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 cbac
## GCSE MARKING SCHEME

MATHEMATICS - UNITISED

JANUARY 2015

## INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2015 examination in GCSE MATHEMATICS - UNITISED. They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.
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## UNIT 1 - FOUNDATION TIER

| January 2015 UNIT 1 Foundation | Mark | Final Mark Scheme Comments |
| :---: | :---: | :---: |
| (a) <br> (b) 25068  <br> (c)(i) <br> (ii) 31000  <br>   $1 / 2$ | $\begin{gathered} \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ 4 \end{gathered}$ | Also allow F.T. 30000 - 'their 25068'. |
| 2. (a)Comedy 18 <br>  Adventure <br> Science Fiction 10 <br>  Romantic <br>  13 <br> (b) Labelled bars of equal width for Comedy, Adventure, Science Fiction and Romantic. <br> AND vertical axis labelled 'Frequency' (or equivalent) <br> Uniform scale starting at 0 . <br> Four bars at correct heights. | B2 <br> B1 <br> B1 <br> B2 <br> 6 | For all four correct. B1 for two or three correct. Allow unambiguous indication in either 'Tally' or 'Frequency' column (Frequency column takes precedence). <br> Labels may be indicated on the bars themselves or underneath the axis. Accept C, A, SF and R. Accept 'Number (of films)' as a label. <br> B0 for ambiguous placing of numbers between grid lines. <br> B1 for three correct heights. F.T. their frequencies. If no scale assume one square to represent a frequency of 1 . Mark heights on uniform scale that does not start at 0 (e.g. starts at 1 or -1 ) accordingly. |
| 3(a)(i) 7(litres) <br> (ii) Height of water shown at 4.5 litres. <br> (b) Indicates ' $1{ }^{\text {st }}$ notch to the right of 27 '. | $\begin{gathered} \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ 3 \\ \hline \end{gathered}$ | Allow any unambiguous indication between 4 and 5 litres (not inclusive) <br> Allow unambiguous intent. |
| $\begin{array}{cc} \text { 4(a) } & \text { (Points gained }=) \\ \text { (b) } & 13 \times 3+7 \times 1 \\ & \frac{30-9}{3} \\ & \\ & =76 \text { (games won) } \end{array}$ | $\begin{gathered} \hline \text { M2 } \\ \text { A1 } \\ \text { M1 } \\ \\ \text { A1 } \\ 5 \\ \hline \end{gathered}$ | M1 for $13 \times 3+k \times 1(k \neq 0)$ if seen. C.A.O. |
| 5. 3 correct locations marked. (One per 'tolerance range') | B3 | Mark with overlay. Allow $\pm 0 \cdot 2 \mathrm{~cm}$ in any direction. <br> B1 for each correct point. <br> Penalise any incorrect 'extras' -1 , once only <br> If no marks gained, allow SC 1 for an arc, radius 6 cm , centred at point $P$ OR an arc of a different radius with 3 points marked |

\begin{tabular}{|c|c|c|}
\hline \begin{tabular}{l}
January 2015 \\
UNIT 1 Foundation
\end{tabular} \& Mark \& Final Mark Scheme Comments \\
\hline Sight of 30 adults AND 30 children.
\begin{tabular}{c} 
(Portions ordered for the children =)
\end{tabular} 15
(Total number of portions required =) 45 \& B1
B1
B1
B1

B1 \& | May be implied. |
| :--- |
| F.T. 'their number of children'. |
| F.T. 'their number of adults' + 'their number of child portions'. No F.T. if 'number of child portion' $=30$ F.T. rounding up to nearest 10 from 'their number of portions required'. B0 if already a multiple of 10 . |
| An unsupported answer of 50 implies all four B marks. |
| F.T. 'their number of portions ordered' $\times £ 12$. |
| Note: Sight of $(£) 360$ and $(£) 180$ implies first three B1s. |
| Sight of $(£) 540$ as final answer implies B1B1B1B0B1. | <br>

\hline | Look for |
| :--- |
| - spelling |
| - clarity of text explanations and correct units shown |
| - the use of notation (watch for the use of ' $=$ ', ' + ' and '-' being appropriate) |
| QWC2: Candidates will be expected to |
| - present work clearly, with words explaining process or steps |
| AND |
| - make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer |
| QWC1: Candidates will be expected to |
| - present work clearly, with words explaining process or steps |
| OR |
| - make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer | \& QWC

2

7 \& | QWC2. Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. |
| :--- |
| QWC1. Presents relevant material in a coherent and logical manner, but with some errors in use of mathematical form, spelling, punctuation or grammar. OR |
| Evident weakness in organisation of material but using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. |
| QWC0. Evident weakness in organisation of material and errors in use of mathematical form, spelling, punctuation and grammar. |
| An unsupported answer is QWC0. | <br>

\hline | 7(a) $500 / 74$ OR $5 / 0.74$ |
| :--- |
| (She can buy ) 6 (pots) |
| (b) $6 \times(£) 0.74$ OR $6 \times 74($ p) OR (£) 4.44 OR 444(p) |
| OR 56(p) OR (£)0.56 |
| NO because change is 56 p (and there is no 56 p coin) | \& M1

A1
M1
A1

4 \& | Allow M1 for any attempt to find how many ' 74 p in $£ 5$ '. M0 for $5 \div 74$ or $500 \div 0 \cdot 74$ unless rectified. |
| :--- |
| Allow unambiguous embedded answer e.g. $6 \times 74=444$. |
| 6.7(56...) implies M1. |
| F.T. 'their whole number of pots bought'. |
| 'NO' must be stated and the correct change for their number of pots shown or indicated. |
| If number of pots $>6$ then only M1A0 possible. | <br>

\hline | 8(a) Strategy of having 'four sets of $4+1$ other' |
| :--- |
| $(£) 24+(£) 24+(£) 24+(£) 24+(£) 8$ or equivalent. $=(£) 104$ |
| (b) Trialling both offers for an equal number of boards. A correct value for the cost of their stated number of boards at 'Get Noticed'. |
| Correct costs for both offers for an equal number of boards that show the cost at 'Get Noticed' is lower than the cost at 'Boards for All'. | \& | S1 |
| :--- |
| M1 |
| A1 |
| M1 |
| A1 |
| A1 |
| 6 | \& | Allow any indication of attempt at correct strategy. Accept any unambiguous intention. |
| :--- |
| A correct method must be attempted for 'Get Noticed'. (if ordering 17 boards this is $£ 108$ and gains M1A1.) SC1 for a correct cost for 'Get Noticed' for a number of boards not considered for 'Boards for All'. |
| (This will require 19 or 21 or more boards to be costed.) | <br>

