WJEC
CBAC

GENERAL CERTIFICATE OF SECONDARY EDUCATION
TYSTYSGRIF GYFFREDINOL ADDYSG UWCHRADD

MARKING SCHEME

MATHEMATICS - 2 TIER

SUMMER 2008

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2008 examination in GCSE MATHEMATICS - 2 TIER. 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.

GCSE Mathematics June 2008 Foundation paper 1 2 tier examination	Mark	Comments FINAL VERSION
1. (a) (i) 12 24 or 24 12	B1	
(ii) 46 23 or 23 46	B1	
(iii) 9 7 or 7 9	B1	
(iv) 60 4 or 4 60	B1	
(b) 7425	B1	CAO
(c) $^8/_{15}$ ISW	B2 7	B1 for $^{16}/_{30}$ OR EQUIVALENT
2. Rectangle	B1	CAO
Trapezium	B1	CAO
Pentagon	B1 3	CAO
3. 2 1 4 1 2 3 5 8 2 3	B1	CAO
Labels on axes	B1	At least one label given
Uniform scale	M1	M1 for uniform scale
Bars correct	A1 4	FT from 'their table' Accept vertical line diagram
4. (a) $5 \times 40 + 50$	M1	M1 for attempt to multiply AND add.
(£)250	A1	CAO **(£)450 gets M0 A0**
(b) 12 , 15 , 18	M1	M1 for any two correct when 3 numbers shown.
45	A1 4	CAO **18, 27, 36, 45 gets M1 A1**
5. Correct image	B2 2	-1 for each incorrect vertex.
6. (a) $^2/_8$ $^7/_{28}$	B2	B1 for 1 correct or (1 or 2 correct and 1 incorrect)
(b) Rent (£)100 , saving (£)125	M1	M1 for 100 **or** 125 **AND** an **attempt** at finding the second value
(£)100 AND (£)125 seen	A1	
OR		**OR**
$^1/_5 = 20\%$ OR $^1/_5 = {}^{20}/_{100}$, $25\% = {}^{25}/_{100}$	M1	M1 for change to %age or fractions which can be compared. **Allow 25% = ¼ , ¼ > $^1/_5$ for M1 A1**
Correct conclusion drawn	A1	
(c) 50(%)	B1	CAO
25(%)	B1	CAO
¼ (0).5 60(%) or equivalent	B1	FT for 'their' percentages
(d) Oranges cost (£)2.88 or 288(p)	B1	
Change (£)7.12 or 712(p)	B1 9	FT
7. Estimate for height of car	B1	1.2m to 2m 4ft to 6ft 6inches
Height of house 10cm (9.6cm) height of car 2cm (1.9cm) **OR** **5 (equal) intervals marked on the diagram**	B1	± 2mm
Height of house = 5 × 'their height of the car'	M1	Accept 4 (or 5) × 'their height' + <u>a part of 'their' height</u>
Height of house	A1 4	FT for 'their height' **Answer only which is <u>greater</u> than 4× 'their' height BUT <u>less than or equal to</u> 6×'their' height gets B1 M1 A1**
8. (a) 45 45 46 47 47 48 49 50 51	M1	Attempt at ordering the numbers
(i) Median 47	A1	CAO
(ii) Range 6	B1	CAO
(b) P at ½	B1	CAO **SC2 3 correct probabilities given but**
Q at 1	B1	CAO **points not marked on the diagram.**
R at $^1/_6$	B1 6	>0 but < ¼

GCSE Mathematics June 2008 Foundation paper 1 2 tier examination	Mark	Comments **FINAL VERSION**
9. (a) Area = 4 × 3 = 12 (m²) (b) Cost of carpet = 15 × '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 (°) (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 **Answer only 60° gets M1 A1 A0** CAO
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)·04(00…) (ii) 479.887 (c) 72 (d) 8/9 – 6/9 = 2/9 (e) (i) 17 (ii) 27 (f) (i) (0).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 2ⁿᵈ error. CAO B1 for 8 OR 9 seen OR 24×3 OR 12×6 OR 2×2×2×3×3 For dealing with the process correctly CAO OR equivalent fractions, but M1, A0 for ·889 – ·667 = ·222 OR equivalent in % 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 ± 2°. 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).

