OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics C

General Certificate of Secondary Education **J517**

Mark Schemes for the Units

June 2008

J517/MS/R/08

Oxford Cambridge and RSA Examinations

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GCSE Mathematics C (J517)

MARK SCHEMES FOR THE UNITS

B271 Module Test M1

Section A

1	**(a)**	131	**1**	
	(b)	48	**1**	
	(c)	74	**1**	
	(d)	5	**1**	
2	**(a)**	880	**1**	
	(b)	800	**1**	
3	**(a)(i)**	Pentagon	**1**	
	(ii)	19 to 21 190 – 210 mm	**2**	**W1** 3·8 to 4·2 or 38 to 42 seen OR **M1** *their* side length × 5 soi OR **SC1** 190 - 210
	(b)(i)	B *and* C	**2**	**W1** B or C only OR **W1** B *and* C and one other only Any indication
	(ii)	27	**1**	
4	**(a)**	2, 4, 6 indicated	**1**	Accept any clear indication with no extras
	(b)	15, 20, 25, 30 indicated	**2**	All, with no extras **W1** any 2 indicated and no others or any 3 indicated and **no more than 1** incorrect
	(c)	16, 19	**1**	Both Condone further correct numbers
	(d)(i)	12	**1**	Condone further correct numbers
	(ii)	Subtract 7 oe	**1**	Must have direction and quantity
5	**(a)**	4	**1**	
	(b)	8	**1**	
6	**(a)**	20	**1**	
	(b)	65	**1**	**SC1** If 6(a) = 2 then condone 6·5 oe
7	**(a)**	24	**1**	
	(b)(i)	4:40 oe	**1**	Eg accept 20 to 5 or 16:40
	(ii)	5:10 oe	**1**	Eg accept 10 past 5 or 17:10 ft *their* (b) + 30 minutes

Section A Total: 25

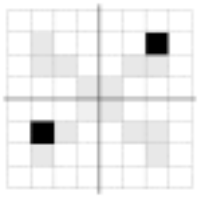
Section B

8	**(a)(i)**	650	**1**	
	(ii)	2·6	**1**	
	(b)	60	**1**	
9	**(a)**	Lou <u>and reason which implies more</u>	**2**	**W1** 13 or 15 or 2 seen OR **W1** Lou and attempt at a reason **W0** Lou and no reason
	(b)	28	**1**	
10	**(a)**	All 5 ways	**2**	Ignore repeats and wrong entries **W1** any 3 ways (not counting original)
	(b)	Unlikely Evens Impossible	**1** **1** **1**	 Accept 50 – 50 Accept 0
11	**(a)**	4, 3	**1**	
	(b)	Position marked	**1**	Clear, unambiguous intention
	(c)	East, E	**1**	Only
	(d)	1492, 1706, 1959, 2228	**1**	Condone errors in figures if intention is clear Accept as names (E, A, L, T)
	(e)	One thousand four hundred (and) ninety two	**1**	Accept 'fourteen hundred (and) ninety two'
	(f)	2890	**2**	**M1** 2797 + 93 soi
	(g)	12 165	**2**	**M1** 12 460 – 295 soi
	(h)(i)	21	**1**	
	(ii)	Bar drawn	**1**	
12		Correct size and shape	**3**	Allow reflected and correct for 3 marks **W1** One correct line AND **W1** Another correct line OR **SC2** Completely correct × 3 enlargement

Section B Total: 25

B272 Module Test M2

Section A

1		Nine thousand (and) fifty one	**1**	
2	**(a)**	8° to 12°	**1**	
	(b)	b a d c	**2**	**W1** for at least 2 correct
	(c)		**2**	Correct answer with no extras **W1** for one correct and only one error or omission
3	**(a)**	3010	**1**	
	(b)	3150	**2**	**M1** evidence of at least six of the numbers ordered or 1 error
4	**(a)**	25	**1**	
	(b)	$\frac{3}{4}$ or equivalent fraction	**1**	Must be a fraction
	(c)	14·49	**2**	**M1** digits 1449 seen or 8·99 + 5·5(0) soi
5	**(a)(i)**	100 000	**1**	
	(ii)	0·1(00)	**1**	
	(b)	48	**2**	**M1** digits 48 seen or 16 × 3 soi
6	**(a)**	Within range 3·5 cm to 5·0 cm from left-hand end (zero)	**1**	
	(b)	3 lots of £10 More £5s than £1s	**W1** **W1**	
7		30 or 45 or 60 etc clearly as answer	**3**	**W3** only if evidence of correctly continuing at least one sequence **M1** sight of 0, 5, 10, 15, 20, or rule **M1** sight of 6, 9, 12, 15, 18, or rule
8		✓ × ✓ × ✓ ✓	**2**	**W1** for 4 or 5 correct – blank is error

