# WJEC CBAC

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**
**TYSTYSGRIF GYFFREDINOL ADDYSG UWCHRADD**

# MARKING SCHEME

# MATHEMATICS - ALTERNATIVE (PILOT)

# SUMMER 2008

**INTRODUCTION**

The marking schemes which follow were those used by WJEC for the Summer 2008 examination in GCSE MATHEMATICS - ALTERNATIVE.  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.

| 2008 Summer Alternative Paper 1 (Non calculator) Foundation Tier | Marks | FINAL POST CONFERENCE MARK SCHEME Comments (25/05/2008) (Page 1) |
|---|---|---|
| 1. (a) (i) (£) twenty five million (pounds) | B1 | C.A.O. |
| (ii) (£) 107,650 | B1 | C.A.O. |
| (b) (i) 49 and 41 | B1 | **C.A.O. Throughout (b) and (c) allow answers in an** |
| (ii) 74 and 24 | B1 | C.A.O. **embedded form, for example 49 + 41 = 90 etc** |
| (iii) 59 | B1 | C.A.O. |
| (c) 33 | B1 | C.A.O. |
| (d) 20/5 **OR 20/4.9(0)** | M1 | Allow M1 for sight of 20/4.9(0) **OR 4.90+4.90+4.90+4.90 =** |
| = 4 | | **19.60 OR 20 − 4.90−4.90−4.90−4.90 = .40** |
| | A1 | C.A.O. |
| | 8 | |
| 2. (a) cylinder | B1 | C.A.O. |
| isosceles triangle | B1 | C.A.O. |
| pentagon | B1 | C.A.O. |
| parallelogram | B1 | C.A.O. |
| (b) parallel line | B1 | C.A.O. |
| AB (is perpendicular to) AD | B1 | C.A.O. |
| | 6 | **Allow A and B is perpendicular to A and D** |
| 3. (a) (i) 39 | B1 | **C.A.O.** |
| (ii) 72 | B1 | **C.A.O.** |
| (b) .4 = 40% OR 30% = .3 OR $\frac{1}{4}$ = 25% | B1 | Get 2 quantities in a common form |
| | B1 | **All 3** quantities in a common form |
| $\frac{1}{4}$ , 30% , .4 | B1 | Correct order **OR F.T. their values.** |
| **(Descending order gets B0)** | 5 | **Unsupported correct list gets all 3 marks** |
| 4. (a) 10 7 6 9 | B2 | B1 for any three correct **(tallies)** and frequencies. **Frequences** |
| (b) A(pple) | B1 | F.T. their table of frequencies **take precedence** |
| | | **B0 for 10, but A(pple) and 10 is B1 over tallies** |
| (c) A, O, B, G along one axis | B1 | **OR indicated on the bars themselves** |
| Uniform scale | M1 | F.T. their table of frequencies. |
| **(No numbers interpreted as 1-10 in ones)** | | **Use of any other scale must be clearly indicated on graph** |
| Four bars at correct heights | A2 | A1 for any 2 correct bars on F.T. |
| | 7 | **Bars can be of varying width** |
| 5. (a) | M1 | For attempting to count squares |
| **69 – 76** | A1 | Within the range inclusive |
| **690 – 760 (m²)** | B1 | F.T. their total squares × 10. |
| | | **Unsupported answers in this range get all 3 marks.** |
| (b) (i) 26 | B1 | C.A.O. |
| **cm** | U1 | Independent of all marks |
| (ii) 8 × 5 | M1 | |
| = 40 | A1 | C.A.O. |
| | 7 | |
| 6. For example: 1032 | | |
| 430 (10) | M1 | Any complete valid method that would have achieved the |
| 602 | | correct answer of 24. Repeated addition etc |
| 430 (10) | A1 | For at least one completely correct stage |
| 172 | | |
| 172 (4) Answer = 24 | A1 | C.A.O. |
| | 3 | **Unsupported 24 gets all 3 marks.** |
| 7. (a) 1/6 of 42 = 7 | M1 | Any valid method. **Allow M1 for 5/6 × 42** |
| 5/6 of 42 = 35 | A1 | C.A.O. |
| (b) 1248 | B1 | C.A.O. |
| | 3 | |
| 8. (a) 9x | B1 | |
| (b) x = 18/6 ISW (= 3) | B1 | **Allow embedded use of 3 for x.** |
| (c) a = 5×20 – 6 | M1 | For correct substitution |
| = 94 | A1 | C.A.O. |
| (d) n = 4m **OR** m = $\frac{1}{4}$n | B2 | B1 for sight of 4m without the n= |
| | | **OR B1 for rule in words, e.g. 'multiply (the first number)** |
| | 6 | **by 4' OR 'divide by 4'** |