GCSE Mathematics June 2008 Foundation paper 1 2 tier examination	Mark	Comments **FINAL VERSION**
14. (a) $x + 49 + 3x + 111 = 360$	B2	B1 for LHS or expression in x = 360
$4x = 200$	B1	FT if LHS is of equivalent difficulty and RHS = 360 or 180
$x = 50$	B1	FT if of the form $ax = b$. **No equation formed but correct answer given B0 B1 B1.**
(b) $x = 60$	B1	CAO
$y = 180 - ($ 'their 60' $+ 20 + 45)$	M1	
$= 55$	A1	FT
	7	
15. (a) (i) $7x - 3x = 16 - 4$	B1	CAO In (a) and (b) stop at 2nd error.
$4x = 12$	B1	FT Accept embedded answers in a(i), a(ii).
$x = 12/4$ ISW (3)	B1	FT **12 ÷ 4 gets B0**
(ii) $3x + 2 = 6 - 4x$	B1	CAO
$7x = 4$	B1	FT
$x = 4/7$ ISW	B1	FT **4 ÷ 7 gets B0**
(b) (i) $6r + 2 + 5r$	B1	CAO
$11r + 2$ ISW	B1	FT
(ii) $6p + 9 - 2p + 2$	B1	CAO
$4p + 11$	B1	FT **Do not ignore subsequent working**
	10	
16. Circle 3.14×10^2	M1	
314 (m^2)	A1	CAO
Divide area into 3 rectangles OR 2 rectangles		
Area $= 40 \times 40 + 2 \times 10 \times 5$ OR $50 \times 40 - 30 \times 10$	M1	M1 for any other correct method
$= 1700$ (m^2)	A1	CAO
Required area $= 1386$	A1	FT if **BOTH** M marks given
Correct units given m^2	U1	CAO
	6	
17. Sight of 0.3	B1	
Sight of 600 and 20	B1	
Answer 40,000	B1	
Allow		
Sight of 0.5	B1	For this value
Sight of 600 and 20	B1	accept (602 or 601) and 20.
Answer 24,000	B1	Answers 24,080 24,040
OR		
Sight of 0.2 or 0.4	B1	For either of these values
Sight of 600 and 20	B1	accept (602 or 601) and 20.
Answer 60,000 or 30,000	B1	Answers 60,200 or 30,100 60,100 or 30,050
		If any other value is used in the denominator allow SC1 for the sight of 600 AND 20 in the numerator.
	3	

FOUNDATION TIER - PAPER 2

<table>
<tr><th colspan="2">GCSE Mathematics June 2008
Foundation paper 2
Pilot examination</th><th>Mark</th><th colspan="2">Comments
FINAL VERSION</th></tr>
<tr><td>1. (a)</td><td>182.12
22.96
26.52
246.3(0)

(b) 10 × 'their total'/100 or equiv.
(£) 24.63</td><td>B1
B1
B1
B1
M1
A1

6</td><td>CAO
CAO
CAO
FT for 1 error

FT from (a)</td><td>**18.212 18.21 18.21**
2.296 2.29 2.30
2.652 2.65 2.65
1.47 1.47 1.47
Accept any of the above giving
24.63 24.62 24.63
for part (b)
All four must be attempted
for M1
Unsupported (£)24.62 gets M1 A1</td></tr>
<tr><td>2. (a)</td><td>105 106 107 108 109 110
111   112 113
(b) 32</td><td>M1 A1

B1
3</td><td colspan="2">M1 for attempting to count squares.
Accept fractional answers in the given range.
CAO</td></tr>
<tr><td>3.</td><td>16
10
13
15</td><td>B1
B1
B1
B1
4</td><td colspan="2">CAO
CAO
CAO
CAO</td></tr>
<tr><td>4. (a)</td><td>(i) 68
(ii) Pointer at 56
(b)   570</td><td>B1
B1
B1
3</td><td colspan="2">CAO
> 54 but < 58</td></tr>
<tr><td>5. (a)</td><td>(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</td><td>B1
B1
B1
B2

