OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics C

General Certificate of Secondary Education **J516**

Mark Schemes for the Units

June 2007

J516/MS/R/07

Oxford Cambridge and RSA Examinations

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GCSE Mathematics C (J516)

MARK SCHEMES FOR THE UNITS

Mark Scheme B241
June 2007

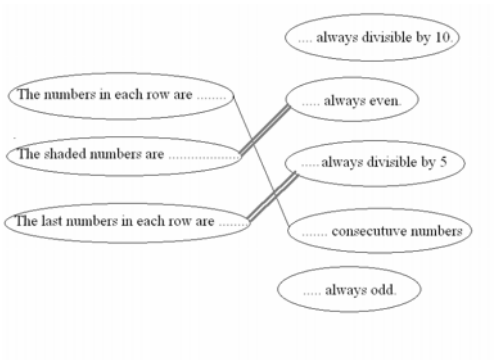
SECTION A

1	(a) 79	**1**	
	(b) 12	**1**	
	(c) 30	**1**	
2	(a) Platinum or 1772	**1**	
	(b) 1060	**1**	
	(c) 3410	**1**	
	(d) 1600	**1**	
	(e) 1535	**2**	**M1** for 1064 + 471 seen or implied
3	D F	**2**	1 + 1
4	All 4 correct 	**2**	**1** for 2 correctly indicated
5	(a) The correct 5 only ACB BAC BCA CAB CBA	**2**	**1** for 3 correct, condoning errors or repeats
	(b) (i) 3:40 or equivalent	**1**	Allow alternative common time formats
	(ii) 4 o'clock or equivalent	**1**	Allow alternative common time formats. Follow through from part (ii)
6	(a) Evens Unlikely Impossible	**1** **1** **1**	**SC2** for all the probabilities correctly given numerically ie $\frac{1}{2}$ $\frac{1}{12}$ 0
	(b) (i) 60	**1**	
	(ii) 25	**1**	

7	(a) 79	**1**	
	(b) 24	**1**	
	(c) Forton	**1**	

Section A Total: 25

SECTION B

8	(a)	(i)	7	**1**	
		(ii)	9	**1**	
		(iii)	7	**1**	
	(b)	(i)	(2, 5)	**1**	
		(ii)	(0, 4) indicated in some way	**1**	Correct by eye (± 2 mm)
9	(a)	(i)	3 1 2 3	**1**	
		(ii)	Sensible (true) comment	**1**	For example, "numbers go 1 2 3" or "number are diagonal" or pattern 123", "1st line is the same as the 4th line" (or 2nd / 5th line or 3rd / 6th) or equivalent. Not just" I followed the pattern" or equivalent - must have a relevant description.
	(b)			**1** **1**	
10	(a)	(i)	1 hexagon	**1**	
		(ii)	2 pentagons	**1**	
	(b)		$\frac{1}{4}$ or $\frac{2}{8}$ or equivalent	**1**	Condone 2/8 and 1/4
	(c)		Correct	**3**	**2** for correct sail regardless of position. (**1** for two correct sides) **1** for correctly drawn mast height ***and*** position on the board.

11	(a)	(£)1370		**1**	
	(b)	6(g)		**2**	**M1** for "2" or "8÷4" or "24" or "8 x 3" o.e. seen.
	(c)	(i)	200 (cm)	**1**	
		(ii)	8	**1**	Allow follow through (i) ÷ 25
		(iii)	8.2 cm to 8.8 cm or 82 mm to 88 mm	**2**	**1** for the less accurate correct "number" outside this range (7.8 – 9.2 or 78 – 92)
			Matching unit	**1**	**1** for (5 – 15) **cm** or (50 – 150) **mm** for the units mark. If zero scored for question SC1 for 3.2 ± 0.2 and 3.2 ± 0.2 and 2 ± 0.2 or 6.4 ± 0.2 and 2 ± 0.2 (or x 10 equivalent) seen.
	(d)	(i)	8	**1**	
		(ii)	(£) 250	**1**	Allow follow through 2000 ÷ "their (i)"

Section B Total: 25

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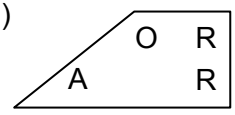
June 2007

