

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

MARKING SCHEME

MATHEMATICS - 2 TIER

SUMMER 2008

FOUNDATION TIER - PAPER 1

GCSE Mathematics June 2008 Foundation paper 1 2 tier examination	Mark	Comments FINAL VERSION
1. (a) (i) 12 24 or 24 12 (ii) 46 23 or 23 46 (iii) 9 7 or 7 9 (iv) 60 4 or 4 60 (b) 7425 (c) $\frac{8}{15}$ ISW	B1 B1 B1 B1 B1 B2 7	CAO B1 for $\frac{16}{30}$ OR EQUIVALENT
2. Rectangle Trapezium Pentagon	B1 B1 B1 3	CAO CAO CAO
3. 2 1 4 1 2 3 5 8 2 3 Labels on axes Uniform scale Bars correct	B1 B1 M1 A1 4	CAO At least one label given M1 for uniform scale FT from 'their table' Accept vertical line diagram
4. (a) $5 \times 40 + 50$ (£)250 (b) 12 , 15 , 18 45	M1 A1 M1 A1 4	M1 for attempt to multiply AND add. CAO (£)450 gets M0 A0 M1 for any two correct when 3 numbers shown. CAO 18, 27, 36, 45 gets M1 A1
5. Correct image	B2 2	-1 for each incorrect vertex.
6. (a) $\frac{2}{8}$ $\frac{1}{28}$ (b) Rent (£)100 , saving (£)125 (£)100 AND (£)125 seen OR $\frac{1}{5} = 20\%$ OR $\frac{1}{5} = \frac{20}{100}$, $25\% = \frac{25}{100}$ Correct conclusion drawn (c) 50(%) 25(%) $\frac{1}{4}$ (0.5 60(%) or equivalent (d) Oranges cost (£)2.88 or 288(p) Change (£)7.12 or 712(p)	B2 M1 A1 M1 A1 B1 B1 B1 B1 B1 9	B1 for 1 correct or (1 or 2 correct and 1 incorrect) M1 for 100 or 125 AND an attempt at finding the second value OR M1 for change to %age or fractions which can be compared. Allow 25% = $\frac{1}{4}$, $\frac{1}{4} > \frac{1}{5}$ for M1 A1 CAO CAO FT for 'their' percentages FT
7. Estimate for height of car Height of house 10cm (9.6cm) height of car 2cm (1.9cm) OR 5 (equal) intervals marked on the diagram Height of house = $5 \times$ 'their height of the car' Height of house	B1 B1 M1 A1 4	1.2m to 2m 4ft to 6ft 6inches $\pm 2\text{mm}$ Accept 4 (or 5) \times 'their height' + <u>a part of 'their' height</u> FT for 'their height' Answer only which is <u>greater</u> than $4 \times$ 'their' height BUT <u>less than or equal to</u> $6 \times$ 'their' height gets B1 M1 A1
8. (a) 45 45 46 47 47 48 49 50 51 (i) Median 47 (ii) Range 6 (b) P at $\frac{1}{2}$ Q at 1 R at $\frac{1}{6}$	M1 A1 B1 B1 B1 B1 6	Attempt at ordering the numbers CAO CAO CAO SC2 3 correct probabilities given but points not marked on the diagram. CAO >0 but $< \frac{1}{4}$

