14$ (cm)   award 1/3 ✓✗✗

   (b) $10.5\div\dfrac{7}{3}=4.5\rightarrow 10.5-4.5=6$ (cm)   award 3/3

2. 10.5 − 3 = 7.5 (cm)   award 0/3

[END OF MARKING INSTRUCTIONS]

National
Qualifications
2024

2024 Mathematics

National 5 - Paper 2

Question Paper Finalised Marking Instructions

Marking Instructions for each question

Question			Generic scheme	Illustrative scheme	Max mark
1.			$\bullet^1$ know how to decrease by 26%	$\bullet^1 \times 0.74$	**3**
			$\bullet^2$ know how to calculate value	$\bullet^2\ 460 \times 0.74^3$	
			$\bullet^3$ evaluate	$\bullet^3$ (£) 186.40	

Notes:

1. Correct answer without working award 3/3

2. For the award of $\bullet^3$ accept 186. However, do not accept 186.4 or 190.

3. For a year-by-year approach, accept

   eg $460 \times 0.74 = 340.4(0) \rightarrow 340.4 \times 0.74 = 251.9(0)$

   $\rightarrow 251.90 \times 0.74\,(= 186.406) = 186.41$ or 186.40 or 186 award 3/3

4. Disregard rounding subsequent to the correct answer.

5. Where an incorrect percentage is used, the working must be followed through to give the possibility of awarding 2/3.
   eg $460 \times 1.26^3 = 920.17$ or 920 award 2/3 ✗✓1✓1

6. Where an incorrect power (≥ 2) is used, the working must be followed through to give the possibility of awarding 2/3.
   eg $460 \times 0.74^2 = 251.90$ or 252 award 2/3 ✓✗✓1

7. $\bullet^3$ is unavailable for incorrect working subsequent to correct answer
   eg $460 \times 0.74^3 = 186.40 \rightarrow 460 - 186.40 = 273.60$ award 2/3 ✓✓✗

8. Where division is used:
   (a) along with 0.74^3 $\bullet^1$ is not available.
      eg $460 \div 0.74^3 = 1135.17$ or 1135 award 2/3 ✗✓1✓1
   (b) along with an incorrect percentage $\bullet^1$ and $\bullet^2$ are not available.
      eg $460 \div 1.26^3 = 229.96$ or 230 award 1/3 ✗✗✓1

Commonly Observed Responses:

1. (a) $460 \times 0.74^3 = 186.40304$ award 2/3 ✓✓✓2
   (b) $460 \times 0.74^3 = 186.403$ award 2/3 ✓✓✗

2. $460 \times 0.74 = 340.40$ or 340 award 1/3 ✓✗✓2

3. $460 \times 0.74 \times 3 = 1021.20$ or 1021 award 1/3 ✓✗✓2

4. (a) $460 \times 0.26 = 119.60 \rightarrow 460 - 3 \times 119.60 = 101.20$ award 1/3 ✓✗✓2
   (b) $460 \times 0.26 = 120 \rightarrow 460 - 3 \times 120 = 100$ award 1/3 ✓✗✓2

5. $460 \times 0.26 \times 3 = 358.80$ or 359 award 0/3 ✗✗✓2

Question	Generic scheme	Illustrative scheme	Max mark
2.	$\bullet^1$ correct method $\bullet^2$ evaluate and write in scientific notation	$\bullet^1$ $1.22\times10^6 \times 250$ or equivalent $\bullet^2$ 3.05×10^8	**2**

Notes:

1. Correct answer without working   award 2/2

2. (a) For 305 000 000   award 1/2 ✓✓2
   (b) For 305×10^6 award 1/2 ✓✗

3. For the award of $\bullet^2$
   (a) $\left(1.22\times10^6 \times 250 =\right)3.05\times10^8 = 3.1\times10^8$ or 3×10^8 award 2/2
   (b) $\left(1.22\times10^6 \times 250 =\right)3.1\times10^8$ or 3×10^8 award 1/2 ✓✗

4. For subsequent incorrect working, $\bullet^2$ is not available.
   eg $250 \div \left(1.22\times10^6\right) = 2.049180328\times10^{-4} = 2.05\times10^{-9}$ award 0/2 ✗✗

Commonly Observed Responses:

1. $1.22\times10^6 \div 250 = 4.88\times10^3$ award 1/2 ✗✓1

2. (a) $250 \div \left(1.22\times10^6\right) = 2.05\times10^{-4}$ or $2.049\ldots\times10^{-4}$ award 1/2 ✗✓1
   (b) $250 \div \left(1.22\times10^6\right) = 2.05\times10^8$ or $2.049\ldots\times10^8$ award 0/2 ✗✗

Question	Generic scheme	Illustrative scheme	Max mark
3.	$\bullet^1$ correct substitution into cosine rule	$\bullet^1$ $\dfrac{18^2+25^2-34^2}{2\times18\times25}$ stated or implied by $\bullet^2$	**3**
	$\bullet^2$ evaluate $\cos A$	$\bullet^2$ $-\dfrac{23}{100}$ or $\dfrac{-207}{900}$ or -0.23	
	$\bullet^3$ calculate angle	$\bullet^3$ $103(.29\ldots)$	

Notes:

1. Correct answer without working   award 0/3

2. Degree sign is not required.

3. For the award of $\bullet^1$ accept eg $34^2=18^2+25^2-2\times18\times25\times\cos A$

4. For the award of $\bullet^3$ accept $\cos A=103(.29\ldots)$

5. Where wrong angle has been calculated correctly

   (a) $\dfrac{34^2+25^2-18^2}{2\times34\times25}=\dfrac{1457}{1700}\rightarrow31(.01\ldots)$ award 2/3 ✗✓1✓1

   (b) $\dfrac{34^2+18^2-25^2}{2\times34\times18}=\dfrac{855}{1224}\rightarrow46$ or $45.69\ldots$ award 2/3 ✗✓1✓1

6. **BEWARE** $180-(18+25+34)=103$ award 0/3

7. Where more than one **final** angle is stated, $\bullet^3$ is not available

   eg $\dfrac{18^2+25^2-34^2}{2\times18\times25}\rightarrow-0.23\rightarrow103.3$ **and** 256.7 award 2/3 ✓✓✗

8. Inappropriate use of RAD or GRAD should only be penalised once in Qu3, Qu11 or Qu13
   (a) 2 or 1.80... RAD
   (b) 115 or 114.77... GRAD

Commonly Observed Responses:

1. $\dfrac{18^2+25^2-34^2}{2\times18\times25}\rightarrow-0.23\rightarrow\cos^{-1}(0.23)=76.7\rightarrow180-76.7=103.3$ award 3/3

Question	Generic scheme	Illustrative scheme	Max mark
4.	$\bullet^1$ start to process left hand side	$\bullet^1$ $5x-10+4$	**3**
	$\bullet^2$ rearrange (collect constants on one side and variables on the other side)	$\bullet^2$ $-14<2x$ or $-2x<14$	
	$\bullet^3$ solve for x	$\bullet^3$ $-7<x$ or $x>-7$	

Notes:

1. Correct answer without valid working   award 0/3
   Treat repeated substitution as invalid working.

2. (a) There must be evidence that the candidate has dealt with the negative coefficient of x on the LHS of the inequation by either:
   (i) reversing the direction of the inequality sign at $\bullet^3$
      eg $5x-10+4<7x+8 \rightarrow -2x<22 \rightarrow x>-11$ award 2/3 ✓✗✓1

   OR (ii) collecting the x term(s) on the RHS of the inequation at $\bullet^2$
      eg $5x-10+4<7x+8 \rightarrow 2<2x \rightarrow 1<x$ award 2/3 ✓✗✓1
   (b) Where a candidate requires to do neither of the above, then $\bullet^3$ is not available
      eg $5x-10+4<7x+8 \rightarrow 2x<14 \rightarrow x<7$ award 1/3 ✓✗✗

3. For subsequent incorrect working, $\bullet^3$ is not available.
     eg (a) $-7<x \rightarrow x<-7$ award 2/3 ✓✓✗
         (b) $-7<x \rightarrow x=-7$ award 2/3 ✓✓✗

Commonly Observed Responses:

1. $5x-2+4<7x+8 \rightarrow -2x<6 \rightarrow x>-3$ award 2/3 ✗✓1✓1

2. (a) $5x-10+4=7x+8 \rightarrow -2x=14 \rightarrow x=-7 \rightarrow x>-7$ award 3/3
      (b) $5x-10+4=7x+8 \rightarrow -2x=14 \rightarrow x=-7$ award 2/3 ✓✓✗

Question	Generic scheme	Illustrative scheme	Max mark
5.	$\bullet^1$ know that $116\% = 278.40$ $\bullet^2$ begin valid strategy $\bullet^3$ complete calculation within valid strategy	$\bullet^1$ $116\% = 278.40$ $\bullet^2$ eg $\left(1\% =\right)\dfrac{278.40}{116}$ $\bullet^3$ (£) 240	**3**

Notes:

1. Correct answer without working   award 3/3

2. (a) $116\% = 278.40 \rightarrow 16\%$ of $278.40 = 44.54$ award 1/3 ✓××
   (b) 16% of $278.40 = 44.54$ award 0/3

3. (a) $116\% = 278.40 \rightarrow 116\%$ of $278.40 = 322.94$ award 1/3 ✓××
   (b) 116% of $278.40 = 322.94$ award 0/3

4. (a) $116\% = 278.40 \rightarrow 84\%$ of $278.40 = 233.86$ award 1/3 ✓××
   (b) 84% of $278.40 = 233.86$ award 0/3

Commonly Observed Responses:

1. $\dfrac{278.40}{1.16} = 240$ award 3/3

2. $\dfrac{278.40}{84} = 3.31428\ldots \rightarrow 331.43$ award 2/3 ×✓1✓1

Question			Generic scheme	Illustrative scheme	Max mark
6.	(a)		$\bullet^1$ factorise	$\bullet^1$ $\quad y(y-6)$	1

Notes:

1. If part (a) is not attempted, accept correct answer to part (a) in part (b) (see COR 1).

Commonly Observed Responses:

1. $(y-6)(y\pm0)$ award 0/1 ✓2

2. See CORs in part (b).

	(b)		$\bullet^2$ factorise denominator	$\bullet^2$ $(y-6)(y+3)$	2
			$\bullet^3$ simplify	$\bullet^3$ $\dfrac{y}{y+3}$	

Notes:

1. Correct answer without working award 2/2

2. For subsequent incorrect working $\bullet^3$ is not available eg $\dfrac{\cancel{y}}{\cancel{y}+3}=\dfrac{1}{1+3}=\dfrac{1}{4}$ award 1/2 ✓✗

3. $\bullet^3$ is only available when both the numerator and denominator have at least two factors.