\hline
\end{tabular}

| January 2015 UNIT 1 Foundation | Mark | Final Mark Scheme Comments |
| :---: | :---: | :---: |
| 9 (a) Uniform scale on vertical axis. <br> Plotting ( 12,340 ). <br> Correct line drawn from $(0,0)$ to $(12,340 \pm 5)$ <br> (b) $\quad(50 \mathrm{lb}=) \quad 800(\mathrm{oz})$ <br> Any correct strategy, e.g. 100 times their value at 8 oz . $\text { OR } \quad \frac{340}{12} \times 800$ <br> A correct answer for their line OR 22666(•6..) (gm) $=22.667(\mathrm{~kg})$ | B1 P1 <br> L1 <br> B1 <br> M1 <br> A1 <br> B1 <br> 7 | PO, LO if no attempt at uniform scaling. $\pm{ }^{1 / 2}$ a small square'. <br> Allow P1 if attempt made at uniform scaling. Allow line starting at $(2,57 \pm 1)$. <br> Correct line implies P1L1. <br> B0 for incorrect units e.g. 800 lb or 800 kg . <br> F.T. 'their graph' and also F.T. 'their 800 oz '. <br> If using their graph allow $\pm{ }^{‘} 1 / 2$ a small square' in reading of grams at 8 oz . <br> F.T. 'their answer in grams' / 1000 <br> Accept unsupported answers between $22 \cdot 5$ and $22 \cdot 8$. <br> Similarly with F.T. answers. <br> Alternative method: $\begin{array}{cc} 1 \mathrm{~kg} \approx 2 \cdot 2 \mathrm{lb} & B 1 \\ 50 \div 2 \cdot 2 & M 1 \\ =22 \cdot 7(\ldots) \text { ISW } & A 2 \end{array}$ |
| 10. $\begin{aligned} 9 \times 24 \quad(= & 216) \\ & \frac{9 \times 24}{45} \end{aligned}$ <br> 5 (tins) | M1 <br> M1 <br> A1 <br> 3 | C.A.O. M1,M1,A0 for an answer of $4 \cdot 8$. Allow unambiguous embedded final answer e.g. $5 \times 45=225\left(\mathrm{~m}^{2}\right)$ for all three marks. |
| 11. <br> Position at $035^{\circ}$ from Aberdeen. <br> Position at $290^{\circ}$ from Stavanger. <br> Position marked OR two intersecting lines. | M1 <br> M1 <br> A1 $3$ | $\pm 2^{\circ}$ (use overlay). <br> Allow the M marks for dots, crosses or any unambiguous indication that the correct bearings have been offered. <br> F.T. if at least M1 and two intersecting lines. (Lines must originate from Aberdeen and Stavanger respectively) |
| $\text { 12. } \left.\begin{array}{ll} \begin{array}{l} 0 \cdot 2 \times 800 \\ =160 \end{array} & \text { OR } 0 \cdot 3 \times 300 \\ & =90 \end{array}\right] \begin{array}{ll}  & =36(\%) \end{array}$ | $\begin{gathered} \mathrm{M} 1 \\ \text { A1 } \\ \text { A1 } \\ \text { M1 } \\ \text { A1 } \\ \hline \end{gathered}$ | F.T. 'their 90 ' and 'their $160+90$ '. Do not F.T. $300 / 1100$. |
| $\begin{array}{ccccc} \text { 13. } & 5 \times 4 & (+) & \frac{10 \times 5}{2} & (+) \frac{\pi \times 2^{2}}{2} \\ = & 20 & (+) & 25 & (+) \\ & & 6 \cdot 28(\ldots) \\ & =51 \cdot 3\left(\mathrm{~m}^{2}\right) \end{array}$ | M2 <br> A2 <br> A1 <br> 5 | M1 for one or two correct. <br> A1 for 20 AND 25 , A1 for $6 \cdot 28(\ldots)$ or $6 \cdot 3$ <br> F.T. provided M1A1 gained and three values added with an answer given to 1 d.p. |
| 14. Least Value Greatest Value <br> 7.5 8.5 <br> 15 25 | $\begin{gathered} \text { B4 } \\ 4 \\ \hline \end{gathered}$ | B1 for each correct entry. <br> Accept 8.49 recurring but not 8.49 . <br> Accept 24.9 recurring but not 24.9 . |

## UNIT 1 - HIGHER TIER

| $\begin{gathered} \text { January } 2015 \\ \text { UNIT } 1 \text { Higher } \end{gathered}$ | Mark | Final Mark Scheme Comments |
| :---: | :---: | :---: |
| 1. (Fuel cost $=) \frac{160}{40} \times(£) 6.24$ $=(£) 24.96$ $(\text { Total cost of travel }=)(\mathfrak{£}) 48.71 \text { or }(\mathfrak{£}) 49$ <br> $($ Cost of computer in pounds $=) \frac{1500}{1 \cdot 18}$ $=(£) 1271.18(\ldots) \text { or }(£) 1271.19 \text { or }(£) 1271$ <br> $($ Total spent $=)(£) 1319.89(\ldots)$ or $(\mathfrak{£}) 1319.90$ or $(£) 1320$ <br> (Amount saved to the nearest $£=$ ) <br> (£) 330 <br> Look for <br> - spelling <br> - clarity of text explanations and correct units shown <br> - the use of notation (watch for the use of ' $=$ ', ' + ' and '-' being appropriate) <br> QWC2: Candidates will be expected to <br> - present work clearly, with words explaining process or steps <br> AND <br> - make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer <br> QWC1: Candidates will be expected to <br> - present work clearly, with words explaining process or steps <br> OR <br> - make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer | M1 <br> A1 <br> B1 <br> M1 <br> A1 <br> B1 <br> B1 <br>  <br> QWC <br> 2 <br>  <br> 9 | SC1 for (£) 12.48 <br> F.T. 'their $£ 24.96$ ' $+£ 23.75$. <br> F.T. 'their derived $£ 48.71$ ' + 'their derived $£ 1271.18$ ' <br> F.T. $£ 1650$ - 'their $£ 1319.89(\ldots)$ '. <br> B0 if not given to the nearest pound. <br> Alternative method $\begin{array}{rrr} \text { M1A1B1 then }(\text { Total in euros })=48.71 \times 1 \cdot 18+1500 & \text { M1 } \\ =1557.48 & \text { Al } \\ \begin{array}{rlr} (\text { Total in } £)=(1557.48 \div 1 \cdot 18=)(£) 1319.20 & \text { B1 } \\ \text { (Amount saved to the nearest } £=) & \text { (£)330 } & \text { B1 } \end{array} \end{array}$ <br> QWC2. Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. <br> QWC1. Presents relevant material in a coherent and logical manner, but with some errors in use of mathematical form, spelling, punctuation or grammar. OR <br> Evident weakness in organisation of material but using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. <br> QWC0. Evident weakness in organisation of material and errors in use of mathematical form, spelling, punctuation and grammar. |
| 2. <br> Position at $035^{\circ}$ from Aberdeen. <br> Position at $290^{\circ}$ from Stavanger. <br> Position marked OR two intersecting lines. | M1 <br> M1 <br> A1 $3$ | $\pm 2^{\circ}$ (use overlay). <br> Allow the M marks for dots, crosses or any unambiguous indication that the correct bearings have been offered. <br> F.T. if at least M1 and two intersecting lines. (Lines must originate from Aberdeen and Stavanger respectively) |
| 3. $\begin{array}{rrr} \begin{array}{l} 0.2 \times 800 \\ =160 \end{array} & \text { OR } \quad 0.3 \times 300 \\ & =90 \\ & & \\ 2 \frac{90}{250} \times 100 & \end{array}$ $=36(\%)$ | $\begin{gathered} \text { M1 } \\ \text { A1 } \\ \text { A1 } \\ \text { M1 } \\ \text { A1 } \\ \hline \end{gathered}$ | F.T. 'their 90 ' and 'their $160+90$ '. Do not F.T. 300 / 1100. |


