## $\frac{\text { WJEC }}{\text { CBAC }}$

## GCSE MARKING SCHEME

MATHEMATICS - WALES PILOT

NOVEMBER 2010

## INTRODUCTION

The marking schemes which follow were those used by WJEC for the November 2010 examination in GCSE MATHEMATICS - WALES PILOT. 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.

| 2010 Autumn Paper 1 (Non calculator) Wales Pilot Foundation Tier | Marks | POST CONFERENCE MARK SCHEME (14/11/2010) <br> Comments (Page 1) |
| :---: | :---: | :---: |
| 1. (a) (i) Thirty five thousand two hundred and seventy six <br> (ii) 16340 <br> (b) (i) 28 and 62 <br> (ii) 43 <br> (iii) 42 <br> (iv) 8 <br> (v) 64 <br> (c) 8 <br> (d) (i) 7680 <br> (ii) 8000 | B1 <br> B1 <br> B1 <br> B1 <br> B1 <br> B1 <br> B1 <br> B1 <br> B1 <br> B1 <br> 10 | C.A.O. <br> C.A.O. <br> C.A.O. <br> C.A.O. <br> C.A.O. <br> C.A.O. <br> Accept $8^{2}$ <br> Accept $8 \times 3$ OR $3 \times 8$ <br> C.A.O. <br> C.A.O. |
| ```2. g(rams) cl OR mm 3 OR cm}\mp@subsup{}{3}{3}\mathrm{ OR cc OR ml m(etres) m``` | $\begin{gathered} \hline \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ 4 \end{gathered}$ | $\begin{aligned} & \hline \text { C.A.O. } \\ & \text { C.A.O. } \\ & \text { C.A.O. } \\ & \text { C.A.O. } \end{aligned}$ |
| 3. (a) Lines Curve <br> (b) Line of symmetry on lizard 4 lines of symmetry | $\begin{gathered} \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B2 } \\ 5 \end{gathered}$ | C.A.O. <br> C.A.O. <br> C.A.O. <br> B1 for at least 2 lines of symmetry with up to 1 incorrect line. |
| 4. A should be nearer $1 / 4$ than 0 or $1 / 2$ B should be between $1 / 2$ and $3 / 4$ | B1 for each | Accept 2, 4 and 5 instead of A, B and C respectively |
| 5. (a) Wednesday <br> (b) 4 <br> (c) 1 <br> (d) 31 <br> (e) 5 | B1 B1 B1 B1 B1 5 | $\begin{aligned} & \hline \text { C.A.O. } \\ & \text { C.A.O. } \\ & \text { C.A.O. } \\ & \text { C.A.O. } \\ & \text { C.A.O. } \end{aligned}$ |
| 6. (a) <br> (b) $1 / 5$ of $40=8$ $\begin{aligned} & \text { AND } 8 \times 2 \\ & =16 \end{aligned}$ <br> (c) $1 \%$ of $400=4$ AND $6 \times 4$ $=24$ | $\begin{gathered} \text { M1 } \\ \text { A1 } \\ \text { A1 } \\ \\ \text { M1 } \\ \text { A1 } \\ \text { M1 } \\ \text { A1 } \\ 7 \end{gathered}$ | Any correct complete method for the multiplication of 124 by 36. <br> For either 744 or 3720 OR any 2 of 144,720 and 3600 <br> (Apply 'one error' in other methods) <br> Place value errors get M0, A0, A0 <br> C.A.O. <br> Any valid method. Allow M1 for $2 / 5 \times 40$ <br> C.A.O. <br> Any valid method. Allow M1 for 6/100 $\times 400$ <br> C.A.O. |