| 2008 Summer Alternative Paper 1 (Non calculator) Foundation Tier | Marks | FINAL POST CONFERENCE MARK SCHEME Comments (25/05/2008) (Page 2) |
|---|---|---|
| 9. (a) Plots<br>    Line | P1<br>L1 | **Allow ONE error within a small square.** |
| (b) Any correct strategy, e.g. 5 times value at 6 gallons<br>    Around 135 – 136 | M1<br>A1<br><br>4 | **Unsupported 135 – 136 inclusive gets M1, A1**<br>**Unsupported 134 – 137 and not 135 – 136 inc. gets M1, A0**<br>**If no line allow correct methods that do not need the line,<br>for example, $15 \times 9 = 135$.** |
| 10. (a) 4<br>    (b) $(x – 6)/3$ **(I.S.W.)**<br>    (c) $3y + 6$ **(I.S.W.)** | B1<br>B2<br>B2<br>5 | C.A.O.<br>B1 for $x – 6/3$ OR $x – 6 \div 3$ i.e. no brackets<br>B1 for $3y \pm$ any constant (inc. 0) OR an 'expression in y' + 6 |
| 11. (a) 7170<br>    (b) **(0)**.041 | B1<br>B1<br>2 | C.A.O.<br>C.A.O. **Ignore leading zeros** |
| 12. (a) 60<br>    (b) 180 – 'their 60' – 80 **OR 100 – 'their 60'**<br>        = 40<br>    (c) 180 – 90 – 'their b' **OR 90 – 'their b'**<br>        = 50 | B1<br>M1<br>A1<br>M1<br>A1<br>5 | C.A.O.<br><br>F.T. their 60<br><br>F.T. 90 – b. |
| 13.    Correct image<br>    (Allow 2mm) | B3<br><br><br><br><br><br><br><br>3 | If not all correct, then<br>**B2 for four correct vertices**<br>**OR B1 for three correct vertices**<br>OR B2 for 'correct' enlargement NOT using the point O.<br>B1 for 'correct' enlargement NOT using the point O AND<br>orientated differently to the given figure<br>Use of a **different scale factor ($\neq$1)** should be marked then<br>MR–1. |
| 14. Rounding any two values:   312 to 300 or 310,<br>        49 to 50,    502 to 500<br><br>    **Estimate in the range 20 – 40** | M1<br><br><br>A1<br>2 | For reasonable estimates that lead to a calculation that<br>effectively only involves multiplication or division. by single<br>digit numbers.<br>Must be a correct calculation using their figures. |
| 15. (a) 3 or 4 angles correct and correctly labelled.<br><br><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><br>OR<br>    If 0 OR 1 for their diagram or no diagram,<br>    360/180<br>    Angles are 70, 60, 120 and 110<br><br><br><br>    (b) (i)  (Robert is incorrect OR cannot prove it.)<br>        You need the total number of films represented<br>        by the pie chart.<br><br>    (ii)  (Orla is incorrect ) - (No credit for this)<br>        Correct explanation such as:<br>        Probability is ¼ for the *Ritz* and '15' sector for<br>        the *Empire* is ⅓ (or more than ¼) so Orla is<br>        wrong OR equivalent. | B4<br><br><br>B3<br>B3<br>B2<br>B1<br><br><br><br>M1<br>A1<br><br><br><br>B2<br><br><br><br>B2<br><br><br><br><br>8 | Use the overlay and allow + 2°.<br>Correct labels (NOT the frequency OR angle)<br>3 correct labels is enough.<br><br><br>If B0 scored for the diagram, check the angles and the method<br>to see if the M1 and the A1 can be awarded.<br>1 is 2° gets the M1<br><br><br>C.A.O.<br>OR SC1 for all correct percentages:<br>19(.4)%, 16(.7)% 33(.3)%, 30(.6)%<br><br>**Follow through explanations that use their pie chart in (a)**<br>No credit for (Robert is incorrect OR cannot prove it.)<br>Robert is incorrect can be implied in their explanation.<br>B1 for 'He could be correct if the number surveyed for both<br>cinemas was the same'<br>Orla is incorrect can be implied in their explanation.<br>B1 for Probability is ¼ for the *Ritz*<br>B1 *Empire*'s fraction is 60/180 = ⅓ or .33 or 33%<br>DO NOT accept "because the *Empire* shows more '15' films<br>than the *Ritz*".<br>If B0 then award B1 for Robert is incorrect OR cannot prove<br>it AND Orla is incorrect. |