| $\begin{gathered} \text { January } 2015 \\ \text { UNIT } 1 \text { Higher } \end{gathered}$ | Mark | Final Mark Scheme Comments |
| :---: | :---: | :---: |
| 4. <br> Attempt at $\sum \mathrm{f} \times \mathrm{x}$ <br> (138) <br> Division by $\sum \mathrm{f}$ <br> (72) <br> $($ Mean $=) \quad 1.9$ (points) ISW | B2 <br> M1 <br> m1 <br> A1 <br> 5 | B2 for all four correct. B1 for 2 or 3 correct. If no marks gained allow B1 for indicating that 1 game is equivalent to $5^{\circ}$. <br> F.T. their completed table. $\text { Or } 690(\mathrm{M1}) \div 360(\mathrm{ml})$ <br> C.A.O. for 'their table'. |
| 5(a) 3.71 <br> (b) $4 / 5$ | $\begin{gathered} \text { B2 } \\ \text { B1 } \\ \\ 3 \end{gathered}$ | B1 for 3.7(05.....) <br> Accept equivalent such as $48 / 60$. B0 for $4 \cdot 8$. |
| $\text { 6. } \quad \begin{aligned} 5440 \times(7 / 8)^{2} & \begin{array}{l} \text { or equivalent } \\ \\ \end{array} \end{aligned}$ | $\begin{gathered} \mathrm{M} 2 \\ \text { A1 } \\ \\ 3 \\ \hline \end{gathered}$ | M1 for $5440 \times(7 / 8)$ or equivalent. M1, A1 for sight of 4760 . <br> Treat increase as a mis-read. |
| 7(a) (i) A statement that indicates that the company started to make a profit. <br> (ii) A statement that indicates that the profit made by the company has 'levelled out'. <br> (iii) A statement that indicates that the company was losing money. <br> (b) $\begin{array}{r} \frac{1220+0.18 \times 650+247}{2.75}=576 \end{array}$ | A1 5 | Accept any equivalent statement that shows an understanding of the nature of the curve drawn from year 4 onwards. <br> Allow use of the word 'profit' in e.g. 'the profits are getting less' or 'the profits are plummeting'. <br> M1 awarded at this stage. |
| $\begin{aligned} 8 \quad 10 & \times \frac{150}{100} \\ & \times \frac{3}{5} \\ & =9 \text { (hours) } \end{aligned}$ | $\begin{gathered} \hline \text { M1 } \\ \text { M1 } \\ \text { A1 } \\ 3 \end{gathered}$ | M2 for the correct use of the ' 10 ' with all four of the numbers $150,100,3$ and 5 . <br> M1 for the correct use of the ' 10 ' with any two of the numbers 150, 100, 3 and 5. <br> C.A.O. |
| 9. $108 \% \equiv 69.93$ $\begin{aligned} \text { (Previous best throw) } \frac{69.93}{108} \times 100 \\ =64.75(\mathrm{~m}) \end{aligned}$ | $\begin{gathered} \text { B1 } \\ \text { M1 } \\ \\ \text { A1 } \\ 3 \\ \hline \end{gathered}$ | Accept any indication. Or equivalent. |


| January 2015 UNIT 1 Higher | Mark | Final Mark Scheme Comments |
| :---: | :---: | :---: |
| $\begin{aligned} & \text { 10. } \begin{array}{l} \text { Sight of } 345(\mathrm{~cm}) \\ \text { Sight of } 20 \cdot 5(\mathrm{~cm}) \\ \text { Use of } \frac{345}{20 \cdot 5} \\ \text { (Least number required }=) 68 \end{array}=67 \cdot 3(17 \ldots .) \end{aligned}$ | B1 <br> B1 <br> M1 <br> A2 <br> A1 <br> 6 | F.T. 'their least base length' if $<350$, and 'their greatest strip length' if $>20$. <br> A1 if ' $\times 4$ ' not calculated ( $16 \cdot 8 \ldots$ ) <br> F.T. rounding up if of equivalent difficulty. <br> Note: Allow B0,B1,M1,A2,A1 for |
| 11. Correct use of Distance $=$ Speed $\times$ Time 75 (miles) AND 210 (miles) AND 15 (miles) Correct use of 'Fuel used' = Distance $\div$ 'mpg' 1.5625 (gal) AND 5 (gal) AND 0.375 (gal) 7 (gallons) | M1 <br> A1 <br> M1 <br> A1 <br> A1 <br> 5 | One correct implies first M1. <br> F.T. 'their distances'. One correct implies second M1. <br> Allow 1.6 and 0.4 . <br> F.T. 'their values' only if all three found using 'dist / mpg'. <br> Must be to the nearest gallon. <br> A correct answer gains the previous A1. |
| $\begin{gathered} \text { 12(a) Sight of } \begin{array}{cc} \frac{\theta}{\theta} \times \pi \times 10^{2} & \text { OR } \\ 360 & \underline{\theta} \times \pi \times 6^{2} \\ 360 \\ 360 \end{array} \\ \begin{array}{c} \theta \times 10^{2}-\frac{\theta}{360} \times \pi \times 6^{2}=48.03 \\ \theta=\frac{48.03 \times 360}{64 \pi} \\ \end{array} \\ =86^{\left({ }^{\circ}\right)} \end{gathered}$ $\begin{array}{cc} \text { (b) Sight of } \frac{86}{360} \times 2 \pi \times 10 & \text { OR } \frac{86}{360} \times 2 \pi \times 6 \\ =15 & \text { OR }=9 \\ (\mathrm{PQSR}=) & 15+9+4+4 \\ =32(\mathrm{~cm}) \end{array}$ | B1 <br> M1 <br> m1 <br> A1 <br> M1 <br> A1 <br> M1 <br> A1 <br> 8 | Or equivalent. <br> SC 1 for $55^{\left({ }^{\circ}\right)}$ OR SC1 for $152 \cdot 8 \ldots{ }^{\left({ }^{\circ}\right)}$ or $153^{\left({ }^{\circ}\right)}$ (as well as a possible B1) <br> F.T. 'their $86^{\circ}$. <br> Accept 15 to 15.02 inclusive. Accept 9 to 9.01 inclusive. <br> F.T. 'their evaluated arc lengths' only if $86 / 360$ and $\pi$ used. C.A.O. for 'their $86^{\circ}$ '. |
| 13. (a) Sight of $\pi \times 15^{2} \times 30$ OR $2 / 3 \times \pi \times 15^{3} \mathrm{OR}$ $\begin{aligned} \pi \times 15^{2} & \times 30-2 \times 2 / 3 \times \pi \times 15^{3} \\ & =7068(\cdot \ldots .)\left(\mathrm{cm}^{3}\right) \text { or } 2250 \pi \end{aligned}$ <br> (b) Sight of $1 / 3 \times \pi \times(0 \cdot 4 x)^{2} \times 0 \cdot 9 x$ $\begin{gathered} x^{3}-1 / 3 \times \pi \times(0 \cdot 4 x)^{2} \times 0 \cdot 9 x=849 \cdot 2 \\ x^{3}=1000 \quad \text { or equivalent } \\ x=10(\mathrm{~cm}) \end{gathered}$ | $\begin{gathered} \hline \text { B1 } \\ \text { M1 } \\ \text { A1 } \\ \text { B1 } \\ \text { M1 } \\ \text { A1 } \\ \text { A1 } \\ \hline \end{gathered}$ | (Look for $21205 \cdot \ldots$ - $14137 \cdot \ldots$...) <br> Accept answers between 7065 and $7071 \cdot 5$ inclusive. <br> B0 if M1 awarded for use of $0.4 x^{2}$ <br> Only F.T. allowed is use of $0 \cdot 4 x^{2}$ instead of $(0.4 x)^{2}$. <br> F.T. their $x^{3}$ value. |

UNIT 2 - FOUNDATION TIER

| 2015 January <br> UNIT 2 (non-calculator) Foundation Tier | Mark | Final Mark Scheme Comments |
| :---: | :---: | :---: |
| 1. (a)(i) 27 <br> (ii) 64 <br> (iii) 26 and 52 <br> (iv) 54 <br> (v) 62 <br> (b) (£) 72 <br> (c) 2796 <br> (d) 4 thousand(s), 4000 <br> (e) 38.3 | $\begin{gathered} \hline \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ 9 \end{gathered}$ | Accept thousand(s). B0 for 1000. |
| 2. | B4 <br> 4 | B1 for each correct pair. <br> More than one line from any shape gets B0 for that pair. |
| $\begin{array}{cr} \hline \text { 3. cricket } & 6 \\ \text { football } & 12 \\ \text { tennis } & 2 \end{array}$ | B1 <br> B1 <br> B1 $3$ | Penalty - 1 if three correct sets of tally marks given only. <br> If B0 then SC2 for $6 / 20,12 / 20,2 / 20$. <br> If B0 then SC1 for $3 / 10,6 / 10,1 / 10$ or SC 1 for $0.3,0 \cdot 6,0 \cdot 1$. |
| 4.(a) <br> (b) (i) (£) $12 g$ <br> (ii) $h-3$ <br> (c) (i) $(x=) 60$ <br> (ii) $(x=) 8$ <br> (d) $10 k-7 m$ | B1 <br> B1 <br> B1 <br> B1 <br> B1 <br> B2 <br> 7 | Accept $12 \times g, g \times 12$ <br> Accept embedded answers. <br> Must be an expression for B2 <br> B1 for $10 k+-7 m$ <br> B1 for either $10 k$ or $-7 m$ seen |
| 5. $180\left({ }^{\circ}\right)-47\left({ }^{\circ}\right)-39\left({ }^{\circ}\right)$ $94\left({ }^{\circ}\right)$ | $\begin{gathered} \text { M1 } \\ \text { A1 } \\ 2 \end{gathered}$ |  |