| 2010 Autumn Paper 1 (Non calculator) Wales Pilot Foundation Tier | Marks | POST CONFERENCE MARK SCHEME (14/11/2010)  <br> Comments (Page 2) |
| :---: | :---: | :---: |
| 7. (a) $8 \cdot 4-8 \cdot 8$ <br> (b) EF <br> (c) BE <br> (d) (i) $52-56\left({ }^{\circ}\right)$ <br> (ii) $154-158\left({ }^{\circ}\right)$ <br> (e) reflex <br> (f) All 4 correct squares | $\begin{aligned} & \text { B1 } \\ & \text { B1 } \\ & \text { B1 } \\ & \text { B1 } \\ & \text { B1 } \\ & \text { B1 } \\ & \text { B2 } \\ & 8 \end{aligned}$ | $8.6 \pm 2 \mathrm{~mm}$ <br> C.A.O. <br> C.A.O. $\begin{aligned} & 54^{\circ} \pm 2^{\circ} \\ & 156^{\circ} \pm 2^{\circ} \end{aligned}$ <br> C.A.O. <br> -1 for every extra incorrect square. |
| 8. Two rectangles 10 by 4 in correct places <br> Triangle in a correct place Correct triangle | $\begin{gathered} \text { B2 } \\ \\ \text { M1 } \\ \text { A1 } \\ 4 \\ \hline \end{gathered}$ | Use overlay <br> B1 for any one correct rectangle OR B1 for a symmetrical pair of rectangles that have an incorrect '4'. |
| 9. (a) (i) $3 x$ <br> (ii) $2 x$ <br> (b) $\begin{aligned} 3 x & =15 \\ (x & =) 15 / 3 \quad \operatorname{ISW}(=5) \end{aligned}$ | B1 <br> B1 <br> B1 <br> B1 <br> 4 | Accept $x+x+x$ OR $3 \times x$ OR $x \times 3$ OR $x 3$ Accept $x+x$ OR $2 \times x$ OR $x \times 2$ OR $x 2$ <br> F.T. their $(\mathrm{a})(\mathrm{i})=15$ <br> F.T. their $\mathrm{ax}=\mathrm{b}(\mathrm{a} \neq 1)$ <br> Allow B2 for answer only of 5 |
| 10. A line of length 10 cm A line of length 7 cm An angle of $53-57^{\circ}$ Completed parallelogram | $\begin{gathered} \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ 4 \end{gathered}$ | Use overlay <br> The 2 lines must have a common vertex for second B1 Included between 2 sides one of which is 10 or 7 |
| 11. (a) (i) 27 <br> (ii) 29,31 <br> (b) (i) 400 <br> (ii) $3 \cdot 23$ <br> (iii) $(0) \cdot 16$ <br> (iv) $5 / 6-4 / 6$ $=1 / 6$ | $\begin{gathered} \hline \text { B1 } \\ \text { B2 } \\ \\ \text { B2 } \\ \text { B1 } \\ \text { B1 } \\ \text { M1 } \\ \text { A1 } \\ 9 \\ \hline \end{gathered}$ | Accept $3^{3}$ <br> B1 for both with up to 1 incorrect OR B1 for either with no incorrect <br> B1 for 25 OR B1 for 16 <br> C.A.O. <br> C.A.O. <br> Any correct method <br> C.A.O. |
| 12. (a) 6 (miles) <br> (b) 31 (miles) <br> (c) 42 (minutes) <br> (d) 1451 | B1 <br> B1 <br> B1 <br> B1 <br> 4 | C.A.O. <br> C.A.O. <br> C.A.O. <br> Accept 2:51(pm) B0 for 2:51 am OR 02:51 |
| 13. (a) $8(+) 8(+) 5$ <br> (b) 1 box of 5 bars, 1 box of 8 bars, 2 boxes of 5 bars OR 10 1 box of 5 bars and 1 box of 8 bars OR 13 <br> (c) $5+5+8=18$ AND $8+8=16$ | B1 <br> B2 <br> E2 <br> 5 | C.A.O. <br> B1 for any 3 correct and up to 1 incorrect OR 2 correct and none incorrect Ignore repeats <br> E1 for a set of trials that include EITHER $5+5+8=18$ OR $8+8=16$ |


| 2010 Autumn Paper 1 (Non calculator) Wales Pilot Foundation Tier | Marks | POST CONFERENCE MARK SCHEME (14/11/2010)  <br> Comments (Page 3) |
| :---: | :---: | :---: |
| 14. (a) Idea of ordered pairs plotted. <br> At least 5 plotted correctly, not joined. <br> (b) Positive (correlation). <br> (c) Line of best fit by eye. <br> (d) From their line | M1 <br> A1 <br> B1 <br> B1 <br> B1 $5$ | Use overlay <br> At least 2 points plotted correctly. <br> Within 2 mm of the MR-1 if axes interchanged points on the overlay. <br> C.A.O. <br> Must have positive gradient, look fit for purpose and have at least 2 points above their line and 2 points below their line. <br> F.T. if their line has a positive gradient. Reading should be exact, if the point is on the grid lines, else it should be read to either side of the 2 mm square, if the point is inside a square. |
| 15. Strategy, e.g. drawing other stairs, or sum consecutive numbers <br> $1+2+3+4+5+6+7+8+9$ OR $(9 \times 10) / 2$ OR equivalent H1 | S1 <br> M1 <br> A1 <br> 3 | e.g. drawing (1 \&) 2 steps, or 4 steps etc. |
| 16. Strategy, e.g. 7kg considered  <br>  $336 / 7$ <br>   <br>  (Total number of bags) 96 | $\begin{gathered} \text { S1 } \\ \text { M1 } \\ \text { A1 } \\ \text { A1 } \\ 4 \\ \hline \end{gathered}$ | x bags, $5(1 / 2 x)+2(1 / 2 x)=336$ or trial and improvement OR 336/3.5 or correct evaluation either side of 336 total FT |
| 17. (a) It's a leading question. <br> It shouldn't say "improvements" OR "fantastic" <br> (b)(i) What is often? OR They are too vague OR They are not clear OR You cannot get accurate results with these questions <br> (ii) Some numerical choice, <br> e.g. 1-3, 4-6 etc per week | B1 | OR There is no mention of "over what period" OR There is no mention of "Never" <br> For an answer that has an exhaustive range of quantitative choices over a time period, with no gaps. <br> Do not penalise use of 0 or 'never'. <br> B1 for a range of quantitative choices that does not fulfil all the requirements for B 2 . |
| 18.(a) Use of ( $1 / 4 \mathrm{~m}=25 \mathrm{~cm}$ and) $1 / 8 \mathrm{~m}=12.5 \mathrm{~cm}$ OR $1 / 8 \mathrm{~m}$ progress by next morning <br> Up to start of Wed correct <br> Out during Thursday. <br> (b) $8 n-5$ <br> H6ac | S1 M1 A1 B2 5 |  start end overnight <br> Monday 55 30 42.5 <br> Tuesday 42.5 17.5 30 <br> Wednesday 30 5 17.5 <br> Thursday 17.5 out  <br> B1 for $8 n$ |
| 19. (i) Angle A bisected, allow $\pm 2^{0}$ <br> (ii) Arc 5 cm centre A , allow $\pm 2 \mathrm{~mm}$ Correct region shaded <br> H7 | $\begin{gathered} \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \\ \hline \end{gathered}$ | Use overlay <br> FT from correct intentions |
| 20. (a) $\mathrm{y}^{6}$ <br> (b) $\begin{aligned} & 8 x+17=3 x+27 \\ & 8 x-3 x=27-17 \text { OR } 5 x=10 \\ & x=2 \end{aligned}$ <br> H8ac | $\begin{gathered} \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ 4 \end{gathered}$ | C.A.O. <br> Correctly expanded bracket $=8 \mathrm{x}+17 \quad$ FT until $2^{\text {nd }}$ error <br> Collect like terms <br> Accept 10/5 |