SECTION A

1	(a) – no – no no –	**1**	All correct
	(b) Correct line of symmetry drawn on shapes 3 and 6	**2**	**W1** for each
2	(a) **123** + **321** = **444** 1234 + 4321 = **5555** **123456** + **654321** = 777777	**1** **1** **1**	
	(b) 24	**1**	
3	(a)(i) 6½	**1**	
	(ii) 1	**1**	**SC1** for 20½ in (i) **and** 3 in (ii)
	(b) 150	**1**	
4	(a) Half of the cards are not clouds	**1**	
	(b) Mark 4·3 to 6 cm from 0	**1**	
5	(a) 45 or attempt at 3 × 15 64 or 'their 45' + 19 'their 64' – 60 4	**M1** **M1** **M1** **A1**	 Seen or implied Or **W4** for 4 as answer without wrong working If 0 awarded then **SC3** for 23 as answer Or **SC1** for 83 seen
	(b) 15	**2**	**W1** for 1·4 – 1·25 **or** 140 – 125 **or** 140 cm seen **or** figs 15 seen
	(c) 1·60 to 2·00 inclusive	**1**	Or 160 cm to 200 cm
6	(a) 168	**2**	**W1** for attempt at 6 × 28 seen **or** figs 168 seen
	(b) 13	**2**	**W1** for 78 ÷ 6 seen in correct order **or** figs 13
	(c)(i) 10	**1**	
	(ii) 26 – 28	**1**	

Section A Total: 25

SECTION B

7	(a) ¯68	**1**	Accept Asia
	(b) ¯11	**1**	Accept Oceania **SC1** for 68 in (a) **and** 11 in (b)
	(c) 30	**1**	
8	(a) 9	**2**	**M1** for attempt at ordered list seen, minimum 7 numbers ordered.
	(b) 14	**1**	
9	(a)(i) North West	**1**	Accept NW
	(ii) Bank (Street) left, Mill (Street) left	**2**	**W1** for any 2 correct
	(b) 4·25	**2**	**M1** for attempt to add all three weights **or** 0·75(0) seen **or** figs 425 **or** 4(·…)
10	(a) 180	**1**	
	(b) 175	**1**	
	(c) 525 or ft their (b)	**1**	
11	(a) B D A C	**2**	**W1** for any 2 correct
	(b) Cylinder	**1**	
12	(a) 	**2**	**W1** for any 3 correct
	(b) 46° (± 2°) **must** f.t. their A	**1**	
13	(a) 104·5(0)	**2**	**W1** for 18 × 5·25 + 10 **or** 94·5(0) seen **or** figs 1045
	(b) 2 is enough for 16 (so need 3)	**1**	Or 2 children would be without a helper
	(c) 6 (sweets) 12 (left over)	**2**	**W1** for each

Section B Total: 25

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SECTION A

1	(a) 17 isw (b) add 3	**1** **1**	
2	(a) 6742·7 (b) 3·404 (c) 14·4	**1** **1** **2**	 M1 for attempt at 2·4 × 6 or digits 144
3	(a) grams (b) metres	**1** **1**	
4	(a) 18 (b) 6 (c) 11	**1** **1** **1**	
5	(a)(i)25 (ii) 9 (b) 20 (c) (4 + 5) × 3 = 27	**1** **1** **1** **1**	 or ((4+5)×3) = 27
6	(a) 128 (b) 30	**2** **1**	M1 for 640 ÷5
7	2·5(0)	**3**	M1 3×7+4 or 21 or 25 seen M1 'their 25' - 22·5(0) soi
8	(a) all correct and none incorrect (b) 125 (c) 6·5(0)	**2** **1** **1**	W1 for three correct squares condoning errors and omissions

Section A Total: 25

SECTION B

9	(a) (9) 15 12 7 11 (b) 54 (c) Red (d) 4	**2** **1** **1** **3**	W1 for two correct or ft their table M1 for attempt to add all the numbers M1 a total ÷ 9 soi
10	(a) D (b) E (c) (d) 745	**1** **1** **1** **2**	 any orientation M1 for 20× 35 (+45) seen
11	(a) 12 – 16 (b) 8 (c)(i) 22 to 22·5 (ii) 72	**1** **2** **1** **2**	 M1 for 24 M1 for use of an amount which is a factor of 80 eg 5,8,10,20,or 40 **or** W1 for 36
12	(a) correct right-angle correct length (4cm) (b) 123 - 130	**1** **1** **2**	±2° ±2mm M1 for 12·3 – 13(·0) seen
13	(a) 1 (h) 40 (m) (b) 12.50	**2** **1**	W1 for attempt at valid time interval or 100 or 2(h) 40(m) seen accept equivalent times