| 2015 January UNIT 2 (non-calculator) Foundation Tier | Mark | Final Mark Scheme Comments |
| :---: | :---: | :---: |
| 6. Suitable method for comparison, such as: (Using $£ 1$ for 170 g ) $4 \times 170$ (g) $680(\mathrm{~g})$ <br> OR (Using $£ 4$ per kg ) $1000(\mathrm{~g}) \div 4$ $250 \text { (g) }$ <br> Statement equivalent to $680(\mathrm{~g}) \neq 1000(\mathrm{~g})$ OR <br> $170(\mathrm{~g}) \neq 250(\mathrm{~g})$ <br> Look for <br> - relevance of work shown <br> - generally correct spelling <br> - clarity of text explanation <br> - use of notation (appropriate use of ' $=$ ', ' $\times$ ', ‘ $\div$ ', $£, \mathrm{~g}, \mathrm{~kg}$ ) <br> QWC2: Candidates will be expected to <br> - present work clearly, with words explaining process or steps <br> e.g. state clearly which quantities are being compared <br> AND <br> - make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their working <br> QWC1: Candidates will be expected to <br> - present work clearly, with words explaining process or steps <br> OR <br> - make few if any mistakes in mathematical form, spelling, punctuation and grammar, and include units in their working. | M1 <br> A1 <br> E1 <br> QWC2 <br>  <br> 5 | For a correct method to compare two quantities <br> For a numerically correct answer to their calculation <br> Accept approximations for all marks e.g. $£ 6$ buys $6 \times 170 \mathrm{~g}=1020 \mathrm{~g}$ <br> So $£ 6$ buys about 1 kg , not $£ 4$ <br> QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. <br> QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar <br> OR <br> evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. <br> QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. <br> A final unsupported statement only gets QWC0 |
| 7. <br> Angle of $35^{\circ}$ drawn in correct place AT drawn 7 cm long OR a point T marked 7 cm from A | $\begin{gathered} \text { B1 } \\ \text { B1 } \\ 2 \\ \hline \end{gathered}$ | $\begin{aligned} & \text { Use overlay } \\ & \pm 2^{\circ} \\ & \pm 2 \mathrm{~mm} \end{aligned}$ |
| $\begin{gathered} \hline 8.32 .8 \div 8(=4.1) \\ (4.1) \times 3 \\ 12.3(\mathrm{~g}) \end{gathered}$ | $\begin{gathered} \mathrm{M} 1 \\ \text { M1 } \\ \text { A1 } \\ 3 \end{gathered}$ | $\begin{aligned} & \text { OR } 32.8 \times 3(=98.4) \\ & \quad(98.4) \div 8 \\ & \text { CAO } \end{aligned}$ |


| UNIT 2 (non-calculator) Foundation Tier | Mark | Final Mark Scheme Comments |
| :---: | :---: | :---: |
| 9. $1-(0 \cdot 3+0 \cdot 15)$ <br> 0.55 | $\begin{gathered} \text { M1 } \\ \text { A1 } \\ 2 \end{gathered}$ | If M0A0 then SC1 for ( $1-0 \cdot 18=0 \cdot 82$ |
| 10. Enlargement scale factor 3 | $\begin{gathered} \hline \text { B2 } \\ 2 \end{gathered}$ | B1 for at least 3 lines correct <br> B1 for consistent use of wrong scale factor |
| 11. (a) $\begin{aligned} 5 x & =45 \\ x & =9 \end{aligned}$ <br> (b) (i) - 1 and 7 <br> (ii) Suitable axes drawn and labelled with $x$, $y$ and numbers <br> 2 or 3 points plotted correctly, with no incorrect points plotted <br> Correct straight line drawn | $\begin{aligned} & \text { B1 } \\ & \text { B1 } \\ & \\ & \text { B1 } \\ & \text { B1 } \\ & \text { P1 } \\ & \text { L1 } \\ & 6 \end{aligned}$ | Accept embedded answer. <br> FT 'their $5 \mathrm{x}=\mathrm{a}$ '. Integer answers must be expressed as integers. <br> FT 'their table' <br> CAO. L1 implies P1. |
| $\begin{aligned} & \text { 12. }(\angle B A E=) \\ & 180\left(\left(^{\circ}\right)-108\left({ }^{\circ}\right)-33\left(\left(^{\circ}\right)\right. \text { or equivalent }\right. \\ & =39\left({ }^{\circ}\right) \\ & (x=) 60\left({ }^{\circ}\right)-39\left(\left(^{\circ}\right)\right. \\ & =21\left(^{\circ}\right) \end{aligned}$ | M1 <br> A1 <br> M1 <br> A1 <br> 4 <br> 4 | Check diagram for sight of $39\left({ }^{\circ}\right)$ <br> FT 'their angle $B A E$ ' (provided $<60^{\circ}$ ) <br> ALTERNATIVE SOLUTION e.g. <br> Angle $C B A=120\left({ }^{\circ}\right)$ (interior angles) <br> Angle $C B D=120\left({ }^{\circ}\right)-33\left({ }^{\circ}\right)=87\left({ }^{\circ}\right) \quad$ M1 <br> Angle $B D A=87\left({ }^{\circ}\right)$ (alternate angles) A1 <br> Angle $A E D=72\left(^{\circ}\right.$ ) (straight line) <br> $\begin{array}{rll}(x=) 180\left({ }^{\circ}\right)-72\left({ }^{\circ}\right)-87\left({ }^{\circ}\right) & & \text { M1 } \\ & =21\left({ }^{\circ}\right) & \text { A1 }\end{array}$ |
| 13. Correct translation | $\begin{gathered} \hline \text { B1 } \\ 1 \end{gathered}$ |  |
| 14. (Reduced cost of first cottage =) <br> $620 \times 0.85$ OR $620-620 \times 0.15$ OR $620-93$ $(=£) 527$ <br> (Cost of second cottage $=$ ) $(=£) 69 \times 7$ $(=£) 483$ <br> Considers $£ 60$ cancellation charge in an appropriate calculation <br> Interpretation: e.g. 'No, more expensive to pay for the second cottage' | M1 <br> A1 <br> M1 <br> A1 <br> S1 <br> E1 <br> 6 | Or equivalent full method <br> Complete method for finding $69 \times 7$ <br> CAO <br> e.g. 'their 527 ' $-60(=467)$ <br> or 'their 483 ' $+60(=543)$ <br> (either $483>467$ or $543>527$ ) <br> FT for a correct conclusion from 'their numbers'. <br> Award of E1 depends on at least M1 and S1, no error in adding or subtracting 60 , and no error in finding a price difference. |