| GCSE Higher Tier Wales Pilot Nov 2010. Paper 1 | Mark | Comments |
| :---: | :---: | :---: |
| 1. Strategy, e.g. drawing other stairs, or sum consecutive numbers <br> $1+2+3+4+5+6+7+8+9$ OR ( $9 \times 10$ ) / 2 OR equivalent 45 | $\begin{gathered} \text { S1 } \\ \text { M1 } \\ \text { A1 } \\ 3 \end{gathered}$ | E.g. drawing (1 \&) 2 steps, or 4 steps, etc. |
| 2. Strategy, e.g. 7kg considered $336 / 7$ $\text { (Total number of bags) } 48 \text { (bags) }$ | $\begin{gathered} \hline \text { S1 } \\ \text { M1 } \\ \text { A1 } \\ \text { A1 } \\ 4 \end{gathered}$ | x bags, $5(1 / 2 \mathrm{x})+2(1 / 2 \mathrm{x})=336$ or trial and improve OR 336/3.5 or correct evaluation either side of 336 total FT |
| 3. (a) Intention of correct location All lines $\times 2$ <br> (b) Reflection in the line $\mathrm{x}=2$ <br> (c) Correct rotation <br> (d) $360-(180-55)$ or $55+180$ <br> $235^{\circ}$ | $\begin{gathered} \text { B1 } \\ \text { B2 } \\ \\ \text { B2 } \\ \text { B2 } \\ \text { M1 } \\ \text { A1 } \\ 9 \end{gathered}$ | Award B1 for any 3 lines x2. SC1 for enlargement different scale in the correct position B1 for reflection in any vertical or horizontal line B1 for clockwise $90^{\circ}$ rotation about origin |
| 4.(a) 24 (km) and 75 (miles) <br> (b) $20 / 8 \times 5$ <br> (c)(i) $210 / 6$ <br> $=12.5$ (miles per litre) $=(£) 35 \text { saving }$ <br> (ii) Liliput Insurance cost $20+10 \times 17.50$ $=(£) 195$ <br> One month early cost $=(\mathfrak{f}) 175$ <br> Advice stated, e.g. No, pay early saving (£)35 or (£)20 | B3 M1 A1 M1 A1 M1 A1 B1 E1 11 | B2 for either OR B1 for evidence of 5 miles to 8 km used Or equivalent in stages <br> An answer of 175 implies M1 A0 <br> Maybe implied in difference in costs statements <br> Maybe seen (c)(i) <br> E1 depends on M1 awarded in (ii) <br> Accept Yes with reason that Kevin can't pay early and then new company saves (£)15 |
| 5.(a) 33.5 (mm) <br> (b)(i) $30 \times 3+35 \times 2+80 \times 1$ <br> Intention their $\sum \mathrm{fx} / 6$ <br> 40 (mm) <br> (ii) Modal class 30 mm <br> Median 32.5 mm <br> (iii) Average selected with a reason, e.g. mean because uses all data, mode as it shows the most common, median as it is the middle. | B1 M1 <br> M1 <br> A1 <br> B1 <br> B1 <br> E1 <br> 7 | $\begin{aligned} & 90+70+80(=240) \\ & (240 / 6) \end{aligned}$ <br> Accept class 27.5 to 32.5 |
| 6.(a) Use of ( $1 / 4 \mathrm{~m}=25 \mathrm{~cm}$ and) $1 / 8 \mathrm{~m}=12.5 \mathrm{~cm}$ <br> OR $1 / 8 \mathrm{~m}$ progress by next morning <br> Up to start of Wed correct Out during Thursday. <br> (b) $-5,-2,3$ <br> (c) $8 \mathrm{n}-5$ <br> (d) $3(\mathrm{n}+4)$ | S1 <br> M1 <br> A1 <br> B2 <br> B2 <br> B2 <br> 9 | B1 $1^{2}-6,2^{2}-6,3^{2}-6$ OR any two terms correct <br> B1 for 8 n <br> B1 for $n+4 \times 3$ missing brackets, or $3 n+4$ or $n+4(\times 3)$ |
| 7.(i) Angle A bisected, allow $\pm 2^{\circ}$ <br> (ii) Arc 5 cm centre A , allow $\pm 2 \mathrm{~mm}$ Correct region shaded | $\begin{gathered} \mathrm{B} 1 \\ \mathrm{~B} 1 \\ \mathrm{~B} 1 \\ 3 \\ \hline \end{gathered}$ | FT from correct intentions |
| $\begin{aligned} & \text { 8.(a) } y^{6} \\ & \text { (b) } x^{4}+5 x \\ & \text { (c) } 8 x+17=3 x+27 \\ & 8 x-3 x=27-17 \text { OR } 5 x=10 \\ & \quad x=2 \end{aligned}$ | B1 B2 B1 B1 B1 6 | B1 for each term. If B2 penalise further incorrect work -1 <br> Expand bracket <br> FT until $2^{\text {nd }}$ error <br> Collect like terms <br> Accept 10/5 |
| 9.(a) Correct frequency polygon <br> (b) $14,38,74,80$ <br> (c) Labelled suitable uniform scales <br> Plotting at the bounds <br> Accurate plots joined with a curve or line <br> (d)(i) Median $=\ldots \ldots \ldots$ <br> (ii) Idea UQ - LQ, with an attempt at readings Interquartile range accurate for their graph | B2 <br> B1 <br> B2 <br> B1 <br> B1 <br> B1 <br> M1 <br> A1 <br> 10 | B1 if translated OR joined with curve OR one plot incorrect <br> B1 suitable scales OR labelled uniform scales but $\leq$ is included <br> FT their cumulative table only if cumulative Allow 1 error |