4. Do not penalise the use of $(y-6)(y\pm0)$ in part (b) if already penalised in part (a)

   ie (a) $(y-6)(y\pm0)$ (b) $\dfrac{(y-6)(y\pm0)}{(y-6)(y+3)}=\dfrac{y\pm0}{y+3}$ award 0/1 in (a) ✓2 and award 2/2 in (b) ✓✓1

5. Where the answer to part (a) and the numerator in part (b) are different, see CORs below.

Commonly Observed Responses:

For answers in parts (a) and (b) award as follows:

1. (a) No response   (b) $\dfrac{y(y-6)}{(y-6)(y+3)}=\dfrac{y}{y+3}$ award 1/1 in (a) ✓ and award 2/2 in (b) ✓✓

2. (a) $y(y-6)$ (b) $\dfrac{(y-3)(y+3)}{(y-6)(y+3)}=\dfrac{y-3}{y-6}$ award 1/1 in (a) ✓   and award 1/2 in (b) ✓✗

3. (a) $(y-3)(y+3)$ (b) $\dfrac{y(y-6)}{(y-6)(y+3)}=\dfrac{y}{y+3}$ award 0/1 in (a) ✗   and award 2/2 in (b) ✓✓

4. (a) $(y-3)(y+3)$ (b) $\dfrac{(y-3)(y+3)}{(y-6)(y+3)}=\dfrac{y-3}{y-6}$ award 0/1 in (a) ✗   and award 2/2 in (b) ✓✓1

5. (a) $(y-3)(y+3)$ (b) $\dfrac{(y-6)(y\pm0)}{(y-6)(y+3)}=\dfrac{y\pm0}{y+3}$ award 0/1 in (a) ✗   and award 1/2 in (b) ✓✗

6. (a) $(y-6)(y+2y)$ (b) $\dfrac{(y-6)(y+2y)}{(y-6)(y+3)}=\dfrac{y+2y}{y+3}$ award 0/1 in (a) ✗   and award 1/2 in (b) ✓✓2

Question	Generic scheme	Illustrative scheme	Max mark
7.	$\bullet^1$ correct substitution into volume of **sphere** formula $\bullet^2$ correct substitution into volume of cuboid formula and know to subtract volume of **hemisphere** from volume of cuboid $\bullet^3$ consistent calculation (see Note 3) $\bullet^4$ round final answer to 2 significant figures **and** state correct units	$\bullet^1$ $\dfrac{4}{3} \times \pi \times 3^3$ $\bullet^2$ $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3^3$ $\left(= 196 - 56.54\ldots\right)$ $\bullet^3$ $139.45\ldots$ $\bullet^4$ $140\ \text{cm}^3$	4

Notes:

1. Correct answer without working   award 0/4

2. For the award of $\bullet^3$, the calculation must involve the sum or difference of a calculation involving a fraction, π and a power, and a calculation of a product of at least two numbers.

3. Accept variations in π to at least two decimal places

eg $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times 3.14 \times 3^3 = 139.48 = 140\ \text{cm}^3$

4. Disregard errors due to premature rounding provided there is evidence. However do not accept rounding of $\dfrac{4}{3}$ to fewer than 2 decimal places

eg (a) $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3^3 = 196 - 0.5 \times 1.33 \times 3.14 \times 3^3 = 196 - 56.38 = 139.62 \rightarrow 140\ \text{cm}^3$

award 4/4

   (b) $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3^3 = 196 - 0.5 \times 1.3 \times 3.14 \times 3^3 = 196 - 55.1 = 140.9 \rightarrow 140\ \text{cm}^3$

award 3/4 ✓✓✗✓1

   (c) $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3^3 = 196 - 56.38 = 139.62 \rightarrow 140\ \text{cm}^3$ award 3/4 ✓✓✗✓1

5. (a) In awarding $\bullet^3$ answers to intermediate calculations which are **whole numbers** should not be rounded

   eg (i) $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3^3 = 196 - 57 = 139 \rightarrow 140\ \text{cm}^3$ award 4/4

      (ii) $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3^3 = 200 - 57 = 143 \rightarrow 140\ \text{cm}^3$ award 3/4 ✓✓✗✓1

   (b) In awarding $\bullet^4$ intermediate calculations need not be shown

   eg $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3^3 = 140\ \text{cm}^3$ award 4/4

6. $\bullet^4$ is only available where the final answer requires rounding

   eg $7 \times 7 \times 4 - \dfrac{4}{3} \times \pi \times 3^3 = 196 - 113 = 83\ \text{cm}^3$ award 2/4 ✓✗✓1✗

Question	Generic scheme	Illustrative scheme	Max mark

7. (continued)

Commonly Observed Responses:

1. $7 \times 7 \times 4 - \dfrac{4}{3} \times \pi \times 3^3 = 82.902\ldots = 83\,\text{cm}^3$ award 3/4   ✓✗✓1✓1

2. (a) $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 6^3 = -256.389\ldots = -260\,\text{cm}^3$ award 2/4   ✗✓1✓1✗