Section A Total: 25

Section B

9	**(a)**	120	**1**	
	(b)	15:55	**1**	Accept equivalent time format
	(c)	9	**1**	
10	**(a)(i)**	3 to 5	**1**	
	(ii)	30 to 40	**1**	
	(b)(i)	6	**2**	**M1** 1000 ÷ 189 soi
	(ii)	134	**2**	**M1** evidence of *their* (i) × 189
11	**(a)**	282	**1**	
	(b)	'Yes' and £1 worth 6 zlotys, or 10 zlotys worth £(1·60 – 1·70)	**2**	**W1** for 'yes' with some unclear but correct reason, including effectively repeating the question. Must mention units.
12	**(a)(i)**	May	**1**	
	(ii)	Mar(ch), September, October	**2**	**W1** for two correct
	(b)(i)	July	**1**	
	(ii)	January	**1**	
	(iii)	(+ or – or no sign) 5	**2**	**M1** sight of 3 - ⁻2 or 3 + 2
13	**(a)**	E7	**1**	Condone 7E
	(b)	Right, right, right	**2**	**W1** for first two correct, ie right, right
14		20·15 www	**3**	**M1** 3 × 38·5(0) or digits 1155 seen **M1** 150 – 'number' soi

Section B Total: 25

B273 Module Test M3

Section A

1		Linear vertical scale All bars with correct height, equal width and spacing	**1** **2**	**W1** for at least 3 correct heights
2	**(a)**	3	**1**	
	(b)	$\frac{1}{9}$	**1**	Or 0·11[1…] or 11[·1…]%
	(c)	$\frac{3}{9}$ oe isw	**1**	Or 0·33[3…] or 33[·3…]% ft consistent incorrect denominator
3	**(a)**	1·2	**2**	**M1** for attempt at 0·4 × 3 or figs 12
	(b)	1·50	**2**	**M1** for attempt at 15 ÷ 10
4	**(a)**	10	**1**	
	(b)	9	**1**	
	(c)	16	**1**	
5	**(a)**	6	**2**	**M1** for 3 seen or 2 × *their* 10% OR **SC1** for answer 24
	(b)	10:15 [am]	**1**	Accept equivalent time format
	(c)(i)	3 [hours] 45 [minutes]	**2**	**M1** for attempt at addition of all times with hours/minutes correctly aligned or 225 [minutes] seen or [2 hours] 105 [minutes] oe seen OR **SC1** for answer 3 [hours] 5 [minutes]
	(ii)	2:45 [pm]	**1**	Or ft *their* (i) Accept equivalent time format
6		[200 ÷ 4 =] 50 [200 ÷ 10 × 3 =] 60 90	**M1** **M1** **M1**	**W3** for answer 90 www ft for correct answer to 200 – *their* 50 – *their* 60 <u>Alternative method:</u> **M1** for $\frac{11}{20}$ oe **M1** for $1 - \frac{11}{20} = \frac{9}{20}$ oe or 200 ÷ 20 × 11 **M1** for 90 as answer
7	**(a)**	It is 5 squares long, not 6	**1**	oe
	(b)	Correct enlargement	**2**	**W1** for correct enlargement using incorrect scale factor or quadrilateral with 2 or more sides drawn correctly

Section A Total: 25

Section B

8	**(a)(i)**	kilometres	**1**	Accept km
	(ii)	kilograms	**1**	Accept kg
	(b)(i)	275	**1**	
	(ii)	3·6	**1**	
9	**(a)**	1 or 4 or 9 or 16	**1**	Any one from list
	(b)(i)	441	**1**	cao
	(ii)	17	**1**	cao
10	**(a)**	500	**1**	cao
	(b)	1550	**2**	**M1** figs 155 or 550 or 1 litre 550 ml or for 2000 [ml] seen
	(c)	1·14	**1**	
11	**(a)**	7·4	**3**	**M1** for attempt to add, implied by 68 – 80 seen AND **M1dep** for attempt to divide their total by 10 OR **SC2** for answer 66·8
	(b)	22	**1**	
12	**(a)**	'No' and shed 2 m, or ladder 12 cm seen	**2**	**W1** for shed length 2 m, or ladder is 12 cm on diagram, or for 'no' with a correct qualitative comparison
	(b)	Rectangle 5 cm by 4 cm drawn	**2**	**W1** for a rectangle with one side correct
13	**(a)**	61	**2**	**M1** for 25 + 12 × 3 or 36 seen
	(b)	53 – 55	**1**	
	(c)	[Greenford] 73 [Townhead] 68 Townhead [Repairs], [£]5	**M1** **M1** **M1**	or 25 + 12 × 4 ft *their* Greenford and Townhead **W3** for Townhead [Repairs], [£]5 as answer www