| GCSE Higher Tier Wales Pilot Nov 2010. Paper 1 | Mark | Comments |
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| 10.(a)(i) 1/49 <br> (ii) 1 <br> (b) 15 <br> (c) (i) $3.5 \times 10^{7}$ <br> (ii) $1.3 \times 10^{-5}$ <br> (d) $4 \times 10^{12}$ <br> (e) $2 / 3$ alone <br> (f) Either improper fraction correct and attempt to $\text { multiply }(8 / 3 \times 11 / 4), ~ \begin{aligned} & =88 / 12 \\ & =7^{1 / 3} \end{aligned}$ | B1 <br> B1 <br> B1 <br> B1 <br> B1 <br> B2 <br> B1 <br> M1 <br> A1 <br> A1 <br> 11 | In (c) only SC1 for consistent notation problem B1 for ... $\times 10^{12}$ <br> Accept 22/3 |
| 11. $3 \mathrm{~g}+2 \mathrm{~d}=32$ and $4 \mathrm{~g}+3 \mathrm{~d}=44$ Equate coeffs., allow 1 slip OR alternative Weight of goose or duck correct, $g=8$ or $d=4$ Method to find second weight <br> Other correct weight $2 \text { geese }+1 \text { duck }=20(\mathrm{~kg})$ | $\begin{gathered} \text { M1 } \\ \text { M1 } \\ \text { A1 } \\ \text { M1 } \\ \text { A1 } \\ \text { B1 } \\ 6 \\ \hline \end{gathered}$ | Alternatively: $\left.\begin{array}{rl}1 \text { goose }+1 \text { duck } & =12(\mathrm{~kg}) \\ 2 \text { geese }+2 \text { duck } & =24(\mathrm{~kg}) \\ 1 \text { goose }(=32-24) & =8(\mathrm{~kg}) \\ 1 \text { duck }=12-8\end{array}\right)=4(\mathrm{~kg})$ |
| 12. Use of the $y$ values $24,21,16,9$ and 0 with area Use of trapezium rule or idea of sum areas | $\begin{gathered} \hline \text { M1 } \\ \text { M1 } \\ \text { A1 } \\ 3 \end{gathered}$ | CAO |
| 13. $4 / 5 \times 7.5$ OR $(\sqrt{16} / \sqrt{25}) \times 7.56$ | $\begin{gathered} \text { M2 } \\ \text { A1 } \\ 3 \end{gathered}$ | M1 for use of $16 / 25$ as a scale factor or sight of $4 / 5$ |
| 14.(a) $100^{\circ}$ <br> Explanation (Angles in cyclic quad. \& angle at the centre) <br> (b) $78^{0}$ <br> Explanation (Alternate segment theorem) | $\begin{gathered} \hline \text { B1 } \\ \text { E1 } \\ \text { B1 } \\ \text { E1 } \\ 4 \end{gathered}$ | Depends on B1 or FT from 260 <br> Depends on B1 |
| $\begin{aligned} & \text { 15. (a) } y \propto 1 / x \text { OR } y=k / x \\ & 5=k / 2 \\ & y=10 / x \end{aligned}$ <br> (b) | B1 M1 A1 B2 5 | FT non linear only <br> Maybe implied in part (b) <br> FT their non linear expression B1 for each value, do not accept 10/-4 for -2.5 |
| 16.(a) $x=-7, x=-3, x=1$ <br> (b) $y=-30 x+60$ drawn <br> Intersection x approximately 1.4 to 1.5 | $\begin{gathered} \hline \text { B2 } \\ \text { M1 } \\ \text { A1 } \\ 4 \end{gathered}$ | B1 for any two correct. Allow -71. to -7 |
| 17. Approximately $233^{\circ}$ or $307^{\circ}$ Then: Approximately $307^{\circ}$ or $233^{\circ}$ with no other values | $\begin{gathered} \hline \text { B1 } \\ \text { B1 } \\ 2 \\ \hline \end{gathered}$ | FT 540 - first answer |
| 18.(a) Correct sketch (shift left) <br> Correct sketch with $(-5,0)$ indicated <br> (b) Reflection (in $x$-axis) Correct reflection and ( $0,-6$ ) indicated | $\begin{gathered} \hline \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ 4 \end{gathered}$ | SC1 for shift right with 1 indicated <br> Allow for reflection in any horizontal line |
|  | M1 M1 A1 M1 M1 A1 6 | As a common denominator Not necessarily seen as a numerator CAO. Further incorrect working gives A0 <br> FT candidate's single fraction, equivalent level of difficulty. <br> Depends on both M marks. NO marks for $10 x-46=(3-x)(x-5)$ |