B1
B1
7</td><td colspan="2">CAO
CAO

B1 for 2 or 3 factors.   **<u>B0 if any incorrect
factors are given.</u>**
CAO
CAO</td></tr>
<tr><td>6.</td><td>(-5, -2)
(1,4)</td><td>B1
B1
2</td><td colspan="2">CAO
CAO</td></tr>
<tr><td>7. (a)</td><td>A and D
G and B
(b) P and V</td><td>B1
B1
B2
4</td><td colspan="2">B1 for 1 correct or (1 or 2 correct and 1
incorrect)</td></tr>
<tr><td>8. (a)</td><td>98°
26°
(b)   A line of length 13cm or 9cm
or 12cm
A second line having a correct
length
Completed correct triangle</td><td>B1
B1
M1

M1

A1
5</td><td colspan="2">± 2° **If B2 is given then –1 for <u>incomplete triangle</u>**
± 2°
Allow ± 2mm for each length

CAO</td></tr>
<tr><td>9. (a)</td><td>75
(b) 2 correct lines</td><td>B1
B2

3</td><td colspan="2">CAO
B1 for 1 correct line or (2 correct lines and 1 or 2
diagonals)</td></tr>
</table>

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

16. 470 / 1.88	M1		1.44 euros = $1.88	$1.88 = 1.44 euros
(£) 250	A1	CAO	1 euro = $1.88/1.44	$1 = 1.44/1.88 euros
324 / 1.44	M1		324 euros = 1.88 ×324/1.44	$470 = 1.44×470/1.88
(£) 225	A1	CAO	= $423	= 360 euros
Colin (£)25	B1	FT	**Colin $47**	**Colin 36 euros**
	5			

GCSE Mathematics June2008 Foundation paper 2 Pilot examination	Mark	Comments FINAL VERSION
17. (a) Numbered uniform scales on both axes	B1	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.**
One correct point plotted Correct line drawn (b) Line y = −2 Point of intersection (0.5,−2)	B1 B1 B1 B1 5	 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…) 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 24×194+35×201+28×208+20×215 (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 Σ*fx*/107 **correctly evaluated.** *Unsupported 203.8(7….) or 203.9 or 204 given* *all 4 marks.* *Use of bounds gives the following answers* *(lower200.8(7…) upper (206.8(7…))*
21. One correct evaluation (1dp)1≤ x ≤2 2 correct evaluations $1.25 \le x < 1.45$ one either side of 0 2 correct evaluations $1.25 < x \le 1.35$ one either side of 0 OR correct evaluation of 1.35 if previous B1 awarded. Correct conclusion 1.3	B1 B1 M1 A1	x $x^3 + 2x – 5$ 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**
	4	

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 2½ 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 3rd 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) $0 \cdot 35$ of 200 $= 70$ (b) Receipts = £160 Payouts = £140 Profit =(£)20 OR 2000 (p)	M1 A1 M1 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 10	CAO In (a) and (b) stop at 2nd error. FT 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