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9. (a) Area = 4×3 = $12 \text{ (m}^2\text{)}$ (b) Cost of carpet = $15 \times$ 'their area' (£)180 Total cost = (£) 180 + 35 = (£) 215	M1 A1 M1 A1 m1 A1 6	CAO FT from (a) FT
10. (a) $x = (180 - 90 - 29)$ = 61° (b) Base angle = $(180 - 46)/2$ = 67° $y = 113^\circ$ (c) $360 - (130+100+70)$ 60 $z = 120$ (d) Correct reflection	M1 A1 M1 A1 B1 M1 A1 A1 B1 9	Award M1 for $90 - 29$ CAO CAO Allow 3 marks for $y = 113$ F.T $180 -$ 'their 67 ' CAO FT CAO Answer only 60° gets M1 A1 A0
11. (a) 1488 <u>11160</u> 12648 OR Any correct method that will lead to 372×34 e.g $3720 + 3720 + 3720 + 744 + 744$ = 12648 (b) (i) $(0) \cdot 04(00\dots)$ (ii) 479.887 (c) 72 (d) $8/9 - 6/9$ = $2/9$ (e) (i) 17 (ii) 27 (f) (i) $(0) \cdot 21$ (ii) 1.18	M1 A1 A1 M1 A2 B1 B1 B2 M1 A1 B1 B1 B1 B1 13	M for correct place value For 1488 and 11160 FT for 1 error One error A1. Stop at 2 nd error. CAO B1 for 8 OR 9 seen OR 24×3 OR 12×6 OR $2 \times 2 \times 2 \times 3 \times 3$ For dealing with the process correctly CAO OR equivalent fractions, but M1, A0 for $\cdot 889 - \cdot 667 = \cdot 222$ OR equivalent in % CAO CAO CAO CAO
12. Correct enlargement	B2 2	B1 for 1 incorrect vertex. MR -1 for use of incorrect factor > 1 .
13. (a) 3 or 4 angles correct and correctly labelled. 3 or 4 angles correct, labels not fully correct. 2 angles correct and correctly labelled. 2 angles correct, labels not fully correct. 1 angle correct and correctly labelled. OR <u>If 0 OR 1 for their diagram or no diagram,</u> 360/90 Angles are 100, 140, 80, 40 (b) Probabilities must add up to 1.	B4 B3 B2 B1 B1 M1 A1 E1 5	Use the overlay and allow $\pm 2^\circ$. Correct labels (Words NOT the frequency OR angle). 3 correct labels is enough. If only B1 is scored for the diagram, and all the angles given correctly, then cancel the B1 and award M1, A1 for 2 marks. If B0 scored for the diagram, check the angles and the method to see if the M1 and the A1 can be awarded. (1 is) 4° gets the M1. OR SC1 for all correct percentages: 27.8, 38.9, 22.2, 11.1. The probability should be 0.8 (not 0.9).

FOUNDATION TIER - PAPER 2

GCSE Mathematics June 2008 Foundation paper 2 Pilot examination	Mark	Comments FINAL VERSION																				
1. (a) 182.12 22.96 26.52 246.3(0) (b) $10 \times$ 'their total'/100 or equiv. (£) 24.63	B1 B1 B1 B1 M1 A1	<table border="1"> <tr> <td>CAO</td> <td>18.212</td> <td>18.21</td> <td>18.21</td> </tr> <tr> <td>CAO</td> <td>2.296</td> <td>2.29</td> <td>2.30</td> </tr> <tr> <td>CAO</td> <td>2.652</td> <td>2.65</td> <td>2.65</td> </tr> <tr> <td>FT for 1 error</td> <td>1.47</td> <td>1.47</td> <td>1.47</td> </tr> <tr> <td>FT from (a)</td> <td>24.63</td> <td>24.62</td> <td>24.63</td> </tr> </table> <p>Accept any of the above giving for part (b) All four must be attempted for M1 Unsupported (£)24.62 gets M1 A1</p>	CAO	18.212	18.21	18.21	CAO	2.296	2.29	2.30	CAO	2.652	2.65	2.65	FT for 1 error	1.47	1.47	1.47	FT from (a)	24.63	24.62	24.63
CAO	18.212	18.21	18.21																			
CAO	2.296	2.29	2.30																			
CAO	2.652	2.65	2.65																			
FT for 1 error	1.47	1.47	1.47																			
FT from (a)	24.63	24.62	24.63																			
2. (a) 105 106 107 108 109 110 111 112 113 (b) 32	M1 A1 B1 3	M1 for attempting to count squares. Accept fractional answers in the given range. CAO																				
3. 16 10 13 15	B1 B1 B1 B1 4	CAO CAO CAO CAO																				
4. (a) (i) 68 (ii) Pointer at 56 (b) 570	B1 B1 B1 3	CAO > 54 but < 58																				
5. (a) (i) 4 5 6 7 (ii) 7 6 4 5 (b) Shade any 2 sections (c) 1 2 11 22 (d) (i) 7460 (ii) 7000	B1 B1 B1 B2 B1 B1 7	CAO CAO B1 for 2 or 3 factors. <u>B0 if any incorrect factors are given.</u> CAO CAO																				
6. (-5, -2) (1,4)	B1 B1 2	CAO CAO																				
7. (a) A and D G and B (b) P and V	B1 B1 B2 4	B1 for 1 correct or (1 or 2 correct and 1 incorrect)																				
8. (a) 98° 26° (b) A line of length 13cm or 9cm or 12cm A second line having a correct length Completed correct triangle	B1 B1 M1 M1 A1 5	$\pm 2^\circ$ If B2 is given then -1 for incomplete triangle $\pm 2^\circ$ Allow ± 2 mm for each length CAO																				
9. (a) 75 (b) 2 correct lines	B1 B2 3	CAO B1 for 1 correct line or (2 correct lines and 1 or 2 diagonals)																				