  (b) $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 6^3 = 256.389\ldots = 260\,\text{cm}^3$ award 2/4   ✗✓1✗✓1

  (c) $\dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 6^3 - 7 \times 7 \times 4 = 256.389\ldots = 260\,\text{cm}^3$ award 2/4   ✗ ✗✓1✓1

3. (a) $7 \times 7 \times 4 + \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3^3 = 252.5\ldots = 250\,\text{cm}^3$ award 3/4   ✓✗✓1✓1

  (b) $7 \times 7 \times 4 + \dfrac{4}{3} \times \pi \times 3^3 = 309.09\ldots = 310\,\text{cm}^3$ award 3/4   ✓✗✓1✓1

  (c) $7 \times 7 \times 4 + \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 6^3 = 648.389\ldots = 650\,\text{cm}^3$ award 2/4   ✗✗✓1✓1

4. (a) $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3^2 = 177.15\ldots = 180\,\text{cm}^3$ award 3/4   ✗✓✓1✓1

  (b) $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3^3 = 177.15\ldots = 180\,\text{cm}^3$ award 3/4   ✓✓✗✓1

  (c) $7 \times 7 \times 4 - \dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3 = 189.71\ldots = 190\,\text{cm}^3$ award 2/4   ✗✓✓2✓1

5. (a) $\dfrac{4}{3} \times \pi \times 3^3 = 110\,\text{cm}^3$ award 2/4   ✓✗✓2✓1

  (b) $\dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 3^3 = 57\,\text{cm}^3$ award 2/4   ✓✗✓2✓1

6. (a) $\dfrac{4}{3} \times \pi \times 6^3 = 900\,\text{cm}^3$ award 1/4   ✗ ✗✓2✓1

  (b) $\dfrac{1}{2} \times \dfrac{4}{3} \times \pi \times 6^3 = 450\,\text{cm}^3$ award 1/4   ✗✗✓2✓1

7. $7 \times 7 \times 4 = 200\,\text{cm}^3$ award 1/4   ✗✗✓2✓1

Question	Generic scheme	Illustrative scheme	Max mark
8.	$\bullet^1$ correct substitution into quadratic formula $\bullet^2$ evaluate discriminant $\bullet^3$ calculate both roots correct to two decimal places	$\bullet^1$ $\dfrac{-8\pm\sqrt{8^2-4\times3\times1}}{2\times3}$ $\bullet^2$ 52 (stated or implied by $\bullet^3$) $\bullet^3$ $-0.13,\,-2.54$	**3**

Notes:

1. Correct answer without working   award 0/3

2. For a solution obtained by repeated substitution   award 0/3

3. $\bullet^2$ is available for $\dfrac{-4\pm\sqrt{13}}{3}$

4. For the award of $\bullet^2$ accept $\pm0.131\ldots$ or $\pm2.535\ldots$ (or rounded to two decimal places) as evidence of the discriminant.

5. $\bullet^3$ is only available when $b^2-4ac>0$ and the roots require rounding.

6. For subsequent incorrect working $\bullet^3$ is not available

eg $\dfrac{-8\pm\sqrt{8^2-4\times3\times1}}{2\times3}\to-0.13,\,-2.54\to\mathbf{0.13,}-2.54$ award 2/3 ✓✓✗

Commonly Observed Responses:

1. 52 $\left(b^2-4ac\right)$ award 1/3 ✗✓✗

2. (a) $-8\pm\dfrac{\sqrt{8^2-4\times3\times1}}{2\times3}\to-8\dfrac{\pm\sqrt{52}}{6}\to-0.13,\,-2.54$ award 3/3

   (b) $-8\pm\dfrac{\sqrt{8^2-4\times3\times1}}{2\times3}\to-8\dfrac{\pm\sqrt{52}}{6}\to-6.80,\,-9.20$ award 2/3 ✗✓✓1

3. (a) $\dfrac{-3\pm\sqrt{3^2-4\times8\times1}}{2\times8}\to\dfrac{-3\pm\sqrt{-23}}{2\times8}\to0.11,\,-0.49$ award 1/3 ✗✓1✗

   (b) $\dfrac{-3\pm\sqrt{3^2-4\times8\times1}}{2\times8}\to\dfrac{-3\pm\sqrt{23}}{2\times8}\to0.11,\,-0.49$ award 0/3 ✗✗✗

   (c) $\dfrac{-8\pm\sqrt{8-4\times3\times1}}{2\times3}\to\dfrac{-8\pm\sqrt{-4}}{6}\to-1.00,\,-1.67$ award 0/3 ✗✓2✗

Question	Generic scheme	Illustrative scheme	Max mark
9.	$\bullet^1$ multiply by e $\bullet^2$ subtract 3 $\bullet^3$ divide by 2	$\bullet^1$ $ef = 2d + 3$ $\bullet^2$ $ef - 3 = 2d$ $\bullet^3$ $d = \dfrac{ef - 3}{2}$	3

Notes:

1. For a correct answer without working   award 0/3

2. For the award of $\bullet^3$ accept $d = \dfrac{e \times f - 3}{2}$ or $d = (ef - 3) \div 2$ or $d = \dfrac{ef}{2} - \dfrac{3}{2}$