| 2010 Autumn Paper 2 Wales Pilot Foundation Tier | Marks | FINAL POST CONFERENCE MARK SCHEME Comments $\quad(21 / 11 / 2010) \quad$ (Page 1) |
| :---: | :---: | :---: |
| 1. (a) 272 (p) <br> (£) 3.81 <br> £6.53 OR 653p <br> (b) $\begin{aligned} & 4 \times(\mathfrak{£}) 4.38 \\ &=(\mathfrak{£}) 17.52 \\ &(\text { Change }=)(\mathfrak{f}) 2.48 \end{aligned}$ | $\begin{gathered} \hline \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \\ \text { M1 } \\ \text { A1 } \\ \text { B1 } \\ 6 \end{gathered}$ | C.A.O. <br> C.A.O. <br> F.T. for one error $\begin{aligned} & \text { C.A.O. } \\ & \text { F.T. £20 - 'their } 17.52 \text { ' } \end{aligned}$ |
| 2. (a) $\begin{array}{lll} \hline(0) \cdot 5 & \\ 6 / 10 & \\ (0) \cdot 4(0) & \\ \cdot 6 \quad 1 / 2 \quad 40 \% \end{array}$ <br> (b) (i) $4 / 9$ <br> (ii) $5 / 9$ | $\begin{aligned} & \hline \text { B1 } \\ & \text { B1 } \\ & \text { B1 } \\ & \text { B1 } \\ & \text { B1 } \\ & \text { B1 } \\ & \\ & \hline \end{aligned}$ | C.A.O. <br> OR equivalent <br> C.A.O. <br> F.T. their figures <br> C.A.O. <br> F.T. 1 - 'their (i)' |
| 3. (a) 440 (g) <br> (b) Pointer at 440 g <br> (c) 650 $380=270(\mathrm{~g})$ | $\begin{gathered} \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ 5 \end{gathered}$ | C.A.O. <br> F.T. 'their (a)' <br> C.A.O. <br> C.A.O. <br> F.T. their readings if one correct |
| 4. (a) Evidence of square counting $\begin{aligned} & 46-54 \\ & 460-540 \end{aligned}$ <br> (b) radius chord <br> (c) hexagon cone cuboid | $\begin{gathered} \hline \text { M1 } \\ \text { A1 } \\ \text { B1 } \\ \\ \text { B1 } \\ \text { B1 } \\ \\ \text { B1 } \\ \text { B1 } \\ \text { B1 } \\ 8 \end{gathered}$ | e.g. dots in the squares <br> F.T. their area $\times 10$ <br> C.A.O. <br> C.A.O. <br> C.A.O. <br> C.A.O. <br> C.A.O. |
| 5. (a) Amount paid $=15.50 \times 6+56$ $=(£) 149$ <br> (b) Number of hours $=(118-56) / 15.5(0)$ Number of hours $=4$ | M1 <br> A1 <br> M1 <br> A1 <br> 4 | For correct substitution <br> C.A.O. <br> For correct substitution and division Allow embedded references to the correct answer. |
| 6. Man 5 to 7 ft OR 1.5 to 2.5 metres <br> Man 1.3 to $1.5 \mathrm{~cm} \quad$ Yacht length $=12 \mathrm{~cm}$ <br> Multiplying factor $=8$ to $9 \cdot 25$ <br> Estimate yacht's length $=$ man estimate $\times$ factor <br> F.T. man's height estimate $\times$ their SF ( $5-11 \mathrm{inc}$.) <br> = correct answer for their figures <br> IF B0, B0, M0, A0 awarded then <br> SC1 for answers which: <br> EITHER (a) only give man's height between $1 \mathrm{~cm} \& 1 \cdot 5$ cm and yacht's length as $12 \mathrm{~cm} \pm 2 \mathrm{~mm}$ <br> OR (b) a proper attempt at 'dividing' the yacht's length into equal parts | B1 <br> B1 <br> M1 <br> A1 | Award the B1s on sight of man's height and scale factor then use the diagram below to help in awarding the M1, A1 <br> F.T. their man's height estimate AND scale factors 5-11 inc. <br> Correct units must be seen at least once to get the final A1 |