Section B Total: 25

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SECTION A

1(a)	(-2,3) cao	**1**	
(b)(i)	C and D correctly plotted	**1**	
(ii)	(-2,-2) or (3,-2)	**1**	**Must** f.t *their* D
(c)	20cm	**1**	Or f.t *their* **square** or **rectangle** only.
2(a)	16 cao	**1**	
(b)	5 cao	**1**	
(c)	7 cao	**1**	
3(a)	0·029 0·125 0·2 0·204 0·27	**2**	**W1** for one incorrect or all reversed
(b)	$\frac{27}{100}$	**1**	
4(a)	Line x= 1 drawn	**1**	
(b)	Correct reflection	**1**	
5(a)	175g	**1**	
(b)	30	**1**	
(c)	75g	**2**	**W1** for 25 seen
6	£8970 with working	**3**	**W1** for 8970 with no working shown. **or** **M1** for a complete attempt at multiplication or addition of boxes if grid method used. If choice of method, mark the one which leads to answer on answer line. **and** **W1** for figs 69, 207, 78, 104, 13 or 1725 seen, or 4 correct boxes if using grid method. **or** **W1** if repeated addition of 26 lots of 345 seen award W1 for 2 of digits 8970 in correct position.
7(a)	W=6x. Accept W=x+x+x+x+x+x or W=6xx	**2**	**W1** for 6x o.e seen.
(b)	T=6x+y or T=w+y o.e	**1**	f.t from **(a)**
8(a)	$\frac{109}{300}$	**2**	**W1** for wrong form **or** **W1** for $\frac{109}{\text{Sum of frequencies}}$
(b)	Valid reason	**1**	

Section A Total: 25

SECTION B

9(a)	29	**1**	
(b)	15	**3**	**M1** intention to add 7 numbers (total not needed) can be soi by 80 – 130 **and** **M1** Division of a total between 80 and 130 by 7 **or** **W2** Final answer of 11·4 to 18·6 inclusive **or** **W1** Final answer of 80 -130
10(a)	2, -4	**2**	**W1** for each, f.t. -6 from their first number for second value.
(b)	6, 11, 16	**2**	**W1** for any 2 correct, in correct position. **SC1 for** 6n, 11n, 16n
11(a)	5·6km	**1**	
(b)	1 hour 10 minutes	**1**	
(c)	Correct line drawn	**1**	
12	£1·50	**3**	**W2** 18·5(0) or 1.5 **or** **M1** 2 x 5·35 or 2 x 3·9(0) seen. **or** **W1** for 10·7(0) or 7·8(0) seen **And** **M1** for intention to add *their* 10·7(0) and 7·8(0)
13(a)	145°	**1**	
	(Angles on a) straight line **or** (Straight) line (adds to) 180°	**1**	
(b)	110°	**2**	**M1** for 180 – (2 x 35) o.e.
14 (a)	43.5	**3**	**M1** for 5 x 4.5 or 3.5 x 6 or 22.5 or 21 seen **and** **M1 (dependent)** for attempt at addition of two areas.
(b)	3.5 to 4 inclusive	**1**	
15	17(m) with at least one correct trial.	**3**	**W1** for 17 on answer line and table blank. **Or** **W1** for one correct substitution, L must be 4 greater than width. **And** **W1** for an improved substitution. **Or** **SC2** for 17 21 357 no tick as the only entry in table and answer line blank or 21 or 357