\begin{tabular}{|c|c|c|}
\hline \begin{tabular}{l}
January 2015 \\
Unit 2 Higher Tier
\end{tabular} \& M
\(\mathbf{a}\)
\(\mathbf{r}\)
\(\mathbf{k}\) \& Final Mark Scheme Comment \\
\hline 4. (Angle \(B A E=\) ) \(180\left({ }^{\circ}\right)-108\left({ }^{\circ}\right)-33\left({ }^{\circ}\right)\) or equivalent
\[
\begin{array}{r}
=39\left(^{\circ}\right) \quad(x=) 60\left({ }^{\circ}\right)-39\left({ }^{\circ}\right) \\
=21\left({ }^{\circ}\right)
\end{array}
\] \& M1
A1
M1
A1 \& \begin{tabular}{l}
Check diagram for sight of \(39\left({ }^{\circ}\right)\). \\
FT 'their angle \(B A E\) ' (provided \(<60^{\circ}\) ) \\
ALTERNATIVE SOLUTION e.g. \\
Angle \(C B A=120\left({ }^{\circ}\right)\) (interior angles) \\
Angle \(C B D=120\left({ }^{\circ}\right)-33\left({ }^{\circ}\right)=87\left({ }^{\circ}\right)\) \\
Angle \(B D A=87\left({ }^{\circ}\right)\) (alternate angles) \\
Angle \(A E D=72\left({ }^{\circ}\right.\) ) (straight line) \\
\((x=) 180\left({ }^{\circ}\right)-72\left({ }^{\circ}\right)-87\left({ }^{\circ}\right)=21\left({ }^{\circ}\right)\)
\end{tabular} \\
\hline \begin{tabular}{l}
5. (a) \(8 x+12-3 x-6\)
\[
=5 x+6
\] \\
(b) \(10 n-7\) \\
(c) \(4 x>2\)
\[
x>1 / 2 \quad(\text { or } \quad x>2 / 4)
\]
\end{tabular} \& \begin{tabular}{l}
B1 \\
B1 \\
B2 \\
B1 \\
B1 \\
6
\end{tabular} \& \begin{tabular}{l}
Correctly removing brackets. Collecting terms. FT for one error only. Mark final answer. \\
B1 for sight of \(10 n\) \\
FT from \(4 x>a\). Mark final answer. \\
B0 for use of \(=\) sign, unless replaced in final answer.
\end{tabular} \\
\hline \begin{tabular}{l}
6. (a) \\
(c) All 5 points plotted correctly. \\
(d) 'No' with reason e.g. best estimate of the probability is \(0 \cdot 4\), or final relative frequency value is 0.4 .
\end{tabular} \& B1
B1
B1

P2

E1

6 \& | CAO |
| :--- |
| FT their cumulative $1^{\text {st }}$ line, provided fractions are $<1$, and denominators are $30,40,50$. |
| FT their cumulative fractions as decimals, provided $<1$, with accuracy to 2 d.p. where appropriate. |
| FT for their decimals (provided < 1). |
| Ignore joining points, tolerance should show intention to be on grid lines. |
| P1 for 3 or 4 points plotted accurately, must be from cumulative results. |
| Do not award if bars are drawn (unless with points plotted). |
| FT their final column entry in (a), fraction or decimal, provided final entry < 1 . |
| E0 for e.g. only 2 of the 5 trials gives a result less than 0.5 . | <br>

\hline 7. 200 (seconds) AND 168 (seconds) OR sight of 32 (seconds) $[200-168] \div 200(\times 100 \%)$ OR $[1-168 / 200](\times 100 \%)$ OR equivalent method.

$$
16 \%
$$ \& B1

M1

A1

3 \& | Both times correct OR correct time difference. |
| :--- |
| FT from 'their times' (with at least one correct). | <br>

\hline | 8. |
| :--- |
| (a) $9.7 \times 10^{-5}$ |
| (b) $4.78 \times 10^{9}$ | \& B1 \& <br>


\hline 9. Sight of $y=4 x+5$ for $2^{\text {nd }}$ line OR finding both gradients Statement that 'gradient $=4$ ' for both AND 'Yes'. \& | B1 |
| :--- |
| B1 |
| 2 | \& | Equations must be correctly re-arranged. |
| :--- |
| Allow statement that 'gradients are equal' provided 4 already seen. |
| Allow second B1 after 1 error in re-arranging (provided no error in finding coefficient of $x$ ). |
| (Award B0 for an unsupported statement of 'equal gradients'.) | <br>

\hline
\end{tabular}

\begin{tabular}{|c|c|c|}
\hline \begin{tabular}{l}
January 2015 \\
Unit 2 Higher Tier
\end{tabular} \& M
\(\mathbf{a}\)
\(\mathbf{r}\)
\(\mathbf{k}\) \& Final Mark Scheme Comment \\
\hline \begin{tabular}{l}
10. \(\mathrm{b}+4 \mathrm{c}=310,2 \mathrm{~b}+3 \mathrm{c}=345\) \\
Method to find first variable Correct first variable Correct second variable \\
(£)455 AND ' No ’
\end{tabular} \& B1
M1
A1
A1
B1

5 \& | Strategy of forming a pair of equations. (Do not penalise for not defining variables.) |
| :--- |
| FT for equations of equivalent difficulty. $\mathrm{b}=(\mathfrak{f}) 90, \mathrm{c}=(\mathfrak{f}) 55 \quad \text { OR } \quad(\mathfrak{f}) 345+2 \times(\mathfrak{f}) 55$ |
| FT 'their first variable' for second A1. |
| FT 'their derived $b$ anc $c$ '. |
| An unsupported answer gets 0 marks. | <br>

\hline | 11. (a) All correct entries. |
| :--- |
| (b) Sight of $\frac{1}{5} \times \frac{1}{3}$ or $\frac{4}{5} \times \frac{2}{3}$ $\frac{1}{5} \times \frac{1}{3}+\frac{4}{5} \times \frac{2}{3}=9 / 15(=3 / 5)$ | \& \[

$$
\begin{gathered}
\text { B2 } \\
\text { B1 } \\
\text { M1 } \\
\text { A1 } \\
5
\end{gathered}
$$

\] \& | B1 for three correct entries. |
| :--- |
| FT from their tree, probabilities must be < 1 but not equal to $1 / 2$. | <br>

\hline $$
\text { 12. } \begin{aligned}
5 h+3 k & =2 h+8 \\
5 h-2 h & =8-3 k \\
3 h & =8-3 k \\
h & =(8-3 k) / 3 \text { or equivalent }
\end{aligned}
$$ \& \[

$$
\begin{gathered}
\hline \text { B1 } \\
\text { B1 } \\
\text { B1 } \\
\text { B1 } \\
4
\end{gathered}
$$

\] \& | Includes correct expansion. FT until $2^{\text {nd }}$ error. |
| :--- |
| Mark final answer. | <br>


\hline | 13. (a) (Angle $C O A=) 2 \times 67\left({ }^{\circ}\right)\left(=134^{\circ}\right)$ $\begin{aligned} & {\left[180\left(^{\circ}\right)-134\left(^{\circ}\right)\right] / 2 \text { or equivalent }} \\ & \quad(\text { Angle } O A C=) 23\left({ }^{\circ}\right) \end{aligned}$ |
| :--- |
| (b) $36\left({ }^{\circ}\right)$ |
| Alternate segment theorem | \& M1

M1
A1

B1

E1 \& | Check diagram. |
| :--- |
| FT 'their angle COA'. |
| Accept a correctly worded equivalent e.g. 'the angle between a tangent and a chord is equal to the angle in the alternate segment'. |
| E1 is dependent on B1 having been awarded. | <br>

\hline | 14. (a) $x=0 \cdot 2747474 \ldots . . \quad 100 x=27 \cdot 47474 \ldots$. with an attempt to subtract |
| :--- |
| $272 / 990$ or 136/495 |
| (b) (i) 1 |
| (ii) $1 / 9$ or $0 \cdot 111 \ldots$ |
| (c) $25+15 \sqrt{ } 2-15 \sqrt{ } 2-18$ or equivalent $=7$ | \& M1

A1
B1
B2

M1
A1

7 \& | Or $10 x$ and $1000 x$, or equivalent. Or an alternative method. An answer of 27.2/99 gains M1 only. |
| :--- |
| Mark final answer. Do not ignore incorrect cancelling. |
| B1 for $9^{-1}$ or $1 / 3^{2}$ or $1 / 3 \sqrt{ } 729$ or $1 / 729^{1 / 3}$ or $(1 / 729)^{1 / 3}$ or ${ }_{3} \sqrt{ }(1 / 729)$ Mark final answer. |
| Do not ignore subsequent working. |
| If no marks awarded, SC1 for 3 of the 4 terms correct. NB $25+\sqrt{ } 30-\sqrt{ } 30-18=7$ counts as 2 errors and gets 0 marks. | <br>