Section B Total: 25

B274 Module Test M4

Section A

1	**(a)(i)**	29	**1**	
	(ii)	8	**1**	
	(b)	0·041	**1**	
2	**(a)**	Correct reflection	**1**	Vertices at (3, 1), (6, 1), (4·5, 5)
	(b)	Correct reflection	**1**	Vertices at ($^-$4, $^-$1), ($^-$1, $^-$1), ($^-$2·5, $^-$5)
3	**(a)**	Correct point plotted at ($^-$2, $^-$1)	**1**	
	(b)(i)	D plotted to make parallelogram	**1**	ft *their* C
	(ii)	(3, $^-$1) or (1, 5)	**1**	ft *their* plotted point
4	**(a)**	$\frac{23}{100}$ cao	**1**	
	(b)	26	**1**	
	(c)(i)	480 F(riday)	**1**	
	(ii)	40	**1**	
5	**(a)**	$\frac{3}{8}$, 0·375, 37·5%	**1**	
	(b)	$\frac{7}{8}$, 0·875, 87·5%	**1**	
	(c)	0 or $\frac{0}{8}$	**1**	
6		Complete correct method, eg 267 28 × 2136 5340 + 7476 7476	**M1** **W1** **A1**	Accept any complete correct method which, without errors, would lead to the correct answer for M1. 2136, 5340, 196, 1680 or 5600 seen, or 4 correct boxes in grid method, or 4 correct values from 4000, 1200, 140, 1600, 480, 56. **SC1** 7476 without working
7		5 + 3n	**2**	**M1** 3n Accept 3 × n, or n + n + n or n3
8	**(a)**	480 km	**1**	
	(b)(i)	11(00)	**1**	
	(ii)	40 – 50	**1**	
	(c)	100 km/h	**2**	**M1** $\frac{300}{3}$ or $\frac{200}{2}$ $\frac{100}{1}$ seen

Section A Total: 25

Section B

9		17·4	**2**	**M1** attempt to multiply 5·8 by 3
10	**(a)(i)**	22 and 17	**2**	**W1** each ft *their* 22 – 5 for the second mark **SC1** 21 and 15
	(ii)	Subtract one more than before	**1**	oe
	(b)	16	**1**	
11		5·5 – 6·5	**2**	**M1** 4·5(5) seen in working, not as final answer alone
12	**(a)**	35 (Vertically) opposite angles	**1** **1**	 Dependent on 35
	(b)	110 180 **and** isosceles (triangle)	**2** **1**	**M1** attempt to subtract 70 from 180
13	**(a)**	57	**1**	
	(b)	36·75 or 36·8	**3**	**M2** $\frac{441}{12}$ or *their* $\frac{441}{12}$ OR **M1** attempt to add 12 values
14		£0·95 or 95p cao www	**5**	**W4** for 95 or 0·95 www OR **M1** 1·45 × 2·6, implied by 3·77 or 377 **M1** 0·35 × 0·8 soi by 0·28 or 28 **M1** 5 – *their* (3·77+ 0·28) **U1** Correct units for *their* answer, dependent on third M1 OR **W2** 4·05 or 405 www OR If 0 scored, **SC2** £3·20 as final answer
15	**(a)**	320g	**1**	
	(b)	36	**1**	
	(c)	7·5	**1**	

Section B Total: 25

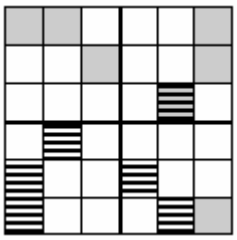
B275 Module Test M5

Section A

1	**(a)**	A D B A B C B D C A C B C D D A D B D C	**2**	**W1** for 5 correct Ignore repetitions and errors
	(b)	$\frac{6}{12}$ oe isw	**1**	Correct or ft *their* (a) including AB AC Accept % and decimals Reject incorrect forms
2	**(a)(i)**	30 500	**1**	
	(ii)	30 000	**1**	
	(b)	30 000 (×) 20(= 600 000) or 30 000 (×) 19(= 570 000) or 30 500 (×) 20 (= 610 000)	**2**	**M1** 30 000, 30 500 or 20 seen
	(c)(i)	20 142	**1**	
	(ii)	Greater range	**1**	Accept eg higher, bigger, more Accept 'range' with 11222 or 14012 and 25234, or with a number greater than 7127 instead of a comparison
3	**(a)(i)**	11	**1**	
	(ii)	8	**2**	**M1** for $25 - 1 = 3x$ or better OR **M1** $x = b/a$ after $ax = b$, or 26/3
	(b)	$9a + 11b$ cao	**2**	**W1** for $9a$ or $(+)11b$ seen
4	**(a)**	9	**1**	
	(b)	..... …… 90(%) …... (0)·03 …… $\frac{53}{100}$ …… …...	**3**	**W1** each
5	**(a)**	25	**2**	**W1** for 16 or 9 seen
	(b)	B and any two correct answers $^{-}8$ 0 $^{-}8$ $^{-}8$	**2**	**W1** for B or any two correct answers
6	**(a)**	(a =) 90 (b =) 5	**2**	**W1** for each answer
	(b)	'No' and it could be a parallelogram (or rhombus or square)	**1**	Accept any correct explanation, eg a rectangle has four equal angles; need four right-angles, or a correct drawing