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SECTION A

1	(a)	2	**2**	**M1**	correct algebraic step eg $6x = 12$ / 15–3 *or* clear flowchart eg 15–3÷6
	(b)	3·5, 3½, 7/2	**2**	**M1**	correct algebraic step eg $2x = 7$ / 6+1 *or* clear flowchart eg 1+6÷2
2	(a)	7000, 6700, 6500, 6600	**2**	**M1**	100 × 70 / 67 / 65 / 66 / 60 *or* 6680 *or* 6000
	(b)i	18	**2**	**M1**	0·4(0) × 45 oe *or* 4·5 or 4½ seen
	(ii)	56	**2**	**M1**	28 ÷ 50 oe *or* 28 × 2 *or* 3 correct % of 50 found
	(c)	600 000	**3**	**M1** & **M1** *or* **W2**	75% soi (eg ¾, 0·75, 270°) 0·75 / ¾ × 800 000 soi *or* figs 200 0(00) & no contradictory evidence figs 600 0(00) as final answer
3		Nelson with 2 conversions Polly	**3**	W2 *or* **W1**	both correct & 1 correct conversion *or* 2 correct conversions both correct, no conversion *or* 1 correct conversion
4	(a)	3/8 oe fraction	**2**	**M1**	¾ × ½ seen *or* $\frac{1{\cdot}5}{4}$, $\frac{1\frac{1}{2}}{4}$, 0·375, 37·5(%)
	(b)	24	**2**	**M1**	0·6 × 40 soi *or* 3 × 40 ÷ 5 oe may be implied by 8 seen
5		11	**2**	**M1**	21 & 10 seen as terms *or* 3×7 & 2×5 shown
6	(a)	142 to 146	**1**		inclusive
	(b)	126 to 130 www	**2**	 **M1**	inclusive 6·3 to 6·5 *or* 63 to 65 *or* 120 to 136 inclusive *or* ft their seen length (5 cm to 8 cm) correctly converted

Section A Total: 25

SECTION B

7	(a)	49	**1**		
	(b)	1000	**1**		if 0 scored in (a),(b): 7×7 and 10×10×10 both seen
	(c)	5	**1**		condone 5^3 and 5×5×5
8	(a)	kite	**1**		only
	(b)	correct statement about properties	**2**		T for R, F for P, not already stated eg • (2) (lines of) reflection symmetry • diagonals (cross) at right angles • all sides same length / equal
				W1	T for R, T for P, not already stated eg • diagonals bisect • rotation symmetry (order 2) • (2 pairs) opposite angles equal
9	(a)	clockwise two thirds, 240	**1** **1**		
	(b)	correct diagram	**1**		intention
10	(a)	$5h$	**1**		
	(b)	$4a$	**1**		
	(c)	$3x$ $7y$	**2**	**W1**	each
11	(a)	listing all 6 outcomes	**2**		only penalise incorrect extras & repeats once
				W1	any 3 of their own correct
	(b)	$\frac{1}{6}$ oe	**2**		16·6%, 16·7%, 17%, 0·166, 0·167, 0·17 or any correct equivalent fraction
				M1	**ft only** *their* list (at least 2 further rows) for 2 or 1, condone repeating given row correct denominator in their fraction *or* wrong form

12	(a)	1280 cm³	**3**	**W2**	1280 with no *or* incorrect units
				or **M1**	8×8×20 soi *or* figs 128(0) *or* 20×40×24 (19200) ÷ *their* 1280
				& **W1**	seen cm³ with a value >100
	(b)	15	**2**	**M1**	5 *or* 3 seen without contradiction
13	(a)	7, 9	**1**		both, this order
	(b)	correct straight line only	**2**		from vertical axis to x=3 line/plotting: within a 2 mm square by
				W1	eye any 3 of *their* 4 points plotted

Section B Total: 25

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SECTION A

1	(a) Base labelled B	**1**	
	(b) p=10 q = 3 r=16 s=10	**1**	
	(c) 476	**3**	**W2** 238 Or **M2** (3x16 (+) 3x10 (+) 10x16) x2 Or **M1** area of 1 face calculated without further working leading to volume.
2	(a) 40	**1**	
	(b) 9 7 10 2 8 11 0 5 12 1 4 4 8 8 9 9 9 13 0 2 5 5 6 6 7	**2**	For 2 marks condone 1 error in order or 1 omission **M1** for mis-order of 20 results with one error or omission **Or** **M1** for 3 errors or omissions in ordered diagram
	(c) Two distinct comments eg aerobics group higher pulse rates spread of pulse rates the same	 **1** **1**	 ft from (a) and (b) ft from (a) and (b)
3	(a) 30	**2**	**M1** 3 x 2 x 5
	(b) 48	**1**	or ft 18 + their (a)
4	(a) 75	**1**	
	(b) -11	**2**	**M1** 9 seen from -3 X -3 or -29 as answer
5	(a) 3a +5	**1**	or 5 +3a
	(b) $x^2 + 4x$	**1**	
6	96	**3**	**W2** 288 / 3 **Or** **M1** ⅔ x 24 x6 **and** **M1** 144 or 16 (48/3) or 4 (12/3) www
7	(a) 13/20 7/10 3/4	**2**	**M1** 2 correct decimal equivalents or correct percentages or 2 equivalent fractions (eg ¾ = 15/20).
	(b) 0.625	**2**	**M1** 0.6(...) or figs 625 or 1/8 = 0.125