8.	Sight of 0.3	B1	
	Sight of 600 and 20	B1	
	Answer 40,000	B1	
	Allow		
	Sight of 0.5	B1	For this value
	Sight of 600 and 20	B1	accept (602 or 601) and 20.
	Answer 24,000	B1	Answers 24,080 24,040
	OR		
	Sight of 0.2 or 0.4	B1	For either of these values
	Sight of 600 and 20	B1	accept (602 or 601) and 20.
	Answer 60,000 or 30,000	B1	Answers 60,200 or 30,100 60,100 or 30,050
			If any other value is used in the denominator
		3	allow SC1 for the sight of 600 AND 20 in the numerator.
9.		M1	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.
	2, 2, 5, 5, 5	A1	C.A.O. for the five correct factors. (Ignore 1s).
	$2^2 \times 5^3$	B1	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 $(2^2)(5^3)$ OR dot $2^2.5^3$ is B1."+" is B0</u>
		3	The inclusion of any 1s in their index form gets B0.
10.			Do not penalise extra =x or x= or =n or n= in this question. Change of letter is penalised –1 once only.
	(a) 4n – 1 or equivalent	B2	Allow n4 – 1, n × 4 – 1. B1 for the 4n.
	(b) n (n + 2)	B2	Allow n × n+2 without brackets. B1 sight of $1n^2$
			B1 for n × expr. in n OR expr. in n × n+2
		4	If no brackets and no multiplication sign penalise –1 once.
11. (a) Correct image (1, –3) (3, 1) (–1, 3)		B2	B1 for any 2 correct vertices, but not reflection in x-axis Reflection in y=–x is MR-1
(b) Correct image (–2, 0) (–2, –3) (–4, –2)		B2	B1 for anticlockwise rotation of 90º about (–1,2). (0, 4) (0, 7) (2, 6) :2nd point will require extra grid lines. B1 for clockwise rotation of 90º about (2,–1).
		4	(4, 0) (4, –3) (2, –2)
12. Correctly setting up two equations for eliminating one variable		M1	Allow <u>one error</u> in calculating the other 4 coefficients.
First variable's value.		A1	C.A.O. Either x = 7 OR y = –2
Correctly substituting their first variable		M1	F.T.
Second variable's value		A1	F.T.
		4	B4 for both correct answers. Substitution method M1 for correct substitution.
13. (a) $12p^4r^8$		B2	Ignore any extra × signs. B1 for $12p^4r^m$ OR $12p^nr^8$ OR kp^4r^8
(b) 3a(2ab + 3)		B2	B1 for a(6ab + 9) OR $3(2a^2b + 3a)$
		4	OR 3a(2ab + …) OR 3a(… + 3)
			Ignore =0, but B2, -1 for extra inappropriate algebra
14. volume, length , none of these		B1	For all correct.
		1	
15. (a) 4x ≥ 9 OR -9 ≥ -4x		B1	CAO. Use of = is no marks. *Use of > is MR-1*
x ≥ 9/4 I.S.W. 2¼ (NOT 9÷4)		B1	Accept 2.2. *FT until 2nd error*
(b) Smallest = 3		B1	F.T. if 'their 2.25' is NOT a whole number AND a B1 has been awarded.
		3	
16. (a)Equal angele are:		M1	**For any 1 of these AND** an attempt at showing that the 2 triangles are equiangular.
<A=<E, <ACB =<DCE, < B =<D			
		A1	Complete explanation (may only involve 2 pairs of angles)
(b) DE/8 = 15/10		M1	Statement of scale factor is insufficient for M1.
DE = 12 (cm)		A1	Calculation to be carried out needed for M1
		4	

17. (a) Interquartile range = 31·5 – (24 to 24.5)	M1	**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**
= 7·5	A1	**Allow 7 – 7·5** **Unsupported answers in the range 7 – 7·5 get M1, A1.**
(b) 39 – 9	M1	
= 30	A1	C.A.O.
	4	
18.(a) (4p + 5) (4p - 5)	B2	B1 for (4p … 5) (4p …5)
(b) (4q - 5) (q + 2)	B2	B1 for (4q … 5) (q … 2)
	4	Penalise further working -1 only
19. (a) 10h – 20e = 7h – 7k	B1	FT until 2nd error
10h – 7h = 20e – 7k	B1	
h = (20e-7k)/3	B1	Accept 10-7 as 3. Penalise further incorrect working -1
	3	
20. Strategy, repeated use of Pythag. Thm.	M1	E.g. For Patterns 1 & 2
Any two correct Hypotenuses	B2	B1 for any correct Hypotenuse ($\sqrt{2}$ or $\sqrt{3}$ or $\sqrt{4}$ or $\sqrt{5}$ etc)
Perimeter Pattern 6 = 7 + $\sqrt{7}$	A1	CAO. B marks are implied if A1 awarded, i.e. B4 for correct answer with no working
	4	
21. (a) (30+40+50+40+40=) 200	B3	Allow B1 for one correct area, or B2 for any three correct
(b) 40 (seconds)	B1	CAO 200/5=40 gets B0
	4	
22. Volume $x^2(x+2)$ OR $\prod x^2 h$	B1	
Attempt to equate their volumes	M1	FT for their $x^2(x+2)$ and $\prod x^2 h$
$\prod x^2 h = x^2(x+2)$	A1	CAO
h = $x^2(x+2) / \prod x^2$	A1	FT from their equate isolating h, equivalent difficulty
h = (x + 2) / $\prod$	A1	CAO
	5	
23. (a) E.g 4, 9, 16, … OR 9/4, …	B1	Not 1, ¼ , ..
(b) x=0.54141..and 100x=54.1414.. OR 5/10+41/990	M1	Or alternative 10x with 1000x. (M1 for 53.6/99)
536/990	A1	Ignore incorrect cancel
	3	Read as 0.541541… M0 A0
24. 1 – P(no cherry)	B1	Or equivalent complete strategy, idea
P(no cherry) =6/12 x 5/11 x 4/10 (=120/1320=1/11)	M1	Seen alone not part of further probabilities. OR full alternative with correct values.
1200/1320 (=120/132 = 10/11)	A1	CAO. Ignore incorrect cancelling in final answer
	3	
25. (a) 3x - 7y	B1	
(b)(i) 5x + 2y	B1	Penalise not simplifying only once.
(ii) -2x – 2y	B1	FT –OM + 3x
(c) NO, CA ≠ multiple of MA, or equivalent	B1	Allow clear FT with reasoning
	4	