| 2008 Summer Alternative Paper 1 (Non calculator) Foundation Tier | Marks | FINAL POST CONFERENCE MARK SCHEME Comments (25/05/2008) (Page 3) |
|---|---|---|
| 16. (a) $9a - 10$  **(I.S.W.)** | B2 | B1 for the 9a, B1 for the $- 10$ |
| (b) $4x = 8$ | B1 | |
| $x = 8/4$  ISW  (=2) | B1 | F.T. $ax = b$, with $a \neq 1$  **Allow embedded solutions** |
| (c) $\{ (4 \times 5) + -2\}/3$ | M1 | Evidence of correct substitution |
| $= 6$ | A1 | 18/3 is M1 A0 |
| (d) $8z + z = 180$ | **M1** | |
| $\underline{z = 180/9 \ (=20) \ (°)}$ | **A1** | C.A.O. |
| | 8 | |
| 17. (a) Correct reflection in the line $x = -1$  **(0, −5)  (2, −2)  (2, −5)** | B2 | B1 for a correct reflection about $x = c$  ($c \neq -1$). OR B1 for a correct reflection in $y = -1$ OR B1 for drawing $x = -1$ Extra drawings gets B0. |
| (b) Correct translation  **(−2, 3)  (−4, 0)  (0, 0)  (−2, 1)** | B2 | B1 for translation 5 left OR B1 for translation of 2 down OR correct translation for 3 vertices. |
| | 4 | |
| 18. (a) | M1 | For a method that produces 2 prime factors from the set {2, 2, 2, 2, 2, 3, 5} before their second error. If their $2^{nd}$ prime and $2^{nd}$ error occurs at the same 'level' then allow M1. |
| 2, 2, 2, 2, 2, 3, 5 | A1 | **(Ignore 1s).** |
| $2^5 \times 3 \times 5$ | B1 | C.A.O. for the seven correct factors. F.T. their answer if at least one index form used with at least a square.  Ignore prime number requirement for this B mark. Use of brackets $(2^5)(3)(5)$ OR dot $2^5.3.5$ gets the B1. The inclusion of any 1s in their index form gets B0. $2^5 + 3 + 5$ gets B0. |
| (b) For example, even power(s) … | **E1** | |
| | 4 | |
| 19. (a) Suitable axes, with uniform scales (not necessarily labelled) | B1 | Must be numbers only.  Use of $100 < x \leq 110$ etc gets 0. 'Reversed' axes should be marked without penalty. |
| **Correct frequency polygon** | **B2** | **IGNORE bars if polygon drawn.** **B1 for 4 correct plots,** **OR B1 for all 5 correct vertical plots** **OR B1 for all 5 correct horizontal plots** **OR B1 for a correct frequency diagram (equal bars without gaps and all 5 heights correct)** **OR SC1** for a polygon with all 5 vertices correct if translated horizontally.  Usually this means the polygon has been plotted at the ends of the intervals rather than at the mid-points. |
| (b) $130 < h \leq 140$ | B1 | Accept any unambiguous indication of this interval. |
| | 4 | |
| 20. **3/12** | **M1** | |
| **3/12 × 100** | M1 | **SC2 for 125%.** |
| 25% | A1 | **SC1 for 15/12 × 100** *Penalise -1 for further working after 25%.* |
| | 3 | |
| 21. Arc of a circle centre X, radius 7cm | B1 | **Use the overlay ±2mm** |
| Perpendicular bisector of XY. | B1 | **F.T. their region, if there is a line that crosses XY and an** |
| Correct region | B1 | **arc centre X forms a similar region to the correct one.** |
| | 3 | |

# FOUNDATION TIER - PAPER 2

| 2008 Summer Alternative Paper 2 (Calculator allowed) Foundation Tier | Marks | POST CONFERENCE FINAL MARK SCHEME Comments (09/06/2008) (Page 1) |
|---|---|---|
| 1. (a) (3.40) | B1 | C.A.O. |
| 2.01 | B1 | C.A.O. |
| 7.96 | | |
| 9.24 | B1 | C.A.O. |
| 22.61 | B1 | F.T. their figures for one error **22 61 is B0, but 22−61 OR 22,61 is B1** |
| (b) 10 – 3.88 – 5.29 | M1 | |
| = (£)( 0).83 OR 83**(p) OR £.83p** | A1 | **£83 OR .83p is A0** |
| (c) 64/14.97 = 4.275…. | M1 | Allow M1, A0 for 4.2(75…) etc |
| 4 (pairs of jeans) **(£4.12 change)** | A1 | C.A.O. |
| (d) (i) 70 (%) | B1 | C.A.O. |
| (ii) 30 (%) | B1 | F.T. 100 – 'their 70' **Answers in (d) MUST be in %. 7/10, 3/10 etc get B0,B0** |
| | 10 | **However SC1 for** $\frac{70}{100}$ *AND* $\frac{30}{100}$ |
| 2. (a) kilometres **OR km** | B1 | **C.A.O.** |
| litres **OR ℓ OR cm³ OR mℓ OR cc** | B1 | **Any metric unit of volume** |
| cm² **OR mm²** | B1 | **C.A.O.** |
| (b) 28×72 + 46 | M1 | |
| = 2062 | A1 | |
| | 5 | |
| 3. (a) 320 | B1 | C.A.O. |
| (b) 280 | B1 | C.A.O. |
| (c) blue and black | B1 | C.A.O. |
| (d) **620 – 260 (7× 80 + 60 − 3× 80 + 20)** | M1 | Any correct method |
| **= 360** | A1 | C.A.O. |
| | 5 | |
| 4. (a) Correct straight lines | B1 | |
| Correct arc | B1 | |
| (b) 3 rectangles of 8 by 3 | B2 | B1 for 2 correct rectangles |
| 2 squares of 3 by 3 | B1 | |
| Makes a correct net | B1 | Award this mark even if not 'accurate' |
| | 6 | |
| 5. | | **Candidates may be confused as to the exact position of A Allow 2 to 2.2** |
| (a) A (4, 2) | B1 | |
| (b) D marked at ( −2, 2) | B1 | B1 if the correct point is clearly marked and no D as long as unambiguous. **Allow different positions of D to match any confusion concerning the position of A** |
| (c) E (4, −4) F (−2, −4) | M1 | For evidence of the two correct points |
| | A1 | For coordinates of both points, even if E and F interchanged. |
| | 4 | |
| 6. (a) (i) Cost = 500×9.75 + 1350 | M1 | For correct substitution |
| = 6225 (p) OR **(£)** 62.25 | A1 | C.A.O. |
| (ii) standing charge = **3350 − 1950 (200 × 9.75)** | M1 | For correct substitution and subtraction |
| standing charge = **1400 (p) OR (£)14** | A1 | **Allow embedded references to the correct answer.** |
| (b) (i) 12.96 | B1 | C.A.O. |
| (ii) 1.5 | B1 | C.A.O. |
| | 6 | |