Section A Total: 25

SECTION B

8	(a) 6.69	**1**	
	(b) 0.4 or equivalent	**1**	
9	(a) 3 : 1	**1**	
	(b) £75 £25	**2**	**M1** 25 seen or 100/16 or (if 3:1in (a)) 100/4 or M1 ft (a) and A1 ft (a) to 2dp
10	(a) Sum of 5 (equal) angles at centre is 360.	**1**	
	(b) Regular octagon	**2**	6 of the angles to measure between 42º and 48º. **M1** 45º seen, **or** 'web with 8 spokes (6 of the angles to measure between 42º and 48º) **or** attempt at regular octagon evidenced by 4 angles between 42º and 48º.
11	**eg** 100g in small box 48 (p) **and** 100g in large box 49. (...p) or 50(p) small box	**M2** **A1**	Both amounts must be correct for M2 **M1** 2 consistent divisions attempted eg 2.40 ÷ 500 = (0.0048) 3.99 ÷ 800 = (0.0049.. or 0.005) ie may make arithmetic errors or 500 ÷ 2.40 = (208.) 800 ÷ 3.99 = (200. or 201) dependent on M2
12	7	**3**	**M1** 10x + 5 (=75) **and** **M1** 10x = 70 or ft their first step **A1** 7 or ft their penultimate step
13	(a) Straight line drawn	**1**	Must be between (50,160) and (50,170) to between (80,183) and (80,193)
	(b) Reading from their line	**1**	Read to lower/upper integer
14	B at (-5,2), (-4,5) (-3,5) (-3,2)	**3**	**W2** 3 points correct **or** **M2** 90 clockwise rotation, centre (0,0) or **M1** 3 points 'correct' from clockwise rotation, centre (0,0) **or** **M1** 90 clockwise/anticlockwise any centre

15	452 (. .....)	**2**	**M1** 3(.) x12 x12 or π x 12 x 12
16	(a) 1 (5) 9 13	**1**	
	(b) Points plotted Ruled line (by eye) thru' (0,1) (3,13)	**1** **1**	ft their (a) ft - one straight line through their 4 points
	(c) 1.5 or 1½ or 6/4	**1**	or ft their line for non-integral x value Condone coordinate answers (1.5, 7)

Section B Total: 25

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SECTION A

1	(a) Positive	**1**	condone equivalent statements
1	(b)(i) ruled line of best fit between (2, 31) and (2, 40) inclusive and between (6, 55) and (6, 62) inclusive	**1**	
1	(b)(ii) ft their ruled line of best fit	**1**	tolerance 1 full square
2	(a) 320 or 300	**2**	**M1** for two of 20, 8 and 0·5 seen or implied or for answer with figs 32(0) or 30(0)
2	(b)(i) $2^3 \times 3^2$ o.e.	**2**	need not be in index form **M1** for 2 and 3 seen as factors
2	(b)(ii) 360	**2**	**M1** for $2^3 \times 3^2 \times 5$ (or ft from (b)(i)) or for 72 × 5 or 45 × 8 or for $\frac{72 \times 45}{9 \text{ or } 3^2}$
3	(a) 49	**2**	**W1** for $5b^2 = 45$ seen or implied
3	(b) $[x =]\frac{c-30}{9}$ o.e.	**2**	**M1** for a correct constructive first step in rearrangement or for answer of other $[x =]\frac{\pm c \pm 30}{\pm 9}$
4	bisector of angle B constructed arc(s) radius 5 cm (± 2 mm) centre D correct position of T clearly indicated	**M2** **M1** **W1**	tolerance 2°; **M1** for angle bisector arcs but no line drawn or **W1** for angle bisector with no constructing arcs seen or T at 5 cm from D (also implies previous **M1**)
5	(a) 0·25 or $\frac{1}{4}$ isw cao	**3**	**M2** for $4x = 1$ or **M1** for $4x = k$ or $kx = 1$ or $4x - 2 = -1$ or $5x = x + 1$ or $5x - 1 = x$ and **M1** for answer ft their $ax = b$, $a \neq 1$ if **M0** allow **SC1** for ¼ oe seen embedded
5	(b) 7 cao	**3**	**M1** for $3x + 15$ seen and **M1** for $2x = 14$ or ft their expansion if **M0** allow **SC1** for 7 seen embedded in original equation: $5 \times 7 + 1 = 3(7 + 5)$
5	(c) $[n] > 3$ cao	**2**	**M1** for $4n > 12$ or $4n \geq 12$ or for $n = 3$ or for 3 found with other wrong inequality