GCSE Mathematics June2008 Foundation paper 2 Pilot examination	Mark	Comments FINAL VERSION	
10. (a) (i) Sausages (£) 14.16 Steak (£) 13.76 $34.80 - (14.16+13.76)$ 'their 6.88'/8 (£)(0).86 86p (ii) $20/89$ $2000/89$ 22 42(p) (£)(0).42 (b) $62 \times 12.5 / 100$ 7.75	B1 B1 M1 m1 A1 M1 A1 A1 A1 M1 A1 10	CAO CAO Allow B2 if 27.92 seen M0 for 34.80 – 5.80 FT for 'their' cost of sausage and steak Unsupported 0.86p gets B1 B1 M1 m1 A0 Accept 20/89 for the M1. CAO CAO CAO Ignore incorrect units, even %.	
11. (a) Attempt to add the numbers 'their sum'/9 59 (b) (i) 15 17 19 13 15 17 11 13 15 (ii) $6/20$ ISW 30% (0).3	M1 m1 A1 B2 B2 7	531 CAO –1 for each error max –2 B1 for denominator 20 B1 for numerator 6 in a fraction < 1 Incorrect notation used for probability –1.	
12. (a) 28(cm) ISW 20(cm) ISW (b) 4 (c) 16 OR 4^2	B1 B1 B1 B2 5	CAO CAO B1 for sight of areas 35 and 560	
13. (a) (i) $12/4$ ISW (3) (ii) 8 (b) $7x - 21$ I.S.W. (c) 18 (d) $4p - 8q$ (e) $5x + 1$ ISW	B1 B1 B1 B2 B2 B1 8	Do not penalise extra =x or x= or =n or n= in this question. Accept embedded answers in (a). Allow $7 \times x - 7 \times 3$ B1 for the 30 OR –12 $30x - 12y$ gets B0. B1 for $4p$ OR $-8q$ (NOT $-8q$) If B2 is given –1 for further incorrect work Accept $2x + 1 + 3x$ ISW	
14. Accept the names of the shapes R Triangular prism P Cuboid Q Tetrahedron S Octagon	B3 3	All correct B2 for any 2 correct B1 for 1 correct. <u>If 2 letters are put in the same cell, they are both incorrect.</u>	
15. (a) $064(^{\circ})$ (b) Line from Llandudno Line from Blackpool Lines intersecting	B1 M1 M1 A1 4	$\pm 2^{\circ}$ Use overlay FT if at least one M1 given	
16. $470 / 1.88$ (£) 250 $324 / 1.44$ (£) 225 Colin (£)25	M1 A1 M1 A1 B1 5	CAO CAO FT 1.44 euros = \$1.88 1 euro = \$1.88/1.44 324 euros = $1.88 \times 324 / 1.44$ = \$423 Colin \$47	\$1.88 = 1.44 euros \$1 = $1.44 / 1.88$ euros \$470 = $1.44 \times 470 / 1.88$ = 360 euros Colin 36 euros

GCSE Mathematics June2008 Foundation paper 2 Pilot examination	Mark	Comments FINAL VERSION
17. (a) Numbered uniform scales on both axes One correct point plotted Correct line drawn (b) Line $y = -2$ Point of intersection (0.5, -2)	B1 B1 B1 B1 5	Using standard convention When B0 is given: FT only if one scale is marked and the other unmarked but <u>apparently the same</u> OR NO SCALES MARKED but 2cm or 1cm is used as 1 unit on both axes when points are shown or lines are drawn. CAO FT for their lines.
18. Sams $330 + 330 \times 0.175$ $330 + 57.75$ (£)387.75 Sams by (£)20.25	M1 A1 A1 B1 4	M1 A1 for 330×1.175 CAO FT FT for the difference between ‘their answer for Sams’ and 408
19. $(AC^2) = 95^2 - 55^2$ (9025 – 3025) $= 6000$ $AC = 77.4(5966\dots)$ $AC = 77$ (m) or 77.5 (m)	M1 A1 A1 A1 4	Give M1 for $95^2 = AC^2 + 55^2$ CAO FT FT
20. 194, 201, 208 and 215 seen $24 \times 194 + 35 \times 201 + 28 \times 208 + 20 \times 215$ (4656 7035 5824 4300) 21815 203.8(78...) 203.9 204	B1 M1 A1 A1 4	FT for their mid points from within the groups or the use of bounds FT for correct sum of their fx terms FT for their $\Sigma fx/107$ correctly evaluated. <i>Unsupported 203.8(7....) or 203.9 or 204 given all 4 marks.</i> <i>Use of bounds gives the following answers (lower 200.8(7...) upper (206.8(7...))</i>
21. One correct evaluation (1dp) $1 \leq x \leq 2$ 2 correct evaluations $1.25 \leq x < 1.45$ one either side of 0 2 correct evaluations $1.25 < x \leq 1.35$ one either side of 0 OR correct evaluation of 1.35 if previous B1 awarded. Correct conclusion 1.3	B1 B1 M1 A1 4	$x^3 + 2x - 5$ 1 - 2 1.1 -1.4(69) 1.2 -0.8(72) 1.3 -0.2(03) 1.4 0.5(44) 1.35 0.1(6) 1.5 1.3(75) 1.6 2.2(96) 1.7 3.3(13) 1.8 4.4(32) 1.9 5.6(59) 2 7 If calculations are not shown accept the use of statements such as ‘greater than zero and less than zero’ or ‘too high and too low’. Unsupported 1.3 gets B0 B0 M0 A0