4

| 2008 Summer Alternative Paper 2 (Calculator allowed) Foundation Tier | Marks | POST CONFERENCE FINAL MARK SCHEME Comments (09/06/2008) (Page 2) | |
|---|---|---|---|
| 7. Height of small building = 2cm<br>   Height of flagpole = 10 cm<br>   Multiplying factor = 5 | B1<br>B1 | **If they are measuring these lengths then allow variations that lead to 4.8 to 5.2** | **If they are marking 'steps' on the picture, award B1 for steps that lead to a scale factor between 3 – 6 but which does not lead to 5.** |
| Actual height of flagpole = 32×5<br>                                    = 160 (m) | M1<br>A1<br>4 | **Multiplying 'their 5' by 32**<br>**F.T. 'their 5' if between 3–6** | **These calculations may appear on the picture** |
| 8.                                    –9 (ºC)<br>                        Up 2 (ºC)<br>            1 (ºC)<br>                        Up 5 (ºC) | B1<br>B1<br>B1<br>B1<br><br>4 | **Accept +2, but NOT 2**<br><br>**Accept +5, but NOT 5** | |
| 9. (a)  Sum of the numbers (288)<br>         Sum/8<br>         36 | M1<br>M1<br>A1 | For attempt to add the numbers<br>**For dividing a number in the range 225 – 300 inc. by 8**<br>C.A.O. | |
| (b)  $\frac{15}{100} \times 450$  OR  .15 × 450 | M1 | Any complete correct method for finding 15% of 450. | |
| OR 10% = 45   5% = 22.5<br>Discount = (£) 67.5(0)  ISW | A1 | C.A.O. | |
| (c)  Small ices cost 9 × 85(p) = (£) 7.65 | M1 | For the complete method that leads to the total cost of the large ice creams. | |
| Total for large ices = 13.85 – 7.65 = (£)6.2(0) | A1 | C.A.O. | |
| Large ices cost  (£) $\frac{6.2(0)}{4}$<br>                           = (£)1.55 | M1<br><br>A1<br><br>9 | F.T. their "£6·20", but £13·85/4 gets M0.<br><br>If F.T. leads to fractional pence, allow A1 for any correct answer, rounded or not rounded.<br>Reversal of small and large ices is MR–1. | |
| 10. (a)  25x (pence)  **I.S.W.** | B1 | C.A.O.  **Ignore the use of p or pence.** | |
| (b)  y – 5  **I.S.W.** | B1 | C.A.O.  **Ignore the use of cm**. | |
| (c)  (i)  subtract 4  **I.S.W.** | B1 | Accept 'take away 4'<br>**Allow n − 4** | |
| (ii)  multiply by 2  **I.S.W.** | B1<br><br>4 | **Accept 'double'.**<br>**Allow n × 2** | |
| 11. (a)  15   30<br>        12   24<br>             12 | B2 | **B1 for any 3 OR 4 correct entries** | **General** |
| (b)  (i)  2/12 **I.S.W.**  (or 1/6) | B1 | F.T. 'their 2' from their table.<br>Ignore incorrect reduction | Penalise −1 once only words such as "2 out of 12", "2 in 12" OR |
| (ii)  10/12 **I.S.W.**  or 5/6 | B1 | F.T.  1− their (b) (i)<br>**even if incorrect reduction** | "2:12". When fraction and wrong <u>notation</u> |
| (c)  5/12 | B2<br><br><br><br>6 | B1 for 'their 5' (F.T. their table) in a fraction (<1).<br>**F.T. 'their 12' used in (b)(i)**<br>**B1 for y/12 (0<y<12)** | seen DO NOT penalise wrong notation. |