Section A Total: 25

SECTION B

6	(a) 10 and 1	**2**	**1** each
6	(b) points plotted smooth curve through all their plotted points	**W1** **W1**	tolerance 2 mm; correct or ft from table; allow one error or omission tolerance 2 mm; allow only for curve with just one turning point; allow if only 6 points plotted
7	14·75(…) or 14·8	**3**	**M2** for $\sqrt{11\cdot2^2+9\cdot6^2}$ (could be in two steps) or **M1** for $11\cdot2^2 \pm 9\cdot6^2$ or 217·6 or 33·28
8	14	**2**	**M1** for $\frac{63}{450}(\times100)$ or for figs 14 with wrong decimal place or for answer of 86
9	164 isw	**4**	**M1** for at least 3 midpoints 130, 150, 170 etc seen or implied and **M1** for (freq. × their midpts) seen or implied (390, 3900, 3230, 1900, 420 or total 9840) and **M1** for their total ÷ 60 (= 9840 ÷ 60) **SC3** for answers 154 or 174
10	p = 10·8 q = 5·75 or 5·7 or 5·8	**2** **2**	if p wrong, then **M1** for $\frac{12}{5}\times4\cdot5$ o.e. eg 2·4 × 4·5, 0·95 × 12, 4·5 ÷ 0·4166 etc if q wrong, then **M1** for $\frac{5}{12}\times13\cdot8$ o.e. eg 13·8 ÷ 2·4, 13·8 × 0·42, 1·15 × 5 , $\frac{4\cdot5}{\text{their } 10\cdot8}\times13\cdot8$ etc if **0** gained in question on above scheme, allow **SC1** for any of these seen: 12 ÷ 5 or 2·4 or 4·5 ÷ 5 or 0·95 or 5 ÷ 12 or 0·416 to 0·417 or 0·41 or 0·42 or 0·4 or 25 minutes or 13·8 ÷ 12 or 1·15
11	(a) 18	**2**	**M1** for 360 ÷ 20

11	(b) 140 angle between tangent and radius = 90° (or a right-angle) isosceles [triangle] mentioned	**1** **1** **1**	 allow for two of tangent, radius and 90
12	6480	**3**	**M2** for 2400 × 2·7 or 12 × 25 × 8 × 2·7 or figs 648 **M1** for 12 × 25 × 8 or 2400

Section B Total: 25

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June 2007

SECTION A

1	(a) $3\frac{7}{12}$	**3**	**M2** $4 - \frac{5}{12}$ or $3\frac{15}{12} - \frac{8}{12}$ or $\frac{43}{12}$ **or** **M1** $\frac{3}{12}$ or $\frac{8}{12}$ or $\frac{63}{12}$ or $\frac{20}{12}$
2	(a) 441	**3**	**M2** $400 \times 1{\cdot}05^2$ or $1{\cdot}05 \times$ '420' o.e. or $0{\cdot}05 \times$ '420' o.e. **or** **M1** 20 or 420 or 440
	(b) $1{\cdot}6 \times 10^6$	**2**	**M1** 2 100 000 – 500 000 or 21×10^5 or $0{\cdot}5 \times 10^6$ or figs 16
3	Length Volume Area	**1** **1** **1**	
4	$(r =) \sqrt[3]{\frac{3V}{4\pi}}$ WWW	**3**	**W1** operation of × 3 correct **W1** ft operation of ÷ 4π correct **W1** ft operation of cube root correct
5	12·5 (ignore further rounding / truncating)	**3**	**M2** $\frac{10}{4} \times 5$ or $5 \div 0{\cdot}4$ **or** **M1** sf of $\frac{10}{4}$ or 2·5 or 0·4 o.e.
6	$x = 1\frac{1}{2}$ and $y = 1$ following algebra and **WWW**	**3**	**M1** Mult by 2: $4x + 10y = 16$ Condone one error **M1** (Subtract to) eliminate x (ft 1st step) $13y = 13$ Condone one error If **M0**, **W1** for correct x,y . 3 marks only for completely correct algebraic method