Section A Total: 25

Section B

7	**(a)**	Correct angle (± 2°) and line (± 2mm)	**2**	**W1** each
	(b)	4·3 – 4·7	**1**	If 2 in (a) must get correct answer, if 0 or 1 in (a) ft *their* diagram only (±2 mm)
8	**(a)**	25	**2**	**M1** for 4 × 7 – 3 or 28 seen
	(b)	127	**2**	**M1** for 85 or 42 seen or 5 × 17 + 3 × 14
9	**(a)**	(0)52 to (0)56	**1**	
	(b)	31 to 33	**2**	**M1** for 6·2 to 6·6 or 62 to 66 seen or *their* length × 5 soi
10	**(a)**	$\frac{360}{90}$ oe (× 50)	**2**	**W1** for an argument based on estimation eg (just) over half (180) chose French
	(b)	20 or 19	**2**	**M1** for 78 to 82 or 21 to 23(%) seen **SC1** for 100(°) and 25 seen
11		221·26	**2**	**M1** for 9·2 × 3·25 × 7·4 or figs 221(26) or 2213
12		54	**3**	Allow any correct method eg **M1** for 600 × (0)·45 (or 270) AND **M1** for *their* 270 × 1/5 (oe) OR **M1** for 600 × 1/5 = 120 AND **M1** for *their* 120 × 0·45
13	**(a)**	8 11	**1**	
	(b)	Three correct points plotted, and a ruled straight line through *their* points	**2**	ft *their* (a) **M1** for 3 points plotted correctly ignoring errors
14			**3**	**W1** for each quadrant correct

Section B Total: 25

B276 Module Test M6

Section A

1	**(a)**	14	**1**	
	(b)(i)	[0]·18	**1**	
	(ii)	50	**2**	**M1 fo**r 300 ÷ 6 or for figure 5 with wrong power of 10
2		3·40 www	**3**	**M1** for 3 × 7·55 oe attempted [=22·65] AND **M1** for 30 − *their* (3 × 7·55 + 3·95) (may be implied by *their* correct ft answer) Answer of 3·4 implies **M2** If **M0**, allow **SC1** for 30 − (7·55 + 3·95) or 30 − 11·5(0) or 18·5(0)
3		1/20	**2**	Allow equivalent fractions eg 2/40 ignoring wrong cancelling **M1** for 16/20 or 15/20 or other equivalent fractions with denominator a multiple of 20 OR **M1** for [0·8 − 0·75 =] 0·05
4		*a* = 80° Angle sum of triangle = 180° oe *b* = 30° Corresponding [angles]	**1** **1** **1** **1**	 Condone omission of = 180° if *a* is correct; must have triangle Dependent on 30° correct Allow alternate angles etc, ft other angles found and clearly shown on diagram
5	**(a)**	Foot length goes up as height goes up oe	**1**	
	(b)	Ruled line passing between (140, 20·2) and (140, 21·5) and between (170, 25) and (170, 26·5)	**1**	
	(c)	Ft *their* line of best fit	**1ft**	± 2mm, or to nearest integer
6		57° angle drawn Line 7·2 cm, drawn with compass arcs, opposite *their* 57° angle	**1** **2**	± 2° ± 2 mm **W1** if drawn without compass arcs OR **W1** for arcs of radius 7·2 cm with correct centre but triangle not joined correctly

7	**(a)** 10	**1**	
	(b)(i) [x =] 5·5 or 5 ½ or 11/2 isw	**2**	Condone embedded **M1** for $2x = 11$ or for second step correct ft *their* wrong first step, or for complete correct reverse flow diagram
	(ii) ¯3 www	**3**	**M1** for one correct step eg $2x + 7 = 1$ AND **M1** for each of another two correct steps leading to final answer [allow ft from error in earlier steps]