\hline | 15. (a) Sketch with reflection in $x$-axis. Vertex must touch the $x$ axis. |
| :--- |
| (b) Sketch with horizontal compression towards $y$-axis. Must pass through $(0,1)$. | \& B1

B1

2 \& | Clear intention shown (to draw curve of same size and shape). |
| :--- |
| Must be a convex curve. |
| Clear intention shown. Must be a convex curve. | <br>

\hline
\end{tabular}

UNIT 3 - FOUNDATION TIER

| January 2015 <br> UNIT 3 (calculator allowed) Foundation | Mark | Final Mark Scheme Comments |
| :---: | :---: | :---: |
| 1. (a)$(\mathfrak{f}) 26.5(0)$ <br>  <br> (f)2.97 <br>  <br> $(\mathfrak{f}) 3.6(0)$ | $\begin{aligned} & \hline \text { B1 } \\ & \text { B1 } \\ & \text { B1 } \end{aligned}$ |  |
| Total $=(\mathfrak{f}) 33.07$ | B1 | FT if at least B1 awarded. |
| $\begin{gathered} 1 \text { (b) } 40-(\mathfrak{f}) 33.07 \\ (£) 6.93 \end{gathered}$ | $\begin{gathered} \text { M1 } \\ \text { A1 } \end{gathered}$ | FT candidate's total. |
| 1 (c) Two free tickets identified (£) 10.6(0) ISW. | $\begin{gathered} \text { M1 } \\ \text { A1 } \end{gathered}$ | FT 'their (£) 33.07 ' <br> Sc 1 for ('their $(\mathfrak{£}) 33.07$ '- $(\mathfrak{£}) 15.9(0)=)(\mathfrak{f}) 17.17$ where drinks and sweets have not been considered. |
|  | 8 |  |
| 2. (a) 7240 | $\begin{gathered} \hline \text { B1 } \\ 1 \end{gathered}$ |  |
| 2. (b) 37 | B1 1 |  |
| 3. Evidence of counting squares 24-28 inclusive ( $\mathrm{cm}^{2}$ ) | $\begin{gathered} \text { M1 } \\ \text { A1 } \\ 2 \\ \hline \end{gathered}$ |  |
| 4. 5(p) and 2(p) coins | B2 2 | B1 if candidate identifies 14(p) as the difference OR identifies 7(p) needs to be given. |
| 5. (a) All letters correctly placed Regular Polygon C, E, F Irregular Polygon B,G,H Not a Polygon A, D | B3 | B2 for six or seven shapes correctly placed. B1 for four or five shapes correctly placed. Duplication of letters counts as an error. <br> Sc1 for three shapes correctly placed with one in each box with no shapes incorrectly placed. |
| (b) indicates B and H | B1 |  |
| (c) indicates F and C | $\begin{gathered} \text { B1 } \\ 5 \\ \hline \end{gathered}$ |  |
| 6(a) (lemon lush=) 24 | B2 | B1 for one can $=8$ <br> Alternative: $3 / 10$ of $80(=8 \times 3)=24$ |
| (b) difficult to show a part of the diagram with accuracy. e.g. the symbol needs to be easily divided into 8 pieces. | E1 | e.g. the data for Tuesday's sales needs to be a multiple of 8 |
| (c) One row represented in symbols consistent with the key. <br> Two rows represented in symbols consistent with the key. <br> Three rows represented in symbols consistent with the key. | $\begin{aligned} & \text { B1 } \\ & \text { B1 } \end{aligned}$ |  |
|  | B1 | cool cola $\bigoplus \bigoplus \bigoplus \bigoplus \bigoplus \supseteq$ |
|  |  | Orange Fizz ゆ○○Ө |
|  |  | Lemon Lush |
|  | 6 |  |

\begin{tabular}{|c|c|c|}
\hline January 2015
UNIT 3 (calculator allowed) Foundation \& Mark \& Final Mark Scheme Comments \\
\hline \begin{tabular}{l}
7. (a) Hands drawn to show twenty minutes to 5 . \\
(b) (16:40 to \(19: 40\) Total time) \(3 \mathrm{hrs}=180 \mathrm{~min}\) or \(150 \mathrm{mins}=2 \frac{1}{2} \mathrm{hrs}\) \((180-150=) 30(\mathrm{mins})\) or \(\left(3-2 \frac{1}{2}=\right) \frac{1}{2}(\mathrm{hr})\). \((30 \div 2=) 15(\mathrm{~min})\) or \((1 / 2 \div 2=)^{1 / 4}(\mathrm{hr})\) or
\end{tabular} \& \[
\begin{gathered}
\text { B1 } \\
\text { B1 } \\
\text { B1 } \\
\text { B1 } \\
4
\end{gathered}
\] \& \begin{tabular}{l}
Hour hand should be between 4 and 5 but accept at 4 . \\
FT total 'their 180 mins'
\end{tabular} \\
\hline \begin{tabular}{l}
8. (a) Median 58 (Thursday) \\
(ii) Sum of the numbers (295) \\
Sum/5 \\
59 \\
(iii) 42 \\
(b) Correct interpretation of the range of daily sales of at least one of milkshakes or smoothies, in context.
\end{tabular} \& B1
M1
m1
A1
B1
E1

6 \& | B0 for Thursday without number. |
| :--- |
| For attempt to add the numbers division by 5 of a number in the range 215-375 $(54+38+65+58+80) / 5$ gets M1, m1 |
| FT interpretation of 'their range' if in context. On average sales of milkshakes are consistent/around the same each day but smoothies' sales are more varied. |
| E0 if no interpretation. Eg the range is smaller and the mean is the same. | <br>

\hline | 9. (number of adults needed $240 \div 15$ ) 16 (adults needed) |
| :--- |
| ( $240+16=) 256$ (total people on the trip) |
| $256 \div 50(=5.12)$ or equivalent |
| 6 (buses needed) |
| Look for |
| - Spelling in at least one statement or sentence |
| - Clarity of text explanations, |
| - The use of notation (watch for the use of ' $=$ ', ' - ' and ' + ' being appropriate. |
| QWC2: Candidates will be expected to |
| - Present work clearly, with words explaining process and steps |
| AND |
| - Make few, if any, mistakes in mathematical form, spelling, punctuation and grammar in their final answer. |
| QWC1 : Candidates will be expected to |
| - Present work clearly, with words explaining process or steps |
| OR |
| - Make few, if any, mistakes in mathematical form, spelling, punctuation and grammar in their final answer. | \& | B1 |
| :--- |
| B1 |
| M1 |
| A1 |
| QWC2 | \& | Any appropriate method that gives 16 adult places. |
| :--- |
| FT 'their 256' or 240 |
| If no marks awarded, SC1 for use of 1 adult for every 15 students. e.g. 45 students and 3 adults per bus. Award M1A1 for " $240 \div 50(=4.8)$,so 5 buses needed" only if neither B1 has been awarded. |
| QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. |
| QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar. |
| OR |
| Evident weakness in organisation of material but using acceptable mathematical form, with few, if any, errors in spelling, punctuation and grammar. QWC0 Evident weakness in organisation of material, and errors in use of mathematical form, spelling, punctuation and grammar. | <br>