| 2008 Summer Alternative Paper 2 (Calculator allowed) Foundation Tier | Marks | POST CONFERENCE FINAL MARK SCHEME Comments (09/06/2008) (Page 3) |
|---|---|---|
| 12. (a) $180 - 51 - 51$ | B1 | For sight of two 51s |
| | M1 | Correct method. |
| $x = 78$ (º) | A1 | C.A.O. |
| (b) $360 - 135 - 125 - 20$ | M1 | |
| $= 80$ | A1 | |
| $y = 100$ (º) | B1 | F.T. $180 -$ 'their 80'. |
| | 6 | **Unsupported y = 80 gets the M1, A1** |
| 13. $1200 \times 1.48$ | M1 | |
| $= 1776$ | A1 | C.A.O. |
| 1780 dollars | B1 | F.T. rounding up their answer to nearest 5 dollars |
| Cost $= (1780 \div 1.48)$ | M1 | **F.T. 'their 1780' only if they have rounded or truncated 'their 1776' to the nearest \$5** |
| $= (£) 1202.70$ | A1 | Accept (£) 1202.71 OR 1202.7 |
| | 5 | **Any answer less than £1200 gets A0.** |
| 14. (a) 15 | B2 | B1 for sight of 45 or $3\times.. + 8 = 53$. **B1 for $(53 - 8) \div 3$** (B0 for 53-8) |
| (b) 20, 33, 46, 59 | B3 | B2 any 3 terms correct. **B1 for sight of 65/3** OR 13 OR one term correct. |
| | 5 | |
| 15. (a) 11 and 21 entered in the table | B1 | |
| (b) $\times 2$ $+1$ OR $+ \frac{1}{2}$ x2 OR equivalent in words | B2 | B1 for either $\times 2$ in either box OR B1 for ½ in 1st box OR +1 in 2nd box. B0 for + 2. |
| | 3 | **Allow both rules written in one box.** |
| 16. (a) $6x = 12$ | B2 | B1 for 6x, B1 for 12. Must be in an equation for B2 |
| $x = 12/6$ ISW $(=2)$ | B1 | F.T. if division not by 1. *FT until 2nd error* |
| (b) $60x - 140 = 100$ or $3x - 7 = 100/20$ | B1 | **Clearing bracket correctly** *FT until 2nd error* |
| $60x = 240$ or $3x = 12$ | B1 | **Collecting terms correctly** |
| $x = 240/60$ or $x = 12/3$ $( = 4 )$ | B1 | **Allow embedded answer** |
| | | **Answer only of x = 4 gets B3** |
| | | Watch out for compensating errors. |
| (c) $10m - 15n - 8m - 2n$ | B1 | **Clearing brackets correctly** *FT until 2nd error* |
| $= 2m - 17n$ | B1 | **Collecting terms correctly** |
| | 8 | |
| 17. | | If all the mid-points are equal then 0 marks. |
| Mid points 3, 8, 13 | B1 | FT for their mid points from within group (including bounds) |
| $3 \times 12 + 8 \times 30 + 13 \times 8$ | M1 | **FT the correct process of adding their 3 fx terms using their mid points** |
| $(\sum fx =) 380$ | A1 | **FT their correct value for $\sum fx$ using their mid points** |
| 7.6 (seconds) | A1 | **FT their $\sum fx$ / 50 correctly evaluated.** |
| | | Do not allow unsupported 8, but unsupported 7.6 gets all 4 |
| | 4 | marks. |
| 18. Overall strategy, Pythagoras' Theorem twice | B1 | **This is for the strategy of using Pythagoras twice to find AD. The correct substituted Pythagoras is credited by the M marks** |
| $AC^2 = 6^2 + 8^2$ | M1 | |
| $AC^2 = 100$ or $AC = 10$ (cm) | A1 | |
| $AD^2 = AC^2 + 5^2$ | M1 | CAO |
| $AD^2 = 125$ | A1 | FT their AC |
| $AD = 11.1(8)$ OR 11.2 (cm) | A1 | FT their AC |
| | 6 | CAO. Accept rounded or truncated. |

| Q | Alternative Summer 2008. Higher Paper 1 | Mark | Comment |
|---|---|---|---|
| 1 | (a) (i) 5x – 8 or equivalent<br>(ii) (y+8)/5<br>(b) -1, 2, 7 | B1<br>B1<br>B2<br>4 | Accept 5x $x$ – 8 or x5-8. Mark final answer. 5x($x$ -8) is B0<br>Brackets essential. Mark final answer<br>B1 for any one term correct in the correct position |
| 2 | (a) x = $72^0$<br>y = $46^0$<br>z = $46^0$<br>(b) 360/8<br>= 45<br>(c) 9z = 180    OR  8z + z = 180<br>$20^0$ | B1<br>B1<br>B1<br>M1<br>A1<br>M1<br>A1<br>7 | <br><br>FT their y = z<br>Or alternative method<br><br>Accept indication of two angles shown = $180^0$<br><br>Accept correct answers without working for M1 A1 |
| 3 | ( 3 , 6 ), ( 3 , 0 ), ( 8 , 0 ), ( 8 , 6 ) in any order<br><br>Penalise -1 for consistent reverse coordinates. | B4<br><br><br>4 | B3 for any two correct, or B2 for any one correct, or B1 for any point (3, …) or (8,…) or (…,6) or (…, 0)<br>If plots only, no coords: B2 for all 4 plots, no incorrect, or B1 for any 2 correct plots, ignore any incorrect. |
| 4 | (a){ (4x5) + -2x-2}/3<br>= 8<br>(b)  -40 | M1<br>A1<br>B2<br>4 | Evidence of substitution<br>16/3 is M1 A0<br>Allow B1 for sight of -8 or an answer of 40 |
| 5 | (a) Correct reflection (in the line x= -1)<br><br>(b) Correct translation | B2<br><br>B2<br>4 | B1 for a reflection in any vertical line, or B1 for drawing x = -1, or B1 for reflection in y=-1 without line shown.<br>B1 for translation 5 left or 2 down, or correct translation for 3 vertices |
| 6 | Rounding any two values:   312 **to** 300 or 310,<br>49 **to** 50,    502 **to** 500<br>30 or 31 | <br>M1<br>A1<br>2 | <br><br>Accept other answers from simple calculations |
| 7 | (a)  -1<br>(b) Plots correct, allowing one error<br>All points correct & joined with a curve<br>(c) y = 30 seen or implied<br>About 2.438….. | B1<br>B1<br>B1<br>M1<br>A1<br>5 | <br>FT from (a)<br>FT from (a)<br>FT their graph<br>FT their graph |
| 8 | (a) Method with least 2 correct prime factors<br>Sight of correct factors (2, 2, 2, 2, 3, 5)<br>$2^5$ x 3 x 5 or $2^5$ . 3 . 5<br><br>(c) E.g. Even power(s) … | M1<br>A1<br>B1<br><br>E1<br>4 | <br>Ignore 1s seen<br>FT their factors (with at least on index >1 used).<br>Do not ignore 1s. |
| 9 | (a) Correct frequency polygon<br><br><br>(b) $130 < h \leq 140$ | B2<br><br><br><br>B1<br>3 | IGNORE bars if polygon drawn.  B1 for 4 correct plots, or all correct vertical plots, or all correct horizontal plots. SC1 for correct frequency diagram or SC1 for translated polygon.<br>Accept any unambiguous indication of this interval. |
| 10 | 0.02 + 0.23<br>= 0.25 | M1<br>A1<br>2 | |
| 11 | Correct region shaded | B3<br>3 | Mark intention. B1 for line, B1 for arc, B1 for shading ( FT from 2 arcs or 2 lines).  Shading needs to be on both sides of the given line |
| 12 | 3/12<br>3/12  x  100<br>25% | M1<br>M1<br>A1<br>3 | <br><br>SC2 for 125% or SC1 for 15/12 x 100<br>Penalise -1 for further working after 25%. |
| 13 | (a)  8a + 12 + 6a – 2<br>= 14a + 10<br>(b) $b^4$ + 5b<br>(c)  c/10 = 9 – 3  or  c + 30 = 90<br>c = 60 | B1<br>B1<br>B2<br>M1<br>A1<br>6 | Expansion of brackets<br>Collection. FT their expansion if only one error<br>B1 for each correct term<br><br>CAO. Accept embedded answer<br>Allow SC1 for c=120 from c/10 = 9+3<br>Penalise -1 further incorrect working in each part if marks awarded |
| 14 | BC A | B2<br>2 | B1 any one correct |