| 2010 Autumn Paper 2 <br> Wales Pilot Foundation Tier | Marks | FINAL POST CONFERENCE MARK SCHEME |
| :---: | :---: | :---: |
| 7. Adults (£) $485+485$ $(970)$ <br> Children $254+254$ $(508)$  <br> Sea view $5 \times 4 \times 10$ $(200)$  <br> Balcony $3 \times 4 \times 10$ $(120)$  <br> Total $(£) 1798$  | B1 B1 B1 B1 B1 5 | Using the adult and child prices consistently from another row of the table gets MR-1. $\begin{aligned} & \text { SC1 for (£) } 80 \text { OR ( } £ \text { )32 but not ( } £ \text { ) } 8 \text { ( } 1 \text { error) } \\ & \text { F.T. for one error } \end{aligned}$ |
| 8. (a) (i) $x-5$ (years) <br> (ii) $\underline{\mathbf{r}}+8$ (metres) <br> (iii) 12 t <br> (b) 49 <br> (c) (i) $(x=) 11$ <br> (ii) $(\mathrm{y}=) 72$ | B1 <br> B1 <br> B1 <br> B2 <br> B1 <br> B1 <br> 7 | Penalise - 1 for using different letter. Condone capitals C.A.O. (Ignore units) <br> C.A.O. (Ignore units) <br> Accept $12 \times$ OR $12 \times$ OR t12 <br> B1 for 27 OR 22 <br> Accept embedded answers such as $11-4=7$ <br> Accept embedded answers such as 72/6=12 |
| 9. (a) Sum of the numbers (408) Sum/8 $51$ <br> (b) 65 $\text { (c) } \begin{array}{rl} 19 \quad 28 \quad 36 \underline{52 \quad 56} 61 \quad 72 & 84 \\ & =54 \end{array}$ | $\begin{gathered} \hline \text { M1 } \\ \text { m1 } \\ \text { A1 } \\ \text { B1 } \\ \text { M1 } \\ \text { A1 } \\ \text { A } \\ \hline \end{gathered}$ | For attempt to add the numbers <br> For dividing a number in the range $320-490$ inc by 8 . <br> C.A.O. <br> C.A.O. <br> For arranging the numbers in order <br> C.A.O. |
| $\begin{aligned} & \text { 10. } \begin{array}{l} \text { Other side }=60 / 12 \\ \\ =5 \\ \text { Perimeter }=5+5+12+12 \end{array} \quad \begin{array}{l}  \\ \end{array}=34(\mathrm{~cm}) \end{aligned}$ | $\begin{gathered} \hline \text { M1 } \\ \text { A1 } \\ \text { M1 } \\ \text { A1 } \\ 4 \\ \hline \end{gathered}$ | F.T. 'their 5'. |
| 11. (a) odd + odd + odd $=$ odd and 50 is even <br> (b) For example, multiply by 4 <br> (c) For example, $2 / 5$ is $4 / 10$ | E1 <br> E1 <br> E1 <br> 3 | Along these lines <br> Along these lines <br> Along these lines |
| 12. 3 or 4 angles correct and correctly labelled. <br> 3 or 4 angles correct, labels not fully correct. <br> 2 angles correct and correctly labelled. <br> 2 angles correct, labels not fully correct. <br> 1 angle correct and correctly labelled. <br> OR <br> If 0 OR 1 for their diagram or no diagram, <br> 360/240 <br> Angles are 144, 96, 78 and 42 | B4 <br> B3 <br> B3 <br> B2 <br> B1 <br> M1 <br> A1 <br> 4 | Use the overlay and allow $\pm 2^{\circ}$. <br> Correct labels (Letter/word NOT the frequency OR angle). <br> 3 correct labels is enough. <br> Accept labels in the form of a key. <br> If B0 scored for the diagram, check the angles and the method to see if the M1 and the A1 can be awarded. <br> 1 is $1 \frac{1}{2}{ }^{\circ}$ gets the M1. <br> If only B 1 is scored for the diagram, and all the angles given correctly, then cancel the B1 and award M1, A1 for 2 marks. <br> OR SC1 for all percentages: $40,26 \cdot 7,21 \cdot 7,11 \cdot 7$ rounded OR truncated. |