Section A Total: 25

Section B

8	**(a)**	8·18(3...) or 8·184 or 8·2	**1**	
	(b)	3 hours 42 minutes	**1**	
9		(0)·34	**2**	**M1** for attempt at 1 − (0·4 + 0·26)
10	**(a)**	[5] 1 ⁻3	**1**	
	(b)	*Their* 3 points plotted Correct ruled line	**1** **1**	± 2 mm Must extend from $x = 0$ to at least $x = 4$, within 2 mm of correct points; no ft from wrong points
11	**(a)**	78	**1**	
	(b)	55	**2**	**M1** for 54 and/or 56 identified [eg by circling or crossings out on diagram] or for another answer in the range 54 to 56
	(c)	She should have used 37 not 38 She needs to subtract	**1** **1**	
12	**(a)**	104	**2**	**M1** for 312 ÷ 3
	(b)	387	**2**	**M1** for 516/4 or 129
13		Rotation Through 90° clockwise About origin or O or (0, 0)	**1** **1** **1**	Accept turn ¼ turn clockwise, 270° anticlockwise, oe
14		Answer in range 52·78 to 52·82 inclusive m^2	**2** **1**	**M1** for $\pi \times 4{\cdot}1^2$ oe Allow **A1** for 53 if correct method seen
15	**(a)**	$6p^3$	**1**	**0** for $6 \times p^3$ or for $6(p^3)$ etc
	(b)	$10x - 15$	**1**	Mark the final answer
	(c)	$7(x + 3)$	**1**	Allow $7(1x + 3)$

Section B Total: 25

B277 Module Test M7

Section A

1	**(a)**	16 or 20	**2**	**M1** for any 2 of the 3 numbers seen in either of $\frac{8 \times 40}{20}$ or $\frac{8 \times 40}{16}$
	(b)	76 www	**2**	**M1** for either $\sqrt{144} = 12$ or 64 seen
	(c)	Multiplying by a number less than 1 should give an answer less than 26·8	**1**	Accept $30 \times 0{\cdot}9 = 27$, or $27 \times 1 = 27$, or $26{\cdot}8 \times 1 = 26{\cdot}8$
2	**(a)**	60 Alternate angle (or complete correct equivalent)	**1** **1**	 Reason(s) must correctly relate to their attempt to find x
	(b)	135 or *their* (a) + 75 EDF = 75 or ADB = 45 Alternate ∠ (to ADF) or external ∠ of Δ = sum of int. opps, or ∠s of a Δ (= 180) and ∠'s on a line (= 180)	**1** **1** **1**	 Accept EDF, ADB marked on diagram If AD produced to H award 1 mark for CDH = 60 or FDH = 45
3		36 60 84 www	**3**	**M2** any two correct **M1** 180 ÷ *their* 15 or 12
4		$6x = 36$ or $3x = 18$ $x = 6$	**2** **1**	**M1** $2(3x + 10) + 2 \times 15 = 86$ or better, or $3x + 10 + 15 = 43$ or better, or $3x + 10 = 28$
5	**(a)**	$3^2 \times 7$ or $3 \times 3 \times 7$	**2**	**M1** for $63 = 3 \times 21$ or 7×9 soi, or for tree or ladder method with correct first step
	(b)	126	**2**	**W1** for $2 \times 3 \times 3 \times 7$ or $\frac{42 \times 63}{21}$ a multiple of 126 (except 2646)
6	**(a)**	$12x - 15 (= 15)$ or $4x - 5 = 5$ $12x = 30$ or $4x = 10$ $x = 2{\cdot}5$ or 5/2 oe isw	**M1** **M1** **M1**	 Correct or ft from error in first step Correct or ft from *their* $ax = b$, $a \neq 1$ **W3** for 2·5 from trials
	(b)	$x^2 + 3x - 4x - 12$ isw	**2**	**M1** for any three terms correct, or 2 terms correct of 3 simplified terms eg $x^2 - 7x - 12$, $x^2 - x$, etc.

Section A Total: 25

Section B

7	**(a)**	Positive	**1**	Ignore 'weak', 'strong', etc
	(b)(i)	Ruled line of best fit	**1**	Pass between (52·5, 84) and (52·5, 89) and between (72·5, 108) and (72·5, 114)
	(ii)	Read off at $x = 62$ from *their* attempt at a straight line of best fit	**1**	
8	**(a)**	D	**1**	
	(b)	(9, 4, 5)	**1**	
9	**(a)**	$4n + 2$ final answer	**2**	**M1** for $4n$ final answer
	(b)	$[n =] \frac{T + 5}{6}$ oe as final answer	**2**	**M1** for first correct step, ie $T + 5 = 6n$, or $\frac{T}{6} = n + \frac{5}{6}$ OR **SC1** for $T + 5/6$, or $T + 5 \div 6$ oe, or for $\frac{\pm T \pm 5}{\pm 6}$
10		$\frac{23}{60}$, 0·38(3…), 38·(3…)%	**2**	**M1** for numerator of 23, or denominator of 60, or 23 : 60, or 38·(3…)
11		Midpoints soi *Their* midpoints × frequency Attempt at $\sum fm \div 40$ (2140 ÷ 40) 53·5 isw www	**M1** **M1** **M1** **A1**	At least 3 of 42·5, 47·5, 52·5, 57·5, 62·5 At least 3 correct; allow M1 ft for endpoints × frequency Dependent on second M1 A1 mark dependent on M3 Allow **W4** www
12	**(a)**	$x = 1$: $x^3 + 3x = 4$ and $x = 2$: $x^3 + 3x = 14$	**1**	Or $x = 1$: $x^3 + 3x - 11 = {}^{-}7$ and $x = 2$: $x^3 + 3x - 11 = 3$
	(b)	One value in $1 < x < 2$ correctly substituted Another value in $1{\cdot}5 \leq x < 2$ correctly substituted values required rot to at least 1 dp 1·8	**1** **1** **1**	Allow extra work in (a) to count in (b) 1·8 with no trials scores 1 only

x	$x^3 + 3x$
1·1	4·631
1·2	5·328
1·3	6·097
1·4	6·944
1·5	7·875
1·6	8·896
1·7	10·013
1·8	11·232
1·9	12·559