HIGHER TIER - PAPER 1

Paper 1 Two Tier 2008 Higher Tier		Comments
1. For example 90, 250 and 50 OR 100, 200 and 50 Estimate	M1 A1 2	For reasonable estimates that lead to a calculation that effectively only involves multiplication or division by single digit numbers. (100 not reasonable denominator) Must be a correct calculation using their figures, giving an estimate in the range 300 – 500.
2. (a) $240/600 \times 100$ = 40 (%) (b) $110 \times 30/12$ = 5 (large) eggs 500 (ml) (milk) AND 275 (g) (flour)	M1 A1 M1 A1 A1 5	C.A.O. Sight of any ingredient $\times 30/12$ OR $2\frac{1}{2}$ OR equivalent. C.A.O. on the first ingredient used. For the remaining 2 quantities Unsupported correct answers get the appropriate marks. For example, 5 eggs gets M1, A1, then 500 and 275 would be needed for the 3 rd mark.
3. $(-1, -1), (-3, -1), (-2, -2), (-2, -3), (-1, -3)$	B2 2	OR B1 for a pentagon with at least 2 correct vertices, OR B1 for a correct reflection about $x = c$ ($c \neq 1$). OR B1 for a correct reflection in $y = 1$ Penalise – 1 once only if there are extra drawings. If B0, then B1 for sight of the line $x = 1$ with or without any number of diagrams.
4. (a) 0.35 of 200 = 70 (b) Receipts = £160 Payouts = £140 Profit = (£)20 OR 2000 (p)	M1 A1 M1 A1 A1 4	70 out of 200 gets M1, A1. 70/200 gets M1, A0. Full method of $200 \times 80p$ – their perceived (a) \times £2 F.T. ‘their 70’.
5. (a) $x+49+3x+111 = 360$ $4x = 200$ $x = 50$ (b) $x = 60$ $y = 180 - (“their 60”+20+45)$ = 55	B2 B1 B1 B1 M1 A1 7	B1 for LHS or expression in $x = 360$ FT their LHS, equivalent difficulty, and RHS=360 or 180 FT if of form $ax = b$ No equation, but answer of 50 gets B2 CAO FT
6. (a)(i) $7x - 3x = 16 - 4$ $4x = 12$ $x = 12/4$ ISW (ii) $3x + 2 = 6 - 4x$ $7x = 4$ $x = 4/7$ ISW (b) (i) $6r + 2 + 5r$ $11r + 2$ (ii) $6p + 9 - 2p + 2$ $4p + 11$	B1 B1 B1 B1 B1 B1 B1 B1 B1 B1 B1 10	CAO In (a) and (b) stop at 2 nd error. FT Accept embedded answers in (a) CAO FT FT CAO FT CAO FT Do not ignore subsequent working in part (b)
7. Circle 3.14×10^2 $314 (m^2)$ Divide area into 3 rectangles OR 2 rectangles Area = $40 \times 40 + 50 \times 50$ OR $50 \times 40 - 30 \times 10$ = $1700 (m^2)$ Required area = 1386 m^2	M1 A1 M1 A1 A1 U1 6	CAO M1 for any other correct method CAO FT if both M marks given CAO