\hline
\end{tabular}

| January 2015 <br> UNIT 3 (calculator allowed) Foundation | Mark | Final Mark Scheme Comments |
| :---: | :---: | :---: |
| 10. 5.1 | B2 $2$ | B1 for 5.0(64417504..) seen B0 for 5 alone. |
| 11. $\begin{aligned} & (80 \times 3.50=)(\mathcal{f}) 280 \\ & (2 / 5 \times 80=) 32 \\ & 280-32 \times 5 \end{aligned}$ <br> (£) 120 $120 /(80-32)$ <br> (£)2.5(0) | $\begin{gathered} \text { B1 } \\ \text { B1 } \\ \text { M1 } \\ \text { A1 } \\ \text { M1 } \\ \text { A1 } \\ 6 \end{gathered}$ | FT 'their 280 'and 'their 32 ' so long as B1 awarded. <br> FT 'their 120 'and 'their 32 ' |
| 12. Intersecting construction arcs with radius 9 cm and 7.5 cm drawn from A and B respectively. Completed triangle with vertex at intersection of construction arcs. | $\begin{gathered} \text { M1 } \\ \text { A1 } \\ 2 \\ \hline \end{gathered}$ | Accuracy $\pm 2 \mathrm{~mm}$ <br> M0 for freehand arcs or no arcs seen. |
| 13. $a=5$ <br> Substitution of $\mathrm{a}=5$ <br> e.g. $5+3 \times 5+b=23$ or equivalent $b=3$ | $\begin{gathered} \text { B1 } \\ \text { B1 } \\ \\ \text { B1 } \\ 3 \end{gathered}$ | FT 'their a'. <br> Implies previous B1. Look for answers in table. |
| 14. (a) 9:30 (am) or 09:30 <br> (b) horizontal line drawn stopping at point (10:20, 2) <br> (c) Draw a line with positive gradient from $(10: 20,2)$ to $(10: 40,3)$ <br> Use of distance divided by time or gradient of line. 3 (km/h) | B1 <br> B1 <br> M1 <br> A1 <br> 5 | FT part (b) for start of line. <br> Ignore additional lines beyond 10:40. <br> FT positive gradient of 'their line'. <br> ' 1 km in 20 mins', without further working, earns M1 A0 |
| $\begin{aligned} & \text { 15. } 252 \div 6(=42) \\ & 210(\mathrm{~kg}) \text { AND } 42(\mathrm{~kg}) \end{aligned}$ | $\begin{gathered} \text { M1 } \\ \text { A1 } \\ 2 \end{gathered}$ |  |
| 16. (a) | $\begin{gathered} \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ 6 \end{gathered}$ | Accept embedded answer. FT until $2^{\text {nd }}$ error. <br> FT until $2^{\text {nd }}$ error. <br> Accept 7/2. Mark final answer. |
| 17. a) Points plotted at mid-points of groups and straight lines connecting the points <br> b) Appropriate comment that compares purchases made on Monday and Saturday. | B2 <br> E1 <br> 3 | B1 at least 4 points plotted and joined correctly OR for all points plotted correctly but not joined, OR consistent horizontal translation within the limits of the groups. <br> Accept intention of straight lines. Ignore any lines outside the first and last points. <br> E.g. "More low value purchases on a Monday morning", "More money is spent on a Saturday afternoon". |


| January 2015 <br> UNIT 3 (calculator allowed) Foundation | Mark | Final Mark Scheme Comments |
| :---: | :---: | :---: |
| 18. $\begin{aligned} & \left.\mathrm{x}^{2}=\right) \quad 12.3^{2}+5.9^{2} \\ & \mathrm{x}^{2}=186.1 \quad \text { OR }(\mathrm{x}=) \sqrt{ } 186.1 \\ & (\mathrm{x}=) 13.6(418 \ldots \mathrm{~cm}) \end{aligned}$ | $\begin{gathered} \text { M1 } \\ \text { A1 } \\ \text { A1 } \\ 3 \end{gathered}$ |  |
| $\begin{aligned} & \text { 19. } \begin{aligned} &\text { Area of semi-circle }=) \pi \times 6 \cdot 3^{2} / 2 \\ &=62 \cdot 3 \text { to } 62 \cdot 4\left(\mathrm{~m}^{2}\right) \\ & \text { (Number of tins of paint needed }=)\left(\pi \times 6 \cdot 3^{2} / 2\right) \div 15 \\ &=5(\text { tins }) \end{aligned} \end{aligned}$ | $\begin{gathered} \text { M1 } \\ \text { A1 } \\ \text { M1 } \\ \text { A1 } \\ 4 \end{gathered}$ | FT 'their area' provided $\pi$ used in the calculation. Provided of equivalent difficulty. |
| 20. Perpendicular bisector of line joining Aber and Bont drawn. <br> Correct 2 points identified. | B1 B2 $3$ | Use overlay with tolerances included. <br> B1 for 1 point identified Or correct circle or arc drawn within tolerance. <br> If no marks awarded, SC 1 for complete method but outside tolerances. |

\begin{tabular}{|c|c|c|c|c|c|c|c|}
\hline January 2015 UNIT 3 Higher \& Mark \& \multicolumn{6}{|c|}{Final Mark Scheme Comments} \\
\hline 1. \(\frac{27}{18}\) or equivalent.
\[
=1.5
\] \& \[
\begin{aligned}
\& \text { B2 } \\
\& \text { B1 }
\end{aligned}
\] \& \multicolumn{6}{|l|}{\begin{tabular}{l}
B1 for sight of 27 or 18. \\
FT provided B1 already awarded. \\
If no marks awarded, allow SC1 for answers of 18.72 (not used brackets) or 0.5 (used squared instead of cubed) as evidence of a correct numerator or denominator.
\end{tabular}} \\
\hline \[
\begin{aligned}
\& \text { 2. } 252 \div 6(=42) \\
\& 210(\mathrm{~kg}) \text { AND } 42(\mathrm{~kg})
\end{aligned}
\] \& \[
\begin{gathered}
\text { M1 } \\
\text { A1 } \\
2
\end{gathered}
\] \& \& \& \& \& \& \\
\hline \begin{tabular}{l}
3. (a) \(x(x-9)\) \\
(b) \(3 x-21=21\) \\
OR \(\quad \mathrm{x}-7=21 / 3\) \\
\(3 \mathrm{x}=42\) \\
OR \(x=7+7\)
\[
x=14
\] \\
(c)
\[
\begin{gathered}
9 y-5 y=12+2 \\
4 y=14 \\
y=3.5
\end{gathered}
\]
\end{tabular} \& B1
B1
B1
B1
B1
B1
B1
7 \& Accep
FT un
Accep \& \begin{tabular}{l}
embedded \\
\(2^{\text {nd }}\) error. \\
7/2. Mark
\end{tabular} \& ver. FT

answe \& until $2^{\text {nd }}$ erro \& \& <br>

\hline $$
\text { 4. } \begin{aligned}
(\text { Distance }=) \frac{90 \times 1000}{3600} \times 10 & \\
& =250(\mathrm{~m})
\end{aligned}
$$ \& \[

$$
\begin{gathered}
\text { M2 } \\
\\
\text { A1 } \\
3
\end{gathered}
$$

\] \& \multicolumn{6}{|l|}{| M1 for a distance conversion into m OR a speed conversion into 'per second' OR speed $\times$ time. |
| :--- |
| CAO. Allow M1 SC1 for 0.25 km . |} <br>


\hline \multirow[t]{7}{*}{| 5. One correct evaluation $2 \leq x \leq 3$ |
| :--- |
| 2 correct evaluations $2.25 \leq x \leq 2.4$ one either side of 0 |
| 2 correct evaluations $2.25 \leq x \leq 2.35$ one either side of 0 |
| If evaluations not seen, accept 'too high' or 'too low'. |} \& B1 \& \multicolumn{2}{|l|}{$\underline{\mathrm{x}} \quad \underline{5 x^{3}-2 \mathrm{x}-60}$} \& \multicolumn{2}{|l|}{$\underline{\mathrm{x}} \quad \underline{5 \mathrm{x}^{3}-2 \mathrm{x}-60}$} \& \multicolumn{2}{|l|}{$\underline{\mathrm{x}} \quad 5 \mathrm{x}^{3}-2 \mathrm{x}-60$} <br>