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| 1.(a) $\begin{gathered} x=78^{\circ} \\ y=25^{\circ} \\ z=77^{\circ} \end{gathered}$ <br> (b) $360 / 5$ <br> $72\left(^{\circ}\right)$ | $\begin{aligned} & \hline \text { B1 } \\ & \text { B1 } \\ & \text { B1 } \\ & \text { M1 } \\ & \text { A1 } \\ & 5 \\ & \hline \end{aligned}$ | FT $180-\mathrm{x}-\mathrm{y}$ |
| 2. $4 \times 6 \times$ height $=72$ or equivalent height $=3(\mathrm{~cm})$ <br> Correct method finding the area of the card, OR $12 \times 10$ Area $120\left(\mathrm{~cm}^{2}\right)$ | $\begin{aligned} & \mathrm{M} 1 \\ & \mathrm{~A} 1 \\ & \text { M1 } \\ & \text { A1 } \\ & 4 \end{aligned}$ | Sight of 3 <br> FT their height ( $6+2 \mathrm{~h}$ and $4+2 \mathrm{~h}$ ) SC1 for 84 |
| 3. Strategy, largest digits used, 9 ?? $\times 7$ ? OR 7 ?? $\times 9$ ? Digits in ??? \& ?? in descending order within each number $741 \times 93(=68913)$ | $\begin{aligned} & \text { S1 } \\ & \text { M1 } \\ & \text { A1 } \\ & 3 \end{aligned}$ |  |
| 4. (a) $\begin{gathered} 6 x-4 x=20+8 \\ 2 x=28 \\ x=14 \end{gathered}$ <br> (b) $12(\mathrm{y}+3)$ | $\begin{aligned} & \mathrm{B} 1 \\ & \text { B1 } \\ & \text { B1 } \\ & \text { B2 } \\ & 5 \end{aligned}$ | FT until $2^{\text {nd }}$ error Accept $\mathrm{x}=28 / 2$ B1 correctly factorised but not with HCF OR $12(\mathrm{y}+\ldots)$ OR $12(. .+3)$ |
| 5. (a) Entries 85458 <br> (b) Points plotted correctly Joined with a curve <br> (c) $(0,4)$ | $\begin{aligned} & \text { B2 } \\ & \text { M1 } \\ & \text { A1 } \\ & \text { B1 } \\ & 5 \\ & \hline \end{aligned}$ | B1 for any 3 correct entries <br> FT their values, allow 1 error for M1 <br> FT their values <br> FT from their graph |
| 6. (a) $12 \%$ of ( 7 x 9.75 ) OR $88 \%$ of ( 7 x 9.75 ) <br> Shirts cost (£) 60.06 <br> Started with (£) 80 <br> (b) $\quad 2.75 / 250$ and $1.20 / 110$ <br> (£) $1.1(0)$ and (£)1.09(09...) per 100 ml <br> OR 0.011 and $0.0109(p)$ per 1 ml <br> Red justified from previous working <br> ((about) 1 p per 100 ml cheaper OR equivalent for other <br> quantities compared) | M1 <br> A1 <br> A1 <br> M1 <br> A1 <br> E1 <br> 6 | Considering 1 shirt, MR-1 and FT <br> Sight of 8.19 (or 60.06) <br> FT their'68.25-8.19' +19.94 provided M1 awarded <br> OR 275/250 and 120/110 working in pence <br> 1.1 and $1.09(p)$ per 1 ml <br> OR Green 2.75/250 x110 M1 1.21 for 110 ml A1 <br> Red 1.20/110 x 250 M1 2.72(72...) for 250 ml ㄴ <br> Depends on M1 awarded |
| $\begin{aligned} & \text { 7. (a) Use of } \pi \mathrm{r}^{2} \text { with } \mathrm{r}=7.3 \\ & \begin{array}{r} 167\left(.415 \ldots \ldots \mathrm{~cm}^{2}\right) \\ \text { (b) Use of } \pi \mathrm{d} \text { with } \mathrm{d}=12.8 \text { or } 2 \pi \mathrm{r} \text { with } \mathrm{r}=6.4 \\ 40(.212 \ldots \mathrm{~cm}) \end{array} \end{aligned}$ | $\begin{aligned} & \text { M1 } \\ & \text { A1 } \\ & \text { M1 } \\ & \text { A1 } \\ & 4 \\ & \hline \end{aligned}$ | Rounds or truncates to 167 <br> Rounds or truncates to 40 |
| 8. 2007, 7 nights $125 \times 7 / 1.27$ = (£) 688.98 <br> 2008 room rate $8 \%$ of $125+125$ euros 135 (euros) 2008, 7 nights $135 \times 7 / 1.13$ $=(\mathfrak{£}) 836.28$ Increase is (£) 147.30 | $\begin{gathered} \hline \text { M1 } \\ \text { A1 } \\ \text { M1 } \\ \text { A1 } \\ \text { M1 } \\ \text { A1 } \\ \text { B1 } \end{gathered}$ | Accept 688.97 or $688.9763 \ldots$ or $689 .(. .$. <br> OR could be $\times 7$ <br> OR 945 (euros) <br> FT increased room rate provided M1 for 2008 rate <br> Accept 836.(........) <br> FT provided at least M2 or S2 awarded Only consider 1 night: 2007 (£) 98.43 S1, 2008 (£) 119.47 S1, (£)21.04 B1. Also possible M1 A1 as before for 2008 room rate (Max5 marks) |
| 9. (a) 152.5(0) <br> Overall method 2 yr compound reduction $\begin{aligned} 762.5(0)-152.5(0)=610, & 610-122 \\ & =(\mathfrak{£}) 488 \end{aligned}$ <br> (b) YES as saving $£ 427>$ cost $£ 300$ <br> OR NO with reason based on looking at one year at a time, e.g. it was worth it the first year but not in the second year | $\begin{aligned} & \text { B1 } \\ & \text { M1 } \\ & \text { M1 } \\ & \text { A1 } \\ & \text { E2 } \end{aligned}$ | Or correct $20 \%$ of any of their values <br> OR B1, M2 for 762.5(0) x $0.8^{2}$ <br> Increase compound or simple interest possible B1 only As their final answer. <br> FT their value for overall saving. E1 States saving $£ 427$ but no conclusion. 274.50 is the total savings in the $2^{\text {nd }}$ year EO |