<p>8. Sight of 0.3 Sight of 600 and 20 Answer 40,000</p> <p>Allow Sight of 0.5 Sight of 600 and 20 Answer 24,000</p> <p>OR Sight of 0.2 or 0.4 Sight of 600 and 20 Answer 60,000 or 30,000</p>	<p>B1 B1 B1</p> <p>B1 B1 B1</p> <p>B1 B1 B1</p> <p>3</p>	<p>For this value accept (602 or 601) and 20. Answers 24,080 24,040</p> <p>For either of these values accept (602 or 601) and 20. Answers 60,200 or 30,100 60,100 or 30,050</p> <p>If any other value is used in the denominator allow SC1 for the sight of 600 AND 20 in the numerator.</p>
<p>9.</p> <p>2, 2, 5, 5, 5</p> <p>$2^2 \times 5^3$</p>	<p>M1</p> <p>A1 B1</p> <p>3</p>	<p>For a method that produces 2 prime factors from the set {2, 2, 5, 5, 5} before their second error. If their 2nd prime and 2nd error occurs at the same 'level' then allow M1. C.A.O. for the five correct factors. (Ignore 1s). F.T. their answer if at least one index form used with at least a square. <u>Ignore prime number requirement for this B mark.</u> <u>Use of brackets (2²)(5³) OR dot 2².5³ is B1.</u> "+" is B0 The inclusion of any 1s in their index form gets B0.</p>
<p>10.</p> <p>(a) $4n - 1$ or equivalent (b) $n(n + 2)$</p>	<p>B2 B2</p> <p>4</p>	<p>Do not penalise extra =x or x= or =n or n= in this question. Change of letter is penalised -1 once only. Allow $n4 - 1, n \times 4 - 1$. B1 for the $4n$. Allow $n \times n+2$ without brackets. B1 sight of $1n^2$ B1 for $n \times$ expr. in n OR expr. in $n \times n+2$ If no brackets and no multiplication sign penalise -1 once.</p>
<p>11. (a) Correct image (1, -3) (3, 1) (-1, 3) (b) Correct image (-2, 0) (-2, -3) (-4, -2)</p>	<p>B2 B2</p> <p>4</p>	<p>B1 for any 2 correct vertices, but not reflection in x-axis Reflection in $y=-x$ is MR-1 B1 for anticlockwise rotation of 90° about (-1,2). (0, 4) (0, 7) (2, 6) :2nd point will require extra grid lines. B1 for clockwise rotation of 90° about (2,-1). (4, 0) (4, -3) (2, -2)</p>
<p>12. Correctly setting up two equations for eliminating one variable First variable's value. Correctly substituting their first variable Second variable's value</p>	<p>M1</p> <p>A1 M1 A1</p> <p>4</p>	<p>Allow <u>one error</u> in calculating the other 4 coefficients. C.A.O. Either $x = 7$ OR $y = -2$ F.T. F.T. B4 for both correct answers. Substitution method M1 for correct substitution.</p>
<p>13. (a) $12p^4r^8$ (b) $3a(2ab + 3)$</p>	<p>B2 B2</p> <p>4</p>	<p>Ignore any extra \times signs. B1 for $12p^4r^m$ OR $12p^n r^8$ OR kp^4r^8 B1 for $a(6ab + 9)$ OR $3(2a^2b + 3a)$ OR $3a(2ab + \dots)$ OR $3a(\dots + 3)$ Ignore =0, but B2, -1 for extra inappropriate algebra</p>
<p>14. volume, length, none of these</p>	<p>B1</p> <p>1</p>	<p>For all correct.</p>
<p>15. (a) $4x \geq 9$ OR $-9 \geq -4x$ $x \geq 9/4$ I.S.W. $2\frac{1}{4}$ (NOT $9 \div 4$) (b) Smallest = 3</p>	<p>B1 B1 B1</p> <p>3</p>	<p>CAO. Use of = is no marks. <i>Use of > is MR-1</i> Accept 2.2. <i>FT until 2nd error</i> F.T. if 'their 2.25' is NOT a whole number AND a B1 has been awarded.</p>
<p>16. (a) Equal angles are: $\angle A = \angle E, \angle ACB = \angle DCE, \angle B = \angle D$ (b) $DE/8 = 15/10$ $DE = 12$ (cm)</p>	<p>M1</p> <p>A1 M1 A1</p> <p>4</p>	<p>For any 1 of these AND an attempt at showing that the 2 triangles are equiangular. Complete explanation (may only involve 2 pairs of angles) Statement of scale factor is insufficient for M1. Calculation to be carried out needed for M1</p>