| 15 | (a) 5.6 x $10^{-3}$ <br> (b) 1.2 x $10^3$ | B1 <br> B2 <br> 3 | *Penalise incorrect notation once only throughout (a) & (b)* <br> B1 for 12 x $10^2$ seen |
|---|---|---|---|
| 16 | (a) Median  16.5 to 17 <br> (b) Intention UQ(22.5 to 23) – LQ(11.5 to 12) <br>    Answers between 10.5 and 11.5 inclusive | B1 <br> M1 <br> A1 <br> 3 | Either UQ or LQ reading correct. Allow consistent misread of horizontal scale. <br> *SC1 for (a) 17.5±0.2 and (b) 13±0.4 from 130 quarters* |
| 17 | 2,  1,  1,  3 | B2 <br> 2 | B1 for any 2 correct |
| 18 | Explanation,  "don't know number of people asked", "could be different sample of people" | B2 <br><br> 2 | B1 realising that it is something to do with the survey data. <br> B1 for "don't know scale", B0 for "2008 enlarged" <br> *Ignore incorrect statements mixed in with correct statements* |
| 19 | 150 = 6 x ……..  or 150/6  or  25  seen <br> side x side = 25   or  √25  seen <br>                                5 (cm) | M1 <br> M1 <br> A1 <br> 3 |  |
| 20 | (a)  E <br> E.g. "More throws" <br> (b)(i)  40 <br>   (ii)  15 | B1 <br> E1 <br> B1 <br> B2 <br> 5 | Accept 250 <br><br><br> B1 for sight of 100-84, 100-85, 100-86, 0.14, 0.15, 0.16, 16 or 14 |
| 21 | (a)  $12x^6y^9$ <br> (b)   1/ 27 or $27^{-1}$ | B2 <br> B2 <br> 4 | B1 for any two of the number, x or y factors correct <br> B1 for $1/_4√81^3$ (= 1/ $3^3$), $3^{-3}$  or sight of 27 |
| 22 | Area scale factor $3^2$ or 9 <br>    360 / 9 <br>    40 ($cm^2$) | B1 <br> M1 <br> A1 <br> 3 | FT for M1 only incorrect evaluation of $3^2$ as 6 <br> CAO |
| 23 | (a) ( 5t +3 ) (2t + 1 ) <br>                       -3/5  and -1/2 <br> (b)   4( 3d  -  5 ) ( 3d  + 5 ) | B2 <br> B1 <br> B2 <br> 5 | B1 for (5t …1 ) ( 2t … 3 ) or split mid term and $1^{st}$ step factor <br> F.T. for pair of brackets <br> B1 for ( 6d  +  10 ) ( 6d – 10 ) |
| 24 | (a)  $47^0$ <br> Alternate segment theorem <br> (b) $66^0$ <br> (Isosceles triangle,) angle at centre twice angle at circumference | B1 <br> E1 <br> B1 <br> E1 <br> 4 | Accept equal to $A\hat{B}R$ <br><br> Do not accept calculation shown.  Accept abbreviations |
| 25 | (a) √8/√2  **with** one step of correct manipulation <br>                2 and rational <br> √8√18   with one step of correct manipulation <br>                12 and rational | M1 <br> A1 <br> M1 <br> A1 <br> 4 | E.g √8 as 2√2 or √8/√2 = √4 <br><br> E.g. √18 as 3√2 or √8√18 = √144 <br> *+SC1 if both A marks not awarded only  for not stating rational* |
| 26 | (a) Axis $x^2$ uniform scale <br>    Plot 4 points correctly <br> (b) b= 60 ± 5 <br>  Use of gradient or alternative method  to find a <br>    a = -1 ± 0.2. | M1 <br> A1 <br> B1 <br> M1 <br> A1 <br> 5 | <br><br> FT their graph for intercept with y-axis <br> FT only if intention of uniform scale for gradient method |
| 27 | Numerator  3(4x + 7) – 5(x – 4) <br> Denominator (x – 4) ( 4x + 7) <br><br>           7x + 41 <br>         (x – 4)(4x+7) | M1 <br> M1 <br><br> A2 <br><br> 4 | <br><br><br> FT one error to allow A1 or for incorrect expansion of denominator <br> SC1 for sight of 7x+41 if no other marks awarded |