3. **BEWARE** $ef = 2d + 3 \rightarrow \dfrac{ef}{2} = d + 3 \rightarrow d = \dfrac{ef - 3}{2}$ award 1/3 ✓✗✗

Commonly Observed Responses:

1. $ef = 2d + 3 \rightarrow ef - 3 = 2d \rightarrow d = ef - 3 \div 2$ award 2/3 ✓✓✗

2. $ef = 2d + 3 \rightarrow 3ef = 2d \rightarrow \dfrac{3ef}{2} = d$ award 1/3 ✓✗✓2

Question			Generic scheme	Illustrative scheme	Max mark
10.			$\bullet^1$ marshal facts and recognise right-angled triangle (diagram must include right angle)	$\bullet^1$	4
			$\bullet^2$ consistent Pythagoras statement	$\bullet^2$ $10^2 - 7.5^2$	
			$\bullet^3$ calculate third side	$\bullet^3$ $6.6\ldots$	
			$\bullet^4$ calculate width	$\bullet^4$ $33.2\left(\ldots\text{cm}\right)$	
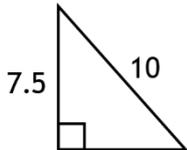
Notes:

1. Correct answer without working   award 0/4

2. In the absence of a diagram or diagram with no right angle marked accept $10^2 - 7.5^2$ or $20^2 - 15^2$ as evidence for the award of $\bullet^1$ and $\bullet^2$.

3. For the award of $\bullet^2$ accept $10^2 = x^2 + 7.5^2$ or $20^2 = x^2 + 15^2$.

4. **BEWARE**
   (a) Where a diagram is shown, working must be consistent with the diagram.
   (b) $\bullet^2$ is not available for an __incorrect__ diagram leading to $10^2 - 7.5^2$.

5. $\bullet^4$ is only available following a Pythagoras or trigonometric calculation within a **valid** right-angled triangle using side lengths of either 10 and 7.5 or 20 and 15.

6. Alternative method: $\bullet^1$
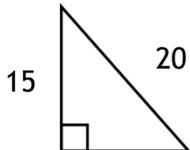
$\bullet^2$ $20^2 - 15^2$
$\bullet^3$ $13.2\ldots$
$\bullet^4$ $33.2\left(\ldots\text{cm}\right)$

Commonly Observed Responses:

1. $10^2 + 7.5^2 \rightarrow 12.5 \rightarrow 45$
   (a) working inconsistent with correct diagram   award 3/4 ✓✗✓1✓1
   (b) working consistent with candidate's diagram   award 3/4 ✗✓1✓1✓1
       (cosine rule may be used to calculate third side)
   (c) no diagram or diagram with no right angle marked   award 2/4 ✗✗✓1✓1

2. $15^2 - 10^2 \rightarrow 11.18\ldots \rightarrow 42.36$ (see Note 5)
   (a) working consistent with candidate's diagram   award 2/4 ✗✓1✓1✗
   (b) no diagram or diagram with no right angle marked   award 1/4 ✗✗✓1✗

Question	Generic scheme	Illustrative scheme	Max mark
11.	$\bullet^1$ re-arrange equation	$\bullet^1$ $\sin x = \dfrac{8}{17}$	**3**
	$\bullet^2$ find one value of x	$\bullet^2$ $28(.07\ldots)$	
	$\bullet^3$ find second value of x	$\bullet^3$ $151.9(2\ldots)$ or 152	

Notes:

1. Correct answers
   (a) without working   award 1/3 ✗✗✓1
   (b) by repeated substitution   award 1/3 ✗✗✓1

2. Degree signs are not required.

3. Do not penalise premature or incorrect rounding provided given answers round to 28 and 152.

4. Where more than two **final** values are stated, $\bullet^3$ is not available

   eg $\sin x = \dfrac{8}{17} \to 28,\ 152,\ 208$ award 2/3 ✓✓✗

5. Inappropriate use of RAD or GRAD should only be penalised once in Qu3, Qu11 or Qu13

   (a) $\sin^{-1}\left(\dfrac{8}{17}\right) = 0 \cdot 4899\ldots \to 0 \cdot 5,\ 179 \cdot 5$ (RAD)

   (b) $\sin^{-1}\left(\dfrac{8}{17}\right) = 31 \cdot 19\ldots \to 31,\ 149$ (GRAD)

Commonly Observed Responses:

1. If $\sin x < 0$, $\bullet^2$ and $\bullet^3$ are only available for consistent 3rd and 4th quadrant angles

   eg $\sin x = -\dfrac{8}{17} \to 208,\ 332$ award 2/3 ✗✓1✓1

2. (a) $\sin x = \dfrac{10}{17} \to x = 36.03,\ 143.97\ (\to 36,\ 144)$ award 2/3 ✗✓1✓1

   (b) $\sin x = \dfrac{10}{17} \to \sin x = 0.59 \to x = 36.16,\ 143.84\ (\to 36,\ 144)$ award 2/3 ✗✓1✓1

   (c) $\sin x = \dfrac{10}{17} \to \sin x = 0.58 \to x = 35.45,\ 144.55\ (\to 35,\ 145)$ award 1/3 ✗✗✓1

Question			Generic scheme	Illustrative scheme	Max mark
12.			$\bullet^1$ correct denominator	$\bullet^1$ $(x+5)(x-4)$	**3**
			$\bullet^2$ correct numerator(s).	$\bullet^2$ $2(x-4)+3(x+5)$	
			$\bullet^3$ express in simplest form (remove brackets in numerator and collect like terms)	$\bullet^3$ $\dfrac{5x+7}{(x+5)(x-4)}$	

Notes:

1. Correct answer without working. 　　　　　　　　　　　　　　　　award 3/3

2. Accept $\dfrac{2(x-4)}{(x+5)(x-4)}+\dfrac{3(x+5)}{(x+5)(x-4)}$ for the award of $\bullet^1$ and $\bullet^2$

3. Do not accept $x+5(x-4)$ or $(x+5)x-4$ or $x+5\times x-4$ for the award $\bullet^1$ unless the correct expansion or the brackets appear in the final answer.