13	21·8 or 22	**4**	**W3** for 21·7 or 21·76(…) OR **M2** for $\sqrt{(18{\cdot}6^2 + 11{\cdot}3^2)}$ OR **M1** for $18{\cdot}6^2 \pm 11{\cdot}3^2$, or 473·65 or 218·27 OR After 0 scored, **SC1** for 11·3 seen, or for answer with 2 or 3 sf after attempt at Pythagoras' Theorem
14	146 to 146·5 cm^2	**3** **1**	**M2** for $15^2 - \pi 5^2$ or 78·5(3…) or 79 OR **M1** for $\pi 5^2$ or 25π or 15^2 or 225 Independent

Section B Total: 25

B278 Module Test M8

Section A

1	**(a)**	Rotation only 90° anticlockwise oe (Centre) (5, ⁻1) oe	**W1** **W1** **W1**	No other transformations Condone lack of brackets, vector notation for coordinates, etc
	(b)	Enlargement with vertices at (⁻2, 4), (⁻2, 1) and (⁻0·5, 1)	**3**	**M2** for half size in correct orientation but wrong position, or for 2 correct points and 3rd point within 5 mm OR **M1** for clear correct method but each point inaccurate up to 5 mm OR **SC1** for half size triangle B anywhere, with no other enlargement seen
	(c)	Valid reason	**1**	Eg angles are the same; sides/lengths have same scale factor; sides/lengths in same ratio/proportion etc
2	**(a)**	Sketches $y = \frac{1}{x}$	**2**	**W1** for one quadrant correct (and other wrong or missing), or for both 'correct' apart from crossing axes, or for two separate part incorrect curves in 1st and 3rd quadrants, or correct sketch of $y = \frac{-1}{x}$
	(b)	Sketches $y = x^3 + 2$	**2**	Must be correct sketch crossing positive *y*-axis **W1** for any positive cubic, or any curve with *y*-intercept at (0, 2) indicated on the graph
3	**(a)**	$1{\cdot}2 \times 10^9$ cao	**1**	
	(b)	States that China is 20 times bigger oe, or shows by a correctly evaluated calculation that Rebecca is incorrect	**2**	**M1** for any correctly written calculation using the correct values with an incorrect evaluation If UK population divided by China population then allow **2** marks for 1/20 or **M1** for 0·05
4		$4\frac{13}{20}$ oe mixed numbers	**3**	**M2** for $\frac{93}{20}$ or $\frac{65}{20}+\frac{28}{20}$ or $(4)\frac{5}{20}+\frac{8}{20}$ or 4·65 OR **M1** for $\frac{65}{20}$ or $\frac{28}{20}$ or $(3)\frac{5}{20}$ or $(1)\frac{8}{20}$ or $\frac{13}{4}+\frac{7}{5}$ or (3)·25 + (1)·4

5		$35x + 15y = 55$ and $12x - 15y = 39$ or $28x + 12y = 44$ and $28x - 35y = 91$	**M1**	Condone 1 error in each equation
		Adds or subtracts	**M1**	Dependent mark. Add/subtract equations correctly for *their* coefficients. Condone 1 error in the addition or subtraction
		$x = 2$	**A1**	After M2 earned and no errors seen
		$y = -1$	**A1**	After M0**, W1** correct answers after no / wrong working, or from trial and improvement
6	**(a)**	9 cao	**1**	
	(b)	Min at 144 and Max at 184	**W1**	
		LQ at 156, UQ at 169 and 'boxed'	**W1**	**0** if box extended beyond quartiles
		Median at 164	**W1**	Must be the only line in a box