| Q | Alternative Summer 2008. Higher Paper 2 | Mark | Comment |
|---|---|---|---|
| 1 | (a)  80/5 | M1 | Intention to divide 80 by 5 |
| |     16  and  64 | A1 | CAO |
| | (b) 35/100 x 340  or  35% x 340 or other method | M1 | M0 for 35% of 340 without operator |
| |     (£) 119 | A1 | |
| |     (£) 459 | A1 | FT their 35% + 340 correctly expressed as money. |
| | | 5 | *(Alternative: 135% x 340  M2,  (£)459  A1)* |
| 2 | (a)   15 | B2 | B1 for sight of 45 or 3x.. + 8 = 53. (B0 for 53-8) |
| | (b)   20, 33, 46, 59 | B3 | B2 any 3 terms correct.  B1 for sight of 65/5, or 13, or one |
| | | 5 | term correct |
| 3 | 168 / time | B1 | Accept 168 / 3.3 for B1 only |
| | 168/ 3.5 | M1 | 168/210 |
| |     = 48 (mph) | A1 | Accept 0.8 miles per minute for M1 A1 only if units given, |
| | | 3 | otherwise 0.8 gets B1 M1 A0 |
| 4 | Any 2 correct points plotted | B2 | B1 for any 1 correct plot |
| | Correct straight line drawn | B1 | |
| | | 3 | *SC1 a straight line with correct gradient of- 3* |
| 5 | (a) 11 and 21 entered in the table | B1 | |
| | (b)  x 2 + 1  (or  + ½ x2 )  or  equivalent in words | B2 | B1 for either x 2 in either box, or B1 for ½ in 1$^{st}$ box, or +1 |
| | | 3 | in 2$^{nd}$ box. B0 for + 2 |
| 6 | (a) Answers in the range 22.5 to 25 | B1 | |
| | (b) Explanation, e.g. "can't tell which person is | B1 | |
| | which", "doesn't show the people in order measured" | 2 | |
| 7 | (a) 75x – 200 = 100   or    3x – 8 = 100/25 | B1 | *FT until 2$^{nd}$ error in (a)* |
| |     75x = 300      or          3x = 12 | B1 | |
| |     x = 300/75     or          x = 12/3     ( = 4 ) | B1 | |
| | (b)  6x ( x – 3 ) | B2 | B1 correct but only partially factorised |
| | (c) 4x- 2x < 13     or -13<2x-4x | M1 | |
| |     x < 13/2   (x < 6.5) | A1 | Ignore incorrect cancelling. *SC1 for x<13/6.* No "<" then no |
| | | 7 | marks - unless reinstated, then allow M1 A1. |
| 8 | Mid points 3, 8, 13 | B1 | |
| |     3 x 12  +  8 x 30  + 13 x 8 | M1 | FT for their mid points from within group |
| |     ( ∑fx =)  380 | A1 | FT for correct sum of their *fx* terms |
| |     7.6 (seconds) | A1 | FT their ∑fx / 50 correctly evaluated. *Do not allow* |
| | | | *unsupported 8, but unsupported 7.6 awarded all 4 marks.* |
| | | 4 | *Bounds with FT answer of (lower) 5.6 or ( upper) 9.6* |
| 9 | Overall strategy, Pythagoras' Theorem twice | B1 | Need not be correct, for the idea |
| | BD$^2$ = 6$^2$ + 8$^2$ | M1 | |
| | BD$^2$ = 100  or   BD = 10 (cm) | A1 | CAO |
| | Diagonal$^2$ = BD$^2$ + 7$^2$ | M1 | FT their BD |
| | Diagonal$^2$ = 149 | M1 | FT their BD |
| | Diagonal = 12.2(06…cm) | A1 | CAO.  Accept rounded or truncated. |
| | | 6 | |
| 10 | (a) 0.4, 0.7, 0.7 and 0.3 on the  correct branches | B2 | B1 for one correct entry |
| | (b)  0.6 x 0.3 | M1 | |
| |     = 0.18 | A1 | |
| | | 4 | |

| 11 | One correct evaluation    $4 \leq x \leq 5$ | B1 | x | 5x$^3$ – 82x -45 | | |
|---|---|---|---|---|---|---|
| | | | **4** | **-53** | | |
| | 2 correct evaluations,  $4.3 \leq x \leq 4.4$, | B1 | 5 | 170 | 4.1 | -36.595 |
| | one either side of  0 | | | | 4.2 | -18.96 |
| | | | | | 4.3 | -0.065 |
| | 2 correct evaluations,  $4.3 \leq x \leq 4.35$, | M1 | **4.35** | 9.86… | 4.4 | 20.12 |
| | | | | | 4.5 | 41.625 |
| | one either side of  0 | | | | 4.6 | 64.48 |
| | OR  evaluation of  4.35 given previous B1 | | 4.31 | 1.8949 | 4.7 | 88.715 |
| | | | | | 4.8 | 114.36 |
| | | | | | 4.9 | 141.445 |
| |     4.3 | A1 | | | | |
| | *No calculations: accept "too high", ">", etc.* | 4 | | | | |