    (a) $\dfrac{2(x-4)}{x+5\times x-4}+\dfrac{3(x+5)}{x+5\times x-4} \rightarrow \dfrac{5x+7}{x^2+x-20}$ or $\dfrac{5x+7}{(x+5)(x-4)}$ 　　award 3/3

    (b) $\dfrac{2(x-4)}{x+5\times x-4}+\dfrac{3(x+5)}{x+5\times x-4} \rightarrow \dfrac{5x+7}{x+5\times x-4}$ 　　award 2/3 ✗✓✓1

4. Where a candidate chooses to expand the brackets in the denominator, then $\bullet^3$ is only available for a consistent expansion (unless incorrect expansion already appears at $\bullet^1$)
  eg

    (a) $\dfrac{2(x-4)}{(x+5)(x-4)}+\dfrac{3(x+5)}{(x+5)(x-4)}=\dfrac{5x+7}{x^2+x-20}$ 　　award 3/3

    (b) $\dfrac{2(x-4)}{(x+5)(x-4)}+\dfrac{3(x+5)}{(x+5)(x-4)}=\dfrac{5x+7}{x^2-20}$ 　　award 2/3 ✓✓✗

    (c) $\dfrac{2(x-4)}{x^2-20}+\dfrac{3(x+5)}{x^2-20}=\dfrac{5x+7}{x^2-20}$ 　　award 2/3 ✗✓✓1

5. For subsequent incorrect working, $\bullet^3$ is not available
  eg

    $\dfrac{2(x-4)}{(x+5)(x-4)}+\dfrac{3(x+5)}{(x+5)(x-4)}=\dfrac{5\cancel{x}+7}{x^2+\cancel{x}-20}=\dfrac{5+7}{x^2-20}=\dfrac{12}{x^2-20}$ 　　award 2/3 ✓✓✗

Commonly Observed Responses:

1. $\dfrac{2x-8}{(x+5)(x-4)}+\dfrac{3x+15}{(x+5)(x-4)}=\dfrac{5x-23}{(x+5)(x-4)}$ 　　award 2/3 ✓✓✗

2. $\dfrac{2x-4}{(x+5)(x-4)}+\dfrac{3x+5}{(x+5)(x-4)}=\dfrac{5x+1}{(x+5)(x-4)}$ 　　award 1/3 ✓✗✗

Question			Generic scheme	Illustrative scheme	Max mark
13.			**Method 1** •^{1} correct substitution into sine rule	•^{1} $\dfrac{BC}{\sin 40} = \dfrac{22}{\sin 110}$	**5**
			•^{2} re-arrange formula	•^{2} $\dfrac{22\sin 40}{\sin 110}$	
			•^{3} calculate BC	•^{3} 15.0…	
			•^{4} consistent substitution into appropriate trig formula	•^{4} $\sin 30 = \dfrac{BD}{15.0\ldots}$ or $\dfrac{BD}{\sin 30} = \dfrac{15.0\ldots}{\sin 90}$	
			•^{5} calculate BD	•^{5} 7.5 (cm)	
			Method 2 •^{1} correct substitution into sine rule	•^{1} $\dfrac{AB}{\sin 30} = \dfrac{22}{\sin 110}$	
			•^{2} re-arrange formula	•^{2} $\dfrac{22\sin 30}{\sin 110}$	
			•^{3} calculate AB	•^{3} 11.7…	
			•^{4} consistent substitution into appropriate trig formula	•^{4} $\sin 40 = \dfrac{BD}{11.7\ldots}$ or $\dfrac{BD}{\sin 40} = \dfrac{11.7\ldots}{\sin 90}$	
			•^{5} calculate BD	•^{5} 7.5 (cm)	

Question	Generic scheme	Illustrative scheme	Max mark

13. (continued)

Notes:

1. Correct answer without working   award 0/5

2. Do not penalise omission of degree signs.

3. Disregard errors due to premature rounding provided there is evidence.
   However, do not accept sin40 or sin110 rounded to less than 2 decimal places.

   eg $BC = \dfrac{22\sin 40}{\sin 110} = \dfrac{22 \times 0.6}{0.9} = \dfrac{13.2}{0.9} = 14.7 \rightarrow BD = 14.7\sin 30 = 7.35$ award 4/5 ✓✓✗✓1✓1

4. (a) Where both AB and BC are calculated correctly and there is no further working
                                                  award 3/5   ✓✓✓✗✗
   (b) Where both AB and BC are calculated but one is calculated incorrectly, if there is:
      (i) further working, then apply the MIs based on the length used to calculate BD
      (ii) no further working, disregard incorrect length   ie   award 3/5 ✓✓✓✗✗