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 CAO
	 M1
	 A1 CAO
	 B1 FT
	 5
		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
	 B1
	 5
		Using standard convention
		 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
		 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 x 194 + 35x201 + 28x208 + 23x215 "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 ∑fx/110 correctly evaluated *Unsupported 204(.18.). give all 4 marks. Use of bounds* *correct FT answers are 201(.18…) or 207(.18…)*		

7. One correct evaluation (1sf) 1≤x≤2
 	
  2 correct evaluations 1.25≤x<1.45 one either side 0
 	
 2 correct evaluations 1.25≤x<1.35 one either side 0
        OR
 Correct evaluation of 1.35 if previous B1 awarded
 	
 Correct conclusion 1.3
 If no values shown accept statements such as
 "higher than zero"or "lower than zero"
	B1
	
	 B1
	
	 M1
	
	 A1
	
	 4
		x x^3+2x-5
		 1 -2
		 1.1 -1.469
		 1.2 -0.872
		 1.3 -0.203 **1.35** **0.16**
		 1.4 0.544
		 1.5 1.375
		 1.6 2.296
		 1.7 3.313
		 1.8 4.432
		 1.9 5.659
		 2 7		

8. (a) 36·49
   (b) <u>84</u> × 100
      350   = 24
 	
  (c) 2/3 x 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 *Answer of 5 (tins) gets all 3 marks unless from obviously*
		 incorrect logic		

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
		 40 in 2 boxes and 50 in 2 boxes is B1, not two criticisms		

10.   800.00
    40.00
   840.00
    42.00   OR
   882.00 $800(1.05)^3$ M1
    44.10   926.10   <u>A2</u>
   926.10   ISW for compound interest
 	
<u>If 4 years used, mark up to 3 years, then MR–1</u>
<u>provided the B or A mark has been awarded.</u>
	B1
	M1
	
	A1
	
	3
		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</u>
		<u>otherwise it is M0. Arithmetical errors are allowed for the</u>
		<u>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</u>
		<u>been awarded.</u>

11. (a) Volume = $\pi \times 4\cdot7^2 \times 23\cdot5$
          = 1630·(87872) OR 1631
                        cm³
  (b) $PR^2 = 13\cdot6^2 + 8\cdot3^2$
      $PR^2 = (184\cdot96 + 68\cdot89) = 253\cdot85$
                 $PR = 15\cdot9(3267)$ or 16
	M1
	A1
	U1
	M1
	A1
	A1
	6
		
		Accept rounds to 1630 upto 1632
		
		Correct substituted Pythagoras. *Ignore incorrect writing*
		C.A.O. Allow PR = 253·85. *process if answers*
		F.T. their PR^2 if M1 awarded *correct*

12. (a) (i) $5\cdot3 \times 10^{10}$
      (ii) 2×10^{-8}
  (b) $4\cdot9(64) \times 10^{-8}$ or 5×10^{-8}
	B1
	B1
	B2
	4
		C.A.O. *Penalise -1 once only for incorrect*
		C.A.O. *notation*
		B1 for $49\cdot64 \times 10^{-9}$ or 0.000000049(6)