| Q | | Mark | Comment |
|---|---|---|---|
| 12 |     Correctly setting up 2 eqns for  1 variable, | M1 | Allow 1 error in any of the other 5 terms. |
| |     First variable's value | A1 | Either x = -0.5 or y = 3 |
| |     Correctly substituting their first variable | M1 | FT their first variable |
| |     Second variable's value | A1 | FT their first variable |
| | | 4 | |

| 13 | Cuboids possible are 1 by 1 by 6 and 1 by 2 by 3 | B1 | *Ignore non-cuboids and repeats* |
| | (1 x 1 x 6) surface area 182 (cm$^2$) | B1 | *If neither of the last 2 B marks awarded, then SC1 for face* |
| | (1 x 2 x 3) surface area 154 (cm$^2$) | B1 | *surface area 7(cm$^2$)* |
| | | 3 | |
| 14 | $a - 5 = b/c$ | M1 | Or alternative correct first step |
| | $c(a - 5) = b$ | A1 | |
| | | 2 | |
| 15 | (a) 3997.5mm , 4002.5 mm | B2 | B1 for each answer |
| | 3997 mm , 4003 mm | B1 | |
| | (b) 4020 mm | B1 | Or converse conversion, needs to be seen – not implied |
| | No neither | B1 | Does not depend on explanation. FT comparison from (a) |
| | | | and their interpretation of 4.02m. |
| | E.g. "Too short", "All less than 4020mm" | E1 | Ignore incorrect treatment of units if stated that neither |
| | | 6 | worktop is long enough. FT comparison from (a) and their |
| | | | correct interpretation of 4.02m (maybe implied) |
| 16 | (a) AE = 7.2 x tan 55$^0$ | M2 | M1 for tan55 = AE/7.2 |
| | AE = 10.282666 | A1 | Accept rounded or truncated |
| | (b) USE of AD = their AE – 1.3 | B1 | |
| | sin C = AD/ 12.8 | M1 | FT their AD, must be <10.282.. or <"their AE" and not 1.3 |
| | 44.(569…………)$^0$ | A1 | CAO. 42.8$^0$ from 10cm, 44.7$^0$ from 10.3cm |
| | | 6 | |
| 17 | (a) 4/3 Π x 6.4$^3$ | M1 | |
| | = 1098.(0662…cm$^3$) | A1 | |
| | (b) Correct method with values shown to find x | M1 | Or equivalent, e.g 1.6 x 3.5. Scale factor 1.6 insufficent |
| | (11.52/7.2) x 3.5 OR x/11.52 = 3.5/7.2 | | for M marks. x maybe found after y |
| | x = 5.6 (cm) | A1 | CAO |
| | y = 7 (cm) | B1 | FT x/0.8 (or x times 1.25) correctly evaluated |
| | | 5 | y=7 from 2x3.5 is B1 |
| 18 | (a) P(RR)=15/20 x 14/19 or P(GG)=4/20 x 3/19 | B1 | Accept including P(PP) |
| | P(same colour)= 15/20 x 14/19 + 4/20 x 3/19 | M1 | Accept including P(PP) |
| | = 222/380 | A1 | Accept equivalent fraction (0.5842….) |
| | | | |
| | (b)P(PP`) + P(P`P) (= 1/20x19/19 + 19/20x1/19) | M1 | Or other complete method |
| | = 2/20 | A1 | Accept equivalent fraction |
| | | 5 | **Ignore incorrect cancelling of final answers.** |
| 19 | $y = k/x^2$ or $y\alpha 1/x^2$ | B1 | |
| | 8 = k / 400 | M1 | FT non linear start |
| | $y = 3200/x^2$ | A1 | Maybe implied in (b) |
| | (b)(i) 200 | B1 | |
| | (ii) 3200/32 | M1 | If simplified FT allow B1 only |
| | 10 or -10 | A1 | Both not required |
| | | 6 | |
| 20 | (a) Any 2 of the areas: 1, 5, 6, 5, 4, 3 | M1 | |
| | 24 | A1 | |
| | (b) 1.5 (minutes) | B1 | |
| | | 3 | |
| 21 | (a) (i) 2**y** – 2**x** | B1 | |
| | (ii) **y** - **x** | B1 | Must be simplified. FT 0.5(i) simplified |
| | (b) Parallel | B1 | |
| | QR = 2MN, twice length, or reverse | B1 | |
| | | 4 | |
| 22 | Mean = 7.4 | B1 | |
| | ($\sum$fx$^2$ =) 556 **OR** ($\sum$fx$^2$/$\sum$f =) 55.6 | B1 | Or correct alternate method |
| | $\sqrt{(55.6 - 54.76)}$ (=$\sqrt{0.84}$) | M1 | FT for substitution of their values for summations into |
| | | | formula for SD |
| | S.D. = 0.9(165…) | A1 | CAO |
| | | 4 | |
| 23 | Strategy: Cosine rule followed by ½ abSinC | B1 | Or alternative correct strategy |
| | AC$^2$ = 8.8$^2$ + 7.2$^2$ – 2x8.8x7.2x Cos84$^0$ | M1 | |
| | AC$^2$ = 116.034…. | A1 | |
| | AC = 10.7719… (cm) | A1 | FT their $\sqrt{AC^2}$ only if M1 awarded |
| | Area = ½ x AC x 18.6 x Sin 47$^0$ | M1 | FT their AC |
| | = 73.26666 (cm$^2$) | A1 | Accept answers in the range 72.7 to 73.5 from rounded or |
| | | 6 | truncated correct AC |

GCSE Mathematics - Alternative Marking Scheme (Summer 2008)

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