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| 10. (a) $q-6=5 t$ $t=(q-6) / 5$ <br> (b) $\begin{aligned} & y=0 \\ & y=-6 \end{aligned}$ <br> (c) $(x-3)(x-7)(=0)$ $x=3 \text { and } x=7$ <br> (d) $4+12>7 n-5 n$ OR $5 n-7 n>-12-4$ $\mathrm{n}<8 \text { or } 8>\mathrm{n}$ | B1 B1 B1 B1 B2 B1 B1 B1 9 | FT until $2^{\text {nd }}$ error <br> B1 for (x ... 3) (x ... 7) <br> FT from their pair of brackets <br> FT until second error <br> Accept $\mathrm{n}<16 / 2$. Do not accept $-\mathrm{n}>-8$. Mark final answer |
| 11. (a) Correct substituted Pythag. $\mathrm{AB}^{2}=3.4^{2}+7.1^{2}$ $\mathrm{AB}^{2}=61.97$ <br> $\mathrm{AB}=7.872 \ldots$ rounded or truncated <br> (b) $5.6 \times \sin 32=$ <br> 2.9675 $\ldots$. rounded or truncated <br> (c) $\tan \mathrm{x}=13.4 / 3.7$ <br> $3.62162 \ldots$ OR $\tan ^{-1}(13.4 / 3.7)$ <br> $x=74.564 \ldots$. rounded or <br> truncated | M1 A1 A1 M2 A1 M1 A1 A1 9 | $\mathrm{AB}^{2}=11.56+50.41$ <br> M 1 for $\sin 32=\mathrm{DF} / 5.6$ <br> CAO |
| 12. (a) Any two lines drawn correctly ( $\mathrm{y}=8, \mathrm{y}=2 \mathrm{x}+5, \mathrm{x}=-$ 3) Correct region identified | $\begin{aligned} & \text { B2 } \\ & \text { B1 } \\ & 3 \end{aligned}$ | CAO |
| 13. (a) All correct entries <br> (b) $0.6 \times 0.4$ $0.6 \times 0.4+0.6 \times 0.4=0.48$ | $\begin{aligned} & \hline \text { B2 } \\ & \text { M1 } \\ & \text { M1 } \\ & \text { A1 } \\ & 5 \\ & \hline \end{aligned}$ | B1 for 2 pairs of branches correct <br> FT from their tree |
| 14.(a) 200 <br> (b) (i) 20 (seconds) <br> (ii) Correct histogram | $\begin{array}{\|l\|} \hline \text { B3 } \\ \text { B1 } \\ \text { B2 } \\ 6 \\ \hline \end{array}$ | Allow B1 for one correct area, or B2 for any three correct areas. $(30+40+50+40+40)$ <br> Frequency densities $4.5,5.5,6.5,2.5, \mathbf{0 . 5}$. Allow B1 for one error ( in f.d. or bars) |
| $15(a) 9.1 / 6.5$ $\times 11.5$ OR $1.4 \times 11.5$  <br> (b) $6.5 / 9.1 \times 10.5$ OR $10.5 / 1.4$ $16(\mathrm{~cm})$  <br>   $7.5(\mathrm{~cm})$ | $\begin{array}{\|l\|} \hline \text { M1 } \\ \text { A1 } \\ \text { M1 } \\ \text { A1 } \\ 4 \\ \hline \end{array}$ | Or equivalent Or equivalent |
| 16.(a) $\begin{aligned} (3 x+2)(5 x+6) & =56 \\ 15 x^{2}+10 x+18 x+12 & =56 \\ 15 x^{2}+28 x-44 & =0 \end{aligned}$ <br> (b) $\begin{aligned} & \mathrm{x}=\left\{-28 \pm \sqrt{ }\left(28^{2}-4 \times 15 \times-44\right)\right\} / 2 \times 15 \\ & \mathrm{x}=\{-28 \pm \sqrt{ } 3424\} / 30 \\ & 1.02 \text { and }-2.88 \end{aligned}$ <br> (c) Only use of 1.02 and $5 x+6$ <br> 11.1 (cm) | M1 A1 A1 M1 A1 A1 M1 A1 8 | From convincing working <br> Allow 1 slip <br> CAO <br> CAO <br> FT provided M1 in (b) |
| $\begin{aligned} & \text { 17.(a) } 9 / 25 \times 8 / 24 \\ & 72 / 600(=3 / 25=0.12) \\ & \begin{array}{l} \text { (b) } 3 / 25 \times 8 / 24 \\ 3 / 25 \times 8 / 24 \end{array}+8 / 25 \times 3 / 24 \quad(=1 / 25+1 / 25) \\ & \quad=2 / 25(0.08) \end{aligned}$ | M1 A1 B1 M1 A1 5 | Overall strategy. Correct values for probabilities Ignore incorrect final cancelling throughout |
| 18. Strategy, sine then cosine rule <br> $\mathrm{BD} / \sin 82=7.8 / \sin 35 \quad$ OR equivalent <br> $\mathrm{BD}=\sin 82 \times 7.8 / \sin 35$ <br> $\mathrm{BD}=13.4665 \ldots$ rounded or truncated <br> $\mathrm{CD}^{2}=18.3^{2}+\mathrm{BD}^{2}-2 \times 18.3 \times \mathrm{BD} \times \cos 69$ <br> $\mathrm{CD}^{2}=339.6 \ldots$ to $340.07 \ldots$ <br> CD $=18.4(\ldots \mathrm{~cm})$ | $\begin{array}{\|l\|} \hline \text { S1 } \\ \text { M1 } \\ \text { A1 } \\ \text { A1 } \\ \text { M1 } \\ \text { A1 } \\ \text { A1 } \\ 7 \end{array}$ | FT their BD |


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| 19. (a) $\frac{1}{2}\left(\frac{4}{3} \pi \mathbf{r}^{3}\right)=7 \pi$ | M2 | $\frac{4}{3} \pi \mathbf{r}^{3}=7 \pi$ <br> Without considering $1 / 2$, M1 |
| $\mathbf{r}^{3}=\frac{7 \times 3 \times 2}{4} \quad \mathbf{O R}^{3}=\frac{42}{4}$ | A1 | FT $\quad$ A0 for sphere $\mathrm{r}^{3}=7 \times 3 / 4$ |
| Radius $=2.189 \ldots . \mathrm{cm}$ | A1 | CAO But A1 full sphere $\mathrm{r}=$ 1.738.. |
| (b) Strategy, e.g. to find area $1 / 6$ or $1 / 2$ hexagon | S1 |  |
| $1 / 2 \times 4 \times 4 \times \sin 60 \quad$ OR <br> $4^{2}=h^{2}+2^{2}, h=3.464$.. together with $1 / 2 x(2$ or 4$) \times 3.464 \ldots$ <br> Area $1 / 6$ hexagon $=6.9282 \ldots$ OR $1 / 12$ hexagon 3.464 . | M1 A1 | Use of 8 instead of 4, MR-1 then FT |
| Cross section area $41.5692 \ldots\left(\mathrm{~cm}^{2}\right.$ rounded or truncated) | A1 |  |
| Volume 831.38... (cm ${ }^{3}$ rounded or truncated) | $\begin{aligned} & \text { A1 } \\ & 9 \end{aligned}$ |  |

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