7	(a) $^{-}8$ and 27	**1**	
	(b) Graph	**2**	**P1** 5 Points or ft (a) $\pm$ 1 square **C1** Within 1 square of correct middle five points
8	$y \leq x - 2$ o.e. $y \geq 2$ o.e.	**1** **1**	**SC1** for y =/$\geq x - 2$ **and** y =/≤ 2 Condone use of < and >.

Section A Total: 25

SECTION B

9	(a) $x^2 + 11x + 24$	**2**	**M1** any 3 out of 4 expanded terms correct
	(b)(i) $2x(a - 3b)$	**2**	**M1** $2(ax - 3bx)$ or $x(2a - 6b)$
	(b)(ii) $(x - 10)(x + 2)$	**2**	**M1** $(x \pm 10)(x \pm 2)$
10	*Rotation* Rotation or Turn 180° (Centre) (0,0) or origin or O *Enlargement* Enlargement, any sf **or** any centre Correct sf ($^-$1) Correct centre (0,0) or origin or O	 **1** **1** **1** **M1** **A1** **A1**	 **NB** ½ turn scores 2 If **W0**, allow **W1** for image drawn. **NB** Any description involving two or more transformations scores 0.
11	(a) 29 – 31 WWW	**2**	**M1** 27 - 29 **and** 57 - 59 written or clearly marked on horizontal axis. If no labels and more than 2 marks take outer 2 values. **SC1** Correct IQR for Saturday (74).
	(b) Any two of these three comments (no more than one of each) Comment on average/median but not mean or mode. Comment on spread. Comment on an interval.	**1** **1**	Examples More money is spent on Saturday. Greater range of amounts are spent on Saturday. More people spent between £40 and £60 on a Tuesday.

12	(a) Both points 16·7, 16·8 plotted. Allow ± 2mm (1 square) *Using template accept within circle*.	**3**	**W2** One point plotted or two points at correct heights. (If more than two points then mark the worst two for W2). **W1** Correct calculation seen for a moving average or any 2 points at correct height.
	(b) 4·8(…) or 4·9	**3**	**M2** $\frac{1·3}{26·8}$ or 1·048… or 104·8… **or** **M1** figs 13 or $\frac{28·1}{26·8}$
13	(a) 7·17(…) or 7·18 or 7·2 WWW	**3**	**M2** (BN =) $\sqrt{7·6^2 - 2·5^2}$ or $\sqrt{57·76 - 6·25}$ or $\sqrt{51·51}$ **M1** (BN^2 =) $7·6^2 - 2·5^2$ or $\sqrt{7·6^2 + 2·5^2}$ or $\sqrt{64·01}$
	(b) 70·6 to 71 incl WWW	**3**	**M2** $\cos^{-1}\left(\frac{2·5}{7·6}\right)$ or $90 - \sin^{-1}\left(\frac{2·5}{7·6}\right)$ or $\tan^{-1}\left(\frac{(a)}{2·5}\right)$ **or** **M1** cos = $\left(\frac{2·5}{7·6}\right)$ or sin = $\left(\frac{(a)}{7·6}\right)$ or tan = $\left(\frac{(a)}{2·5}\right)$ or sinB = $\left(\frac{2·5}{7·6}\right)$