17. (a) Interquartile range = $31.5 - (24 \text{ to } 24.5)$ $= 7.5$ (b) $39 - 9$ $= 30$	M1 A1 M1 A1 4	Award M1, for their graph showing that they are using '45 and 15' AND (have read at least one value correctly or both values with a consistent misread of the scale) AND subtracted their 2 values. Misreads of the scale can be from the 20 or from the 25 etc Allow 7 – 7.5 Unsupported answers in the range 7 – 7.5 get M1, A1. C.A.O.
18.(a) $(4p + 5)(4p - 5)$ (b) $(4q - 5)(q + 2)$	B2 B2 4	B1 for $(4p \dots 5)(4p \dots 5)$ B1 for $(4q \dots 5)(q \dots 2)$ Penalise further working -1 only
19. (a) $10h - 20e = 7h - 7k$ $10h - 7h = 20e - 7k$ $h = (20e - 7k)/3$	B1 B1 B1 3	FT until 2nd error Accept 10-7 as 3. Penalise further incorrect working -1
20. Strategy, repeated use of Pythag. Thm. Any two correct Hypotenuses Perimeter Pattern $6 = 7 + \sqrt{7}$	M1 B2 A1 4	E.g. For Patterns 1 & 2 B1 for any correct Hypotenuse ($\sqrt{2}$ or $\sqrt{3}$ or $\sqrt{4}$ or $\sqrt{5}$ etc) CAO. B marks are implied if A1 awarded, i.e. B4 for correct answer with no working
21. (a) $(30+40+50+40+40=)$ 200 (b) 40 (seconds)	B3 B1 4	Allow B1 for one correct area, or B2 for any three correct CAO $200/5=40$ gets B0
22. Volume $x^2(x+2)$ OR $\Pi x^2 h$ Attempt to equate their volumes $\Pi x^2 h = x^2(x+2)$ $h = x^2(x+2) / \Pi x^2$ $h = (x + 2) / \Pi$	B1 M1 A1 A1 A1 5	FT for their $x^2(x+2)$ and $\Pi x^2 h$ CAO FT from their equate isolating h, equivalent difficulty CAO
23. (a) E.g 4, 9, 16, ... OR $9/4, \dots$ (b) $x=0.54141\dots$ and $100x=54.1414\dots$ OR $5/10+41/990$ $536/990$	B1 M1 A1 3	Not $1, \frac{1}{4}, \dots$ Or alternative $10x$ with $1000x$. (M1 for 53.6/99) Ignore incorrect cancel Read as $0.541541\dots$ M0 A0
24. $1 - P(\text{no cherry})$ $P(\text{no cherry}) = 6/12 \times 5/11 \times 4/10 (=120/1320=1/11)$ $1200/1320 (=120/132 = 10/11)$	B1 M1 A1 3	Or equivalent complete strategy, idea Seen alone not part of further probabilities. OR full alternative with correct values. CAO. Ignore incorrect cancelling in final answer
25. (a) $3x - 7y$ (b)(i) $5x + 2y$ (ii) $-2x - 2y$ (c) NO, CA \neq multiple of MA, or equivalent	B1 B1 B1 B1 4	Penalise not simplifying only once. FT $-OM + 3x$ Allow clear FT with reasoning

HIGHER TIER - PAPER 2

Paper 2 Two Tier 2008 Higher Tier			Comments	
1. Line from Blackpool Line from Llandudno Lines intersecting	M1 M1 A1 3	FT if at least M1 given		
2. 470/1.88 (£) 250 324/ 1.44 (£) 225 Colin £25	M1 A1 M1 A1 B1 5	CAO CAO FT	1.4 euros = \$1.88 1 euro = \$ 1.88/1.44 324 euros = 1.88x324/1.44 = \$423 Colin \$47	\$1.88 = 1.44 euros \$1 = 1.44/1.88 euros \$470 = 1.44x470/1.88 = 360 euros Colin 36 euros
3.(a) Numbered uniform scale on both axes One correct point plotted Correct line drawn (b) Line $y = -2$ Point of intersection (0.5 , -2)	B1 B1 B1 B1 5	Using standard convention <i>FT if only one scale marked, the other unmarked but apparently the same, or nothing marked using 2cm or 1cm as 1 unit on both</i> CAO CAO FT their lines		
4. Sams 330 + 330x0.175 330 + 57.75 (£) 387.75 Sams by (£) 20.25	M1 A1 A1 B1 4	M1 A1 for 330x1.175 CAO FT FT for the difference between their answer and 408		
5. $AC^2 = 95^2 - 55^2$ = 6000 AC = 77.45(966...) AC = 77 (m) or 77.5 (m)	M1 A1 A1 A1 4	Give M1 for $95^2 = AC^2 + 55^2$ CAO FT FT		
6. 194, 201, 208 and 215 seen $24 \times 194 + 35 \times 201 + 28 \times 208 + 23 \times 215$ "their total" 22460 204(.18...)	B1 M1 A1 A1 4	FT their mid points from within the groups or use of bounds FT for correct sum of their fx terms FT for their $\sum fx/110$ correctly evaluated <i>Unsupported 204(.18...), give all 4 marks. Use of bounds correct FT answers are 201(.18...) or 207(.18...)</i>		
7. One correct evaluation (1sf) $1 \leq x \leq 2$ 2 correct evaluations $1.25 \leq x < 1.45$ one either side 0 2 correct evaluations $1.25 \leq x < 1.35$ one either side 0 OR Correct evaluation of 1.35 if previous B1 awarded Correct conclusion 1.3 <i>If no values shown accept statements such as "higher than zero" or "lower than zero"</i>	B1 B1 M1 A1 4	x 1 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2	$x^3 + 2x - 5$ -2 -1.469 -0.872 -0.203 0.544 1.375 2.296 3.313 4.432 5.659 7	1.35 0.16
8. (a) 36.49 (b) $\frac{84}{350} \times 100$ = 24 (c) $\frac{2}{3} \times 7$ = 14/3 5 tins	B2 M1 A1 M1 A1 A1 7	B1 for 36.488(135). 36.48 or 36.5 only gets B1. Partition methods should be worked out properly, e.g. 10%=35, 1%=3.5, 20%=70, 4%=14 SC1 for 0.24 or 24/100 FT <i>Answer of 5 (tins) gets all 3 marks unless from obviously incorrect logic</i>		
9. (a) Vague, what do you mean by often? Use definite figures and/or a time period, such as 0-2, 3-4, 5+ times per annum (b) (i) Overlapping ages (ii) What about the under 30s?	B1 B1 B1 B1 4	No box for never Along these lines <i>40 in 2 boxes and 50 in 2 boxes is B1, not two criticisms</i>		