5. Alternative strategies for •⁴

   eg (a) •⁴ $\sin 60 = \dfrac{DC}{15.0\ldots} \left(DC = 12.99\ldots\right) \rightarrow \sqrt{\left(15.0\ldots\right)^2 - DC^2}$

   (b) •⁴ $Area = \dfrac{1}{2} \times 22 \times 15(.048\ldots) \times \sin 30 \ \left(Area = 82.768\ldots\right) \rightarrow \dfrac{1}{2} \times 22 \times BD = Area$

6. Inappropriate use of GRAD or RAD should only be penalised once in Qu3, Qu11 or Qu13
   (a)   6 or 5.9(4…) (GRAD)
   (b) (RAD)
       (i)   AB = 491 → BD = 366
       (ii) BC = ±371 → BD = 366 but •³ is not available due to the negative length of BC

Commonly Observed Responses:

1. (a) $\dfrac{x}{\sin 40} = \dfrac{22}{\sin 30} \rightarrow x = 28$ award 2/5 ✗✓1✓1^^

   (b) $\dfrac{x}{\sin 30} = \dfrac{22}{\sin 40} \rightarrow x = 17$ award 2/5 ✗✓1✓1^^

2. eg $\dfrac{AB}{30} = \dfrac{22}{110} \rightarrow AB = 6 \rightarrow BD = 6 \times \sin 40 = 3.9$ or 4   award 2/5 ✗✗✗✓1✓1

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Question	Generic scheme	Illustrative scheme	Max mark
14. (a)	$\bullet^1$ state vector	$\bullet^1$ $\mathbf{b}-\mathbf{a}$ or $-\mathbf{a}+\mathbf{b}$	1

Notes:

1. For the award of $\bullet^1$ accept $\mathbf{b}+-\mathbf{a}$.

Commonly Observed Responses:

	Generic scheme	Illustrative scheme	Max mark
(b)	$\bullet^2$ valid pathway	$\bullet^2$ $\mathbf{b}-\mathbf{a}-\dfrac{1}{2}\mathbf{a}$ OR $\overrightarrow{WX}+\dfrac{1}{2}\overrightarrow{XY}$ or equivalent	2
	$\bullet^3$ Express $\overrightarrow{WM}$ in terms of $\mathbf{a}$ and $\mathbf{b}$ in simplest form	$\bullet^3$ $\mathbf{b}-\dfrac{3}{2}\mathbf{a}$	

Notes:

1. Correct answer with no working   award 2/2

2. $\overrightarrow{WX}+\overrightarrow{XM}$ or $\overrightarrow{WZ}+\overrightarrow{ZX}+\overrightarrow{XM}$ is not enough for the award of $\bullet^2$

3. For the award of $\bullet^2$ accept:

  (a) $\overrightarrow{WZ}+\overrightarrow{ZX}+\dfrac{1}{2}\overrightarrow{XY}$

  (b) $\overrightarrow{WZ}+\overrightarrow{ZY}+\dfrac{1}{2}\overrightarrow{YX}$

4. For the award of $\bullet^3$ accept $\mathbf{b}+-\dfrac{3}{2}\mathbf{a}$, $\mathbf{b}-1\dfrac{1}{2}\mathbf{a}$ or $\mathbf{b}-1.5\mathbf{a}$.

5. Answer must be consistent with part (a) except in the case of Note 6.

  eg (i) (a) $\mathbf{a}-\mathbf{b}$ (b) $\mathbf{a}-\mathbf{b}+\dfrac{1}{2}\mathbf{a}=\dfrac{3}{2}\mathbf{a}-\mathbf{b}$ award 0/1 in (a) ✗ and award 2/2 in (b) ✓1✓1

    (ii) (a) $\mathbf{a}-\mathbf{b}$ (b) $\mathbf{a}-\mathbf{b}-\dfrac{1}{2}\mathbf{a}=\dfrac{1}{2}\mathbf{a}-\mathbf{b}$ award 0/1 in (a) ✗ and award 1/2 in (b) ✗✓1

    (iii) (a) $\mathbf{a}+\mathbf{b}$ (b) $\mathbf{a}+\mathbf{b}+\dfrac{1}{2}\mathbf{a}=\dfrac{3}{2}\mathbf{a}+\mathbf{b}$ award 0/1 in (a) ✗ and award 2/2 in (b) ✓1✓1

    (iv) (a) $\mathbf{a}+\mathbf{b}$ (b) $\mathbf{a}+\mathbf{b}-\dfrac{1}{2}\mathbf{a}=\dfrac{1}{2}\mathbf{a}+\mathbf{b}$ award 0/1 in (a) ✗ and award 1/2 in (b) ✗✓1

6. An answer in part (b) which has been **clearly** found independently of part (a) may gain full or partial credit in part (b).

  eg (a) $\mathbf{a}-\mathbf{b}$ (b) $\mathbf{b}-\mathbf{a}-\dfrac{1}{2}\mathbf{a}=\mathbf{b}-\dfrac{3}{2}\mathbf{a}$ award 0/1 in (a) ✗ and award 2/2 in (b) ✓✓

Commonly Observed Responses:

For answer in parts (a) and (b) award as follows:

1. (a) $\mathbf{b}-\mathbf{a}$ (b) $\mathbf{b}-\mathbf{a}+\dfrac{1}{2}\mathbf{a}=\mathbf{b}-\dfrac{1}{2}\mathbf{a}$ award 1/1 in (a) ✓ and award 1/2 in (b) ✗✓1

Question	Generic scheme	Illustrative scheme	Max mark
15.	**Method 1** $\bullet^1$ correct fraction $\bullet^2$ know how to calculate sector area $\bullet^3$ calculate sector area **Method 2** $\bullet^1$ start strategy for finding angle $\bullet^2$ know how to calculate sector area $\bullet^3$ calculate sector area	**Method 1** $\bullet^1 \quad \dfrac{15}{\pi \times 24} \quad (= 0.198\ldots)$ $\bullet^2 \quad \dfrac{15}{\pi \times 24} \times \pi \times 12^2$ $\bullet^3 \quad 90 \left(cm^2 \right)$ **Method 2** $\bullet^1 \quad 15 = \dfrac{angle}{360} \times \pi \times 24$ $\bullet^2 \quad \dfrac{15}{\pi \times 24} \times 360 = angle$ $\rightarrow \left(area = \right) \dfrac{angle}{360} \times \pi \times 12^2$ $\bullet^3 \quad 90 \left(cm^2 \right)$	**3**

Notes:

1. Correct answer without working   award 0/3

2. $\bullet^2$ is not available for simply calculating the angle at the centre of the sector

   ie $\dfrac{15}{\pi \times 24} \times 360 = 71.6197\ldots$ award 1/3 ✓✓2^

3. Accept variations and inconsistencies in the use of π provided there is evidence.

4. Do not penalise premature or incorrect rounding provided given answer rounds to 90 to the nearest whole number. However, see Note 5.

5. Where method 2 is used, accept angle calculations rounded to the nearest degree

   e.g $\dfrac{15}{\pi \times 24} \times 360 = 72 \rightarrow \dfrac{72}{360} \times \pi \times 12^2 = 90.47\ldots$ or $90.5 \left(cm^2 \right)$ award 3/3

6. Where an angle is assumed or calculated using an invalid strategy (eg cosine rule), $\bullet^3$ is not available

   eg $\dfrac{73}{360} \times \pi \times 12^2 = 91.7\ldots \left(cm^2 \right)$ award 0/3

   However, see CORs 1 and 2 for special cases.

7. For subsequent incorrect working, the final mark is not available

   e.g. $\pi \times 12^2 - \dfrac{15 \times \pi \times 12^2}{\pi \times 24} = 362(.38\ldots)$ award 2/3 ✓✓✗

Question	Generic scheme	Illustrative scheme	Max mark

15. (continued)

Commonly Observed Responses:

1. $\dfrac{15}{\pi \times 12^2} \times 360 = 11.9\ldots \rightarrow \dfrac{11.9\ldots}{360} \times \pi \times 24 = 2.5 \left(cm^2\right)$ award 2/3 ✗✓1✓1

2. $\dfrac{15}{\pi \times 12^2} \times 360 = 11.9\ldots \rightarrow \dfrac{11.9\ldots}{360} \times \pi \times 12^2 = 15 \left(cm^2\right)$ award 1/3 ✗✗✓1

3. (a) $\dfrac{15}{360} \times \pi \times 24 = 3.14\ldots \left(cm^2\right)$ award 0/3

   (b) $\dfrac{15}{360} \times \pi \times 12^2 = 18.8\ldots \left(cm^2\right)$ award 0/3

Question			Generic scheme	Illustrative scheme	Max mark
16.			•^{1} valid substitution	•^{1} eg $3\left(1-\sin^2 x\right)-1$	**2**
			•^{2} express in the form $a+b\sin^2 x°$	•^{2} $2-3\sin^2 x$	

Notes:

1. Correct answer without working   award 0/2

2. Do not penalise omission of degree signs.

3. Accept $-3\sin^2 x + 2$ award 2/2

4. Do not accept $\sin x^2$ eg $3\left(1-\sin x^2\right)-1 = 2-3\sin x^2$ award 1/2 ✗✓1

5. •^{1} is not available if there are no variables eg $3\left(1-\sin^2\right)-1 = 2-3\sin^2$ award 1/2 ✗✓1

6. •^{1} is not available if the candidate simply states eg $\cos^2 x = 1-\sin^2 x$ then proceeds no further.

7. •^{2} is not available if there is invalid subsequent working.

Commonly Observed Responses:

1. (a) $3\cos^2 x - \left(\sin^2 x + \cos^2 x\right) = 2\cos^2 x - \sin^2 x$ award 0/2 ✓2 ^

   (b) $3\cos^2 x - \left(\sin^2 x + \cos^2 x\right) = 2\cos^2 x - \sin^2 x = 2\left(1-\sin^2 x\right) - \sin^2 x$ award 1/2 ✓ ^

[END OF MARKING INSTRUCTIONS]

General marking principles for National 5 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 x 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:

$$\begin{array}{ccc} & \bigcirc^5 & \bigcirc^6 \\ \bigcirc^5 & x = 2 & x = -4 \\ \bigcirc^6 & y = 5 & y = -7 \end{array}$$

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

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

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

$\sqrt{64}$ 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.