\hline \& \& 2 \& -24 \& 2.25 \& -7.547 \& 2.36 \& 1.001 <br>
\hline \& B1 \& 2.1 \& -17.895 \& 2.26 \& -6.804 \& 2.37 \& 1.820 <br>
\hline \& M1 \& 2.2 \& -11.16 \& 2.27 \& -6.055 \& 2.38 \& 2.646 <br>
\hline \& \& 2.3 \& -3.765 \& 2.28 \& -5.298 \& 2.39 \& 3.480 <br>
\hline \& \& 2.4 \& 4.32 \& 2.29 \& -4.535 \& 2.4 \& 4.320 <br>
\hline \& \& 2.5 \& 13.125 \& 2.3 \& -3.765 \& \& <br>
\hline $x=2.3$ \& A1 \& 2.6 \& 22.68 \& 2.31 \& -2.988 \& \& <br>
\hline \& \& 2.7 \& 33.015 \& 2.32 \& -2.204 \& \& <br>
\hline \& \& 2.8 \& 44.16 \& 2.33 \& -1.413 \& \& <br>
\hline \& \& 2.9 \& 56.145 \& 2.34 \& -0.615 \& \& <br>
\hline \& 4 \& 3 \& 69 \& 2.35 \& 0.189 \& \& <br>
\hline 6.

$$
\begin{aligned}
& \left.\hline \mathrm{x}^{2}=\right) \quad 12.3^{2}+5.9^{2} \\
& \mathrm{x}^{2}=186.1 \text { OR }(\mathrm{x}=) \sqrt{ } 186.1 \\
& (\mathrm{x}=) 13.6(418 \ldots \mathrm{~cm})
\end{aligned}
$$ \& \[

$$
\begin{gathered}
\hline \text { M1 } \\
\text { A1 } \\
\text { A1 } \\
3
\end{gathered}
$$
\] \& \& \& \& \& \& <br>

\hline | 7. (a) $\begin{aligned} \text { (Angle inside pentagon } & =540 / 5 \\ & =108\left({ }^{\circ}\right) \end{aligned}$ |
| :--- |
| (b) Sight of $60\left({ }^{\circ}\right)$ as an angle in an equilateral triangle. $\begin{equation*} 360-60-60-108 \tag{=132} \end{equation*}$ | \& \[

$$
\begin{gathered}
\text { M1 } \\
\text { A1 } \\
\text { B1 } \\
\text { M1 } \\
\text { m1 } \\
\text { A1 } \\
6
\end{gathered}
$$
\] \& \multicolumn{6}{|l|}{FT 'their 108' for all remaining marks.} <br>

\hline
\end{tabular}

\begin{tabular}{|c|c|c|}
\hline January 2015 UNIT 3 Higher \& Mark \& Final Mark Scheme Comments \\
\hline \begin{tabular}{l}
8. (Area of semi-circle \(=\) ) \(\pi \times 6 \cdot 3^{2} / 2\)
\[
=62 \cdot 3 \text { to } 62 \cdot 4\left(\mathrm{~m}^{2}\right)
\] \\
(Number of tins of paint needed \(=)\left(\pi \times 6 \cdot 3^{2} / 2\right) \div 15\) \(=5\) (tins) \\
QWC: \\
Look for \\
- spelling in at least 1 statement/sentence \\
- clarity of working \\
- correct units used i.e. \(\mathrm{m}^{2}\), tins \\
QWC2: Candidates will be expected to \\
- present work clearly, with words or quantities shown for clarity of process or steps \\
AND \\
- make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer \\
QWC1: Candidates will be expected to \\
- present work clearly, with words or quantities shown for clarity of process or steps \\
OR \\
- make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer
\end{tabular} \& \[
\begin{gathered}
\text { M1 } \\
\text { A1 } \\
\text { M1 } \\
\text { A1 } \\
\\
\\
\text { QWC } \\
2
\end{gathered}
\] \& \begin{tabular}{l}
FT 'their area' provided \(\pi\) used in the calculation. Provided of equivalent difficulty. \\
QWC2 Presents material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. \\
QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar \\
OR \\
evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. \\
QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
\end{tabular} \\
\hline \begin{tabular}{l}
9. (a) Mid-points \(10,30,50,70,90,110\) \\
Frequencies 32, 30, 23, 11, 3, 1 \\
Sum of mid-points \(\times\) freq \((=3520)\)
\[
\div 100=(\mathfrak{£}) 35.2(0)
\] \\
(b) Points plotted at mid-points of groups, and straight lines connecting the points. \\
(c) Appropriate comment that compares purchases made on Monday and Saturday.
\end{tabular} \& \begin{tabular}{l}
B1 \\
B1 \\
M1 \\
m1 \\
A1 \\
B2 \\
E1 \\
8
\end{tabular} \& \begin{tabular}{l}
FT their mid-points and frequencies. Mid-points need to be within the limits of each group, including the limits themselves. Dividing by 100 or their total frequency. \\
B1 at least 4 points plotted and joined correctly, OR for all points plotted correctly but not joined, OR consistent horizontal translation within the limits of the groups. \\
Accept intention of straight lines. Ignore any lines outside the first and last points. \\
e.g. 'More low value purchases on a Monday morning.' \\
'More money is spent on a Saturday afternoon.'
\end{tabular} \\
\hline \begin{tabular}{l}
10. Perpendicular bisector of line joining Aber and Bont drawn. \\
Correct 2 points identified.
\end{tabular} \& B1
B2

3 \& | Use overlay with tolerances included. |
| :--- |
| B1 for 1 point identified Or correct circle or arc drawn within tolerance. |
| If no marks awarded, SC 1 for complete method but outside tolerances. | <br>

\hline 11. (a) $6 \times 10^{2}$

$$
\begin{aligned}
\text { (b) } 2 \times\left(1.66 \times 10^{-24}\right) & +2.66 \times 10^{-23} \\
= & 2.99 \times 10^{-23}
\end{aligned}
$$ \& \[

$$
\begin{gathered}
\hline \text { B2 } \\
\text { M1 } \\
\text { A2 } \\
5 \\
\hline
\end{gathered}
$$

\] \& | B1 for 600 or $0.6 \times 10^{3}$. |
| :--- |
| Or equivalent. |
| A1 for $2.992 \times 10^{-23}$ or equivalent. |
| SC1 for a correct answer to their calculation written instandard form to 3 s.f., provided rounding required. | <br>

\hline $$
\begin{aligned}
& \text { 12. }(\mathrm{x}+15)(\mathrm{x}-3) \\
& \mathrm{x}=-15 \text { or } \mathrm{x}=3
\end{aligned}
$$ \& \[

$$
\begin{gathered}
\text { B2 } \\
\text { B1 } \\
3 \\
\hline
\end{gathered}
$$

\] \& | B1 for (x...15)(x...3). |
| :--- |
| FT for their pair of brackets. Both solutions needed for this B1. B0 for solutions obtained from the quadratic formula. | <br>

\hline $$
\text { 13. } \begin{aligned}
& 1 / 3 \times 5^{2} \times 9 \\
&=75 \quad \\
& \mathrm{~cm}^{3}
\end{aligned}
$$ \& \[

$$
\begin{gathered}
\mathrm{M} 1 \\
\text { A1 } \\
\text { U1 } \\
3
\end{gathered}
$$
\] \& Independent mark. <br>

\hline | 14. (a) $3,7,15,21,23,24$ |
| :--- |
| (b) Idea, plotting the upper class boundary consistently with the corresponding cumulative frequency. |
| At least 4 points plotted correctly. |
| All points correct and joined by straight lines or a curve, including to zero. |
| (c) A correct reading from their graph. |
| (d) Pupils got quicker AND suitable reason |
| e.g. "upper quartile is now less than the median from the start of the week", "both quartiles have come down in time". | \& | B1 |
| :--- |
| M1 |
| A1 |
| A1 |
| B1 |
| E2 $7$ | \& | FT, for all marks, their cumulative frequencies, provided an attempt made to be cumulative. |
| :--- |
| If no marks awarded, SC 1 if points plotted at mid-points. M0A0A0 for bars with or without plots. |
| Answers are likely to be in the range 27.5 to 29. |
| E1 for 'pupils got quicker' OR |
| E1 for valid statement e.g.'the spread of marks has not changed much from start of the week.' |
| If the quartiles from the start of the week are quoted, they need to be correct. $\mathrm{LQ}=23$ to $24 \cdot 5, \mathrm{UQ}=32$ to $33 \cdot 5$. | <br>

\hline
\end{tabular}



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