Section A Total: 25

Section B

7	**(a)(i)**	25000 × 0·68 with valid reason	**1**	Eg 100 – 32 = 68; 1 – 0·32 = 0.68; 32% off means 68% left oe
	(ii)	7860·8(0)	**2**	**M1** for 25000 × 0·68³ oe After 0, allow **SC1** for answers 7860 or 7861 or 11863·8 or 819·2
	(b)	1800 www	**3**	**M2** for 1944 ÷ 1·08 oe OR **M1** for 1·08 oe seen
8	**(a)**	$2x – 5 = 3 × 8$ $2x = 24 + 5$ 29/2 isw or 14·5 oe	**M1** **M1** **M1**	Removes fraction Correct or ft from first step, provided first step attempts to remove fraction **M1** for correct answer or ft from *their ax = b* with $a \neq 1$. Do not accept un-simplified integers eg 6/2 Allow **W3** for answer 14·5 www
	(b)	$(x - 10)(x + 7)$ (=0) $^{-}7$ and 10 www	**2** **1ft**	**M1** for $(x \pm 10)(x \pm 7)$ Could be seen in grid method For ft solutions, dependent on M1 earned
9		Volume Three-dimensional oe	**1** **1**	 Clear reference to multiplication of 3 lengths or area times length
10		Considers two right-angled triangles (h =) 6 sin 22 oe 2·24 to 2·25 or (BC=) 4.48 to 4.5 16·48 to 16·5 www	**M1** **M2** **A1** **A1**	Eg 22 seen; divides plan into 2 right angled triangles **M1** for $h/6$ = sin 22 oe Allow **W5** www **SC1** for 12 + 'a value' evaluated as answer dependent on some trigonometry seen, provided the value is first shown
11	**(a)**	First stage shows 3/10 and label Second stage shows 7/10, 3/10 and labels	**1** **1**	 Allow 1 omission on labels but not probabilities, or allow one mark overall for all correct probabilities but no labels
	(b)	$\frac{9}{100}$ oe isw	**2ft**	ft *their* $\frac{3}{10} \times \frac{3}{10}$ correctly evaluated **M1** for *their* $\frac{3}{10} \times \frac{3}{10}$
12		90 000 93 000	**1** **1**	 After 0, **M1** for $\frac{88+104+78}{3}$ or $\frac{104+78+97}{3}$

Section B Total: 25

B279 Module Test M9

Section A

1	**(a)**	$(x - 3)(x + 5)$ $3, -5$	**M2** **A1**	**M1** $(x \pm 3)(x \pm 5)$ Dependent on M2 OR **W1** ft *their* factorisation OR **W1** for $x = 3$ and -5 only
	(b)	$3x + 2$ as final answer	**2**	**W1** term $3x$ or term 2 seen in answer OR **M1** for $2x(3x + 2)$ or $\frac{3x^2 + 2x}{x}$ or $\frac{6x + 4}{2}$ seen
2	**(a)**	30 to 35 or 3×10^1 or 3×10	**2**	**M1** $\frac{(1 \times) 10^8}{3 \times 10^6}$ or $\frac{3 \times 10^2}{9}$ or $\frac{300}{9}$
	(b)	220850	**2**	**M1** 121500 or 99350 seen
3		$\sqrt{\frac{y-4}{3}}$	**3**	**M1** 1st step eg $y - 4 = 3x^2$ or $\frac{y}{3} = x^2 + \frac{4}{3}$ **M1** 2nd step eg $\frac{y-4}{3} = x^2$ or $\frac{y}{3} - \frac{4}{3} = x^2$ **M1** 3rd step eg $\sqrt{\frac{y-4}{3}}$ or $\sqrt{\left(\frac{y}{3} - \frac{4}{3}\right)}$
4	**(a)**	1	**1**	
	(b)	$\frac{1}{25}$ (isw) or 0·04	**1**	
	(c)	20	**1**	
5	**(a)**	24π www	**2**	Condone $\pi \times 24$ **M1** $\frac{\pi \times 9 \times 8}{3}$ or $\frac{\pi \times 3^2 \times 8}{3}$
	(b)	436	**2**	**M1** for 4 or 2^2 seen as scale factor
6		∠ADC = 90° and 'angle in a semi-circle' ∠ACB = 90° and 'tangent and diameter/radius meet at 90°' x or ∠ABC = 64°	**1** **1** **1**	'Angle in alternate segment' can replace either of the 'circle' statements. Accept perpendicular for 90° Independent mark
7		40% www	**3**	**M1** 45 + 35 + 35 + 40 + 45, or total 40 (large) or 1000 (small) squares AND **M1** $\frac{45 + 35}{\textit{their}\ 200}$ or 16/40 or 400/1000