13.   (a) $x^2 - 12$
         $- 4x$
  (b) $6m - 3t = 2t + 7$
 $6m = 3t + 2t + 7$ OR $5t + 7$
       $m = \dfrac{3t+2t+7}{6}$ OR $\dfrac{5t+7}{6}$
 	
  (c) $4(x-1)(x+1)$
	B1
	B1
	B1
	B1
	B1
	
	B2
	
	7
		B2 only if written as a trinomial, e.g. $x^2 - 4x - 12$ (any
		order)
		Clearing bracket correctly *F.T. until second error*
		For isolating the term in m.
		F.T. equivalent difficulty, i.e. m = f(t)/a with a ≠ 1
		
		B1 for $4(x^2 - 1)$ or $(2x-2)(2x+2)$
		If B2 OR B3 then penalise −1, once only, if any subsequent
		incorrect or inappropriate algebra such as using equations

14. $3x - 7 - 2(4x + 5)$ $= 3$
 	
           $-5x = 20$
      $x = -20/5$ ISW OR −4
	M1
	
	M1
	
	A1
	A1
	
	4
		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</u>
		<u>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>
		If 0 marks awarded, SC1 for $\dfrac{-5x+3}{4} = \dfrac{3}{4}$
		
		Unsupported answer of x = − 4 gets all 4 marks.

15. (a) H = $15 \times \tan67°$
            Height = 35·3(3778) (m)
  (b) cos(angle) = 13/21
           = 0·619(047)
     ∠EBC = 51·7(533) OR 52 OR 51.8
	M2
	A1
	M1
	A1
	A1
	6
		Correct substituted tan ratio. Allow M1 for tan67º =Ht/15
		C.A.O.
		Correct substituted cos ratio, or cos⁻¹(13/21)
		
		Unsupported 51·7 OR 52 gets all 3 marks.

16.   Total = 34700
    (Number in Country / 34700) x 45
16.02…, 10.81…, 8.89…, 5.32…, 3.95…
       16, 11, 9, 5, 4
	B1
	M1
	M1
	A1
	4
		
		FT their total. Or alternative method
		Any 3 correct

17.(a) $y = k/x^2$ or y∝1/x^2 2 = k / 225 $y = 450/x^2$ (b) 4.5	B1 M1 A1 B1 4	 FT non linear start only Maybe implied in (b)

18. Lines drawn: $x + y = 8$, $y = 3x + 5$ and $x = -3$	B2	Award B2 for any two correct lines, or B1 for any one line drawn correctly
Correct region indicated	B1 3	CAO
19. (a) $(4x + 1)(2x - 7)$	B2	B1 for $(4x \ldots 1)(2x \ldots 7)$ OR $(4x \ldots 7)(2x \ldots 1)$ OR B1 for middle term splitting method
$x = -1/4$, $x = 7/2$	B1	FT their pair of brackets. Ignore incorrect cancelling Use of formula gains no marks
(b) $\{-6+\sqrt{(6^2 - 4 \times 3x - 11)}\}/2 \times 3$ $\qquad = \{-6\pm\sqrt{168}\}/6$ $1.16, -3.16$	M1 M1 A1 6	For substitution, allow one slip CAO
20. (a) $BD^2 = 8.7^2 + 12.1^2 - 2 \times 8.7 \times 12.1 \times \cos 80$ $\quad BD^2 = 185.54\ldots$ $\qquad BD = 13.62\ldots.(cm)$ (b) Area CDB $= \frac{1}{2} 6.3 \times BD \times \sin 25 \ (=18.133\ldots \text{ cm}^2)$ $\quad$ Area ADB $= \frac{1}{2} 8.7 \times 12.1 \times \sin 80 \ (=51.835\ldots\text{cm}^2)$ $\qquad$ Area quad. $33.7(\ldots \text{ cm}^2)$	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. $\qquad 207^0$ $\qquad 333^0$ 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 $\quad (n+3)(n+4)$ as a denominator OR $\quad$ multiplying throughout by $(n+3)$ and $(n+4)$ $n(n+4) + 7(n+3) = (n+3)(n+4)$ $n^2 + 4n + 7n + 21 = n^2 + 3n + 4n + 12$ $\qquad\qquad n = -9/4$	 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

GCSE Mathematics - 2 Tier Marking Scheme (Summer 2008)