<p>10. $\begin{array}{r} 800.00 \\ \underline{40.00} \\ 840.00 \\ \underline{42.00} \\ 882.00 \\ \underline{44.10} \\ 926.10 \end{array}$ <p style="text-align: right;">OR</p> <p style="text-align: right;">$800(1.05)^3$ M1</p> <p style="text-align: right;">926.10 A2</p> <p style="text-align: right;">ISW for compound interest</p> <p><u>If 4 years used, mark up to 3 years, then MR-1 provided the B or A mark has been awarded.</u></p> </p>	<p>B1 M1 A1 3</p>	<p>For a correct 5%. Alternatively B1 for (£)120 OR (£)920. For the overall method (3 stages of adding <u>different</u> 5%). <u>The method for finding their three 5% must be a correct one otherwise it is M0. Arithmetical errors are allowed for the M1</u> Candidates using depreciation: Allow SC1 for seeing an amount of (£)685.90 Accept (£)926 <u>If 2 years used it is A0 and MR-1 provided the B mark has been awarded.</u></p>
<p>11. (a) Volume = $\pi \times 4 \cdot 7^2 \times 23 \cdot 5$ $= 1630 \cdot (87872)$ OR 1631 cm³</p> <p>(b) $PR^2 = 13 \cdot 6^2 + 8 \cdot 3^2$ $PR^2 = (184 \cdot 96 + 68 \cdot 89) = 253 \cdot 85$ $PR = 15 \cdot 9(3267)$ or 16</p>	<p>M1 A1 U1 M1 A1 A1 6</p>	<p>Accept rounds to 1630 upto 1632</p> <p>Correct substituted Pythagoras. <i>Ignore incorrect writing</i> C.A.O. Allow PR = 253·85. <i>process if answers</i> F.T. their PR² if M1 awarded <i>correct</i></p>
<p>12. (a) (i) $5 \cdot 3 \times 10^{10}$ (ii) 2×10^{-8}</p> <p>(b) $4 \cdot 9(64) \times 10^{-8}$ or 5×10^{-8}</p>	<p>B1 B1 B2 4</p>	<p>C.A.O. <i>Penalise -1 once only for incorrect notation</i> C.A.O. B1 for $49 \cdot 64 \times 10^{-9}$ or 0.000000049(6)</p>
<p>13. (a) $x^2 - 12$ $- 4x$</p> <p>(b) $6m - 3t = 2t + 7$ $6m = 3t + 2t + 7$ OR $5t + 7$ $m = \frac{3t + 2t + 7}{6}$ OR $\frac{5t + 7}{6}$</p> <p>(c) $4(x - 1)(x + 1)$</p>	<p>B1 B1 B1 B1 B1 B2 7</p>	<p>B2 only if written as a trinomial, e.g. $x^2 - 4x - 12$ (any order) Clearing bracket correctly <i>F.T. until second error</i> For isolating the term in m. F.T. equivalent difficulty, i.e. $m = f(t)/a$ with $a \neq 1$</p> <p>B1 for $4(x^2 - 1)$ or $(2x-2)(2x+2)$ <i>If B2 OR B3 then penalise -1, once only, if any subsequent incorrect or inappropriate algebra such as using equations</i></p>
<p>14. $3x - 7 - 2(4x + 5) = 3$</p> <p style="text-align: center;">$-5x = 20$ $x = -20/5$ ISW OR -4</p>	<p>M1 M1 A1 A1 4</p>	<p>For correctly clear fractions by a valid method for any 2 terms. For correctly clear fractions by a valid method for all 3 terms. <u>NOTE: $3x - 7 - 8x + 10 = 3$ would get M1, M1, A0 and the final A1 can be gained for correct follow through (0)</u> The two A1s are dependent on only one M1 being awarded Not dealing with $-2x+5$ correctly ok for M marks, lose A mark Collecting terms <u>F.T. until 2nd error starting after the M marks.</u> <u>If 0 marks awarded, SC1 for $\frac{-5x+3}{4} = \frac{3}{4}$</u> Unsupported answer of $x = -4$ gets all 4 marks.</p>
<p>15. (a) $H = 15 \times \tan 67^\circ$ Height = 35·3(3778) (m)</p> <p>(b) $\cos(\text{angle}) = 13/21$ $= 0 \cdot 619(047)$ $\angle EBC = 51 \cdot 7(533)$ OR 52 OR 51.8</p>	<p>M2 A1 M1 A1 A1 6</p>	<p>Correct substituted tan ratio. Allow M1 for $\tan 67^\circ = Ht/15$ C.A.O. Correct substituted cos ratio, or $\cos^{-1}(13/21)$ Unsupported 51·7 OR 52 gets all 3 marks.</p>
<p>16. Total = 34700 (Number in Country / 34700) x 45 16.02..., 10.81..., 8.89..., 5.32..., 3.95... 16, 11, 9, 5, 4</p>	<p>B1 M1 M1 M1 A1 4</p>	<p>FT their total. Or alternative method Any 3 correct</p>
<p>17.(a) $y = k/x^2$ or $ya.1/x^2$ $2 = k / 225$ $y = 450/x^2$ (b) 4.5</p>	<p>B1 M1 A1 B1 4</p>	<p>FT non linear start only Maybe implied in (b)</p>