Section A Total: 25

Section B

8	**(a)**	A $\frac{4}{6}$ $\frac{2}{6}$ isw	**1**	Accept equivalent fractions or decimals or %
		B $\frac{2}{6}$ $\frac{1}{6}$ $\frac{3}{6}$ seen on 1 set of branches isw	**1**	Condone incomplete or error on other set of branches
	(b)	$\frac{14}{36}$ or equivalent fraction	**3**	**M2** $\left(\frac{4}{6}\times\frac{2}{6}\right)+\left(\frac{2}{6}\times\frac{2}{6}\right)+\left(\frac{2}{6}\times\frac{1}{6}\right)$ ft *their* probabilities OR **M1** One pair, from 3 listed above, multiplied correctly OR **M1** 3 correct cases identified
9	**(a)**	$y=\frac{x}{3}+4$	**1**	
	(b)	$y = -3x + 4$	**2**	**M1** -3 in answer or seen in working leading to answer
10	**(a)**	$20x^2 + 3x - 2$	**3**	**M2** $20x^2 + 8x - 5x - 2$ OR **M1** 3 terms out of 4 correct
	(b)	$(4x - 3y)(4x + 3y)$ isw	**2**	**M1** $(4x \pm 3y)(4x \pm 3y)$
11	**(a)**	(2, 1, 1·5)	**2**	**W1** 2 correct
	(b)	5·32 to 5·41 www	**3**	**M2** $\sqrt{(4^2+2^2+3^2)}$, or for $\sqrt{(\textit{their}\ \text{EH}^2+\textit{their}\ \text{HG}^2+\textit{their}\ \text{CG}^2)}$ if lengths are clearly labelled on diagram or stated. This calculation can be done in 2 stages. OR **M1** for $\sqrt{(x^2+y^2+z^2)}$ if lengths are not clear on diagram (may be in 2 stages), or for lengths 4 (EH), 2 (HG), 3 (CG) seen or used, or for correct method for calculation of any 'useful' diagonal
	(c)	33·69 to 34·3 www	**3**	**M2** $\sin^{-1}(\textit{their}\ 3 / \textit{their}\ \text{EC})$ OR **M1** $\sin x = (\textit{their}\ 3 / \textit{their}\ \text{EC})$

12	25, 6·25, 4 seen 60/25 = 2·4, 15/6·25 = 2·4, 9·6/4 = 2·4 <u>Alternative method:</u> 0·4/0·2 = 2, 15/60 = 0·25 = 1/2² 0·5/0·4 =1·25, 9·6/15·0 = 0·64 =1/1·25²	**1** **1** **1** **1**	or 0·04, 0·16, 0·25 or 60 × 0·04 = 2·4, 15 × 0·16 = 2.4, 9·6 × 0·25 = 2·4
13	14 or 15 www	**2**	**M1** $\frac{245}{870}\times 50$, or 0·28 × 50, or $\frac{50}{870}\left(=0\cdot057\right)$ then *their* 0·057 × 245, or $\frac{870}{50}\left(=17\cdot4\right)$ then $\frac{245}{\textit{their}\ 17\cdot4}$

Section B Total: 25

List of abbreviations

The following abbreviations are commonly found in GCSE Mathematics mark schemes.

- Where you see **cao** in the mark scheme it means **correct answer only.**
- Where you see **figs 237**, for example, this means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point, eg 237000, 2·37, 2·370, and 0·00237 would be acceptable, but 23070 or 2374 would not.
- Where you see **ft** in the mark scheme it means **follow through.**
- Where you see **oe** in the mark scheme it means **or equivalent.**
- Where you see **rot** in the mark scheme it means **rounded or truncated.**
- Where you see **seen** in the mark scheme it means that the mark is earned if that number or expression is seen anywhere in the answer space, including on the answer line, even if it is not in the method leading to the final answer.
- Where you see **soi** in the mark scheme it means **seen or implied.**
- Where you see **www** in the mark scheme it means **without wrong working.**

Grade Thresholds

General Certificate of Secondary Education
Mathematics C (Graduated Assessment) (Specification Code J517)
June 2008 Examination Series

Unit Threshold Marks (Module Tests)

Unit		Maximum Mark	a*	a	b	c	d	e	f	g	p	u
B271	Raw	50								30	14	0
	UMS	59								40	20	0
B272	Raw	50							35	20	13	0
	UMS	70							60	40	30	0
B273	Raw	50							26	13		0
	UMS	79							60	40		0
B274	Raw	50						36	20	12		0
	UMS	90						80	60	50		0
B275	Raw	50						32	16			0
	UMS	99						80	60			0
B276	Raw	50					27	14				0
	UMS	119					100	80				0
B277	Raw	50				26	12					0
	UMS	139				120	100					0
B278	Raw	50			31	15						0
	UMS	159			140	120						0
B279	Raw	50		27	13							0
	UMS	179		160	140							0

Notes
The table above shows the raw mark thresholds and the corresponding key uniform scores for each unit entered in the June 2008 session.

Raw marks in between grade boundaries are converted to uniform marks by a linear map. For example, 28 raw marks on unit B275 would score 75 UMS in this series.

The grade shown in the table as 'p' indicates that the candidate has achieved at least the minimum raw mark necessary to access the uniform score scale for that unit but gained insufficient uniform marks to merit a grade 'g'. This avoids having to award such candidates a 'u' grade. Grade 'p' can only be awarded to candidates on B271 (M1) and B272 (M2). It is not a valid grade within GCSE Mathematics and will not be awarded to candidates when they aggregate for the full GCSE (J517).

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

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