18. Lines drawn: $x + y = 8$, $y = 3x + 5$ and $x = -3$ Correct region indicated	B2 B1 3	Award B2 for any two correct lines, or B1 for any one line drawn correctly CAO
19. (a) $(4x + 1)(2x - 7)$ $x = -1/4$, $x = 7/2$ (b) $\{-6 + \sqrt{(6^2 - 4 \times 3 \times -11)}\} / 2 \times 3$ $= \{-6 \pm \sqrt{168}\} / 6$ 1.16, -3.16	B2 B1 M1 M1 A1 6	B1 for $(4x \dots 1)(2x \dots 7)$ OR $(4x \dots 7)(2x \dots 1)$ OR B1 for middle term splitting method FT their pair of brackets. Ignore incorrect cancelling Use of formula gains no marks For substitution, allow one slip CAO
20. (a) $BD^2 = 8.7^2 + 12.1^2 - 2 \times 8.7 \times 12.1 \times \cos 80$ $BD^2 = 185.54\dots$ $BD = 13.62\dots(\text{cm})$ (b) Area CDB = $\frac{1}{2} \times 6.3 \times BD \times \sin 25$ (=18.133... cm ²) Area ADB = $\frac{1}{2} \times 8.7 \times 12.1 \times \sin 80$ (=51.835... cm ²) Area quad. 33.7(... cm ²)	M1 M1 A1 M1 M1 A1 6	FT their BD^2 if M1 awarded FT their BD FT if one of M marks awarded, and their calculations accurate
21. 207^0 333^0 with no other values	B1 B1 2	FT 540 – first answer, in range 0 to 360
22. $n(n + 4) + 7(n + 3)$ as a numerator AND $(n + 3)(n + 4)$ as a denominator OR multiplying throughout by $(n+3)$ and $(n+4)$ $n(n + 4) + 7(n + 3) = (n + 3)(n + 4)$ $n^2 + 4n + 7n + 21 = n^2 + 3n + 4n + 12$ $n = -9/4$	B2 B1 B1 B1 5	Brackets required or implied later Award B1 for either numerator or denominator, or multiplying throughout by $(n+4)$ or $(n+3)$ with an error CAO FT for similar level of difficulty, with n^2 terms on both sides