Section B Total: 25

Mark Scheme B249
June 2007

SECTION A

1(a)	0.6, 0.3 and 0.7 in correct places in tree diagram	2	1 for 1st branch **or** both of second branches correct
(b)	0.42 o.e.	2ft	ft their '0.6 × 0.7' evaluated provided both less than 1 or M1 for their '0.6 × 0.7'
2(a)	$\frac{1}{9}$ or 0.11...	1	after 1/9 ignore wrong attempts at decimals
(b)	2	1	
3	3.999.. to 4	2	M1 for 6.499.. to 6.5 **or** 2.5 seen
4	80^o **angle** at the **centre** = 2 × angle at **circumference**	1 R1	Indep Accept ' **angle** at **centre**' (is twice ….) after answer 80
	40^o **alternate segment**	1 R1	Indep. or other **complete** reasons, must mention angle between. **radius** (or diameter) and **tangent** and **isosceles triangle**
5(a)	$3b(a + 5b)$ final answer	2	M1 for $3(ab+5b^2)$ or b $(3a+15b)$ or $3b$ (… + …)
(b)	$x - 7$ www final answer	3	M2 for $(x - 7)(x + 1)$seen **or** M1 for $(x \pm 7)(x \pm 1)$ After M0, SC1 for $((x - 6)(x + 1)$ as numerator **leading to final answer of $x - 6$**
6	3×10^2 **or** 10×10^{-3} or 9×10^{-3} or 0.009 seen or 300 from 3.2×10^2 or 0.01 from 9.5×10^{-3} or 30 from 3.2×9.5	M1	
	[27, 28.5, 30 or 32] $\times 10^{-1}$ o.e. (implies previous M1)	A1	Accept 2.7, 2.85 or 3.2 (×10º) 2.7, 2.85 or 3.2 imply previous M1 but not 3 alone
	Michael	A1	Dep on at least M1 **without any errors seen** After 0 scored, SC1 for 320 **and** 0.0095 seen

7(a)	$y = 36/x^2$ o.e.	2	M1 for (k =) 36 or 9 = k/2² or better or *y* = $\frac{k}{x^2}$ seen
(b)	0.36 o.e.	1ft	ft (their 36) ÷ 10²
(c)	3 **and** -3	2ft	ft $\sqrt{(their 36/4)}$ both solutions W1 for 3 or –3 provided k = 36 shown in question **or** M1 for 4 = their 36/*x*² or better

Section A Total: 25

SECTION B

8(a)	$(y =)\frac{3x+2}{16}$ o.e. final ans	3	M2 for $3x + 2 = y + 15y$ or better or $(y =)\frac{3x-2}{16}$ **or** M1 for $3x - 15y = y - 2$
(b)	$2x^2$ + (1) x – 10 final answer	3	M2 for 2 correct terms from 3 in final answer or 3 correct in expansion but unsimplified **or** M1 for 2 of $2x^2$, $5x$, $-4x$, -10 seen
9	Triangle with coordinates (–2,–2) (–6, –2) (–6, –4)	2	M1 for two correct vertices or correct method shown but slightly inaccurate **or** SF2 centre the origin or SF –2 any centre After M0, SC1 for correct SF -1 enlargement (vertices at (-1, -1), (-3, -1), (-3, -2))
10(a)	60	1	
(b)	31.57 to 31.6 or 32 www	2	M1 for 5×4 + 6×10 + 10×8+15×2 condone an error in 1 product **or** 190 seen **or** 24/76 × 100
11(a)	2143.5 to 2145	2	M1 for $4\div3\times\pi\times8^3$ SC1 for 17157 to 17160
(b)	20 to 20.2 www	2	M1 for $\sqrt[3]{2}$ or $4/3\times\pi r^3 = 2\times$(a) seen or implied by $(r^3 =)1024$ or better After MO, SC1 for answer 10 to 10.1(finds the radius) www
12(a)	$-\frac{1}{2}$ or –0.5	1	
(b)(i)	-3	2	M1 for $\frac{14-5}{-2-1}$ or reverse or answer 3
(ii)	$y = -3x + 8$ cao	2	M1 for $y =$ 'their (i)'x + k or answer $-3x + 8$

13	$10^2 + 10^2$	M1	or $5^2 + 5^2$ or sin 45 = x/10 or cos 45 = x/10
	7.07… or 7.1 or 14.1 or 14.14 or √200 or √50 or better.	A1	ww2
	tanθ = 12/their AM o.e.	M1	Provided AM is not 5, 10, 6 or 12
	inv tan used	M1	Dep on previous M1 Check on calculator if not written
	59.38 to 59.5	A1	www5 ww answer 59 scores SC3

Section B Total: 25

General Certificate of Secondary Education (Mathematics C – Graduated Assessment) (J516)
June 2007 Assessment Series

Unit Threshold Marks

	Unit	**Maximum Mark**	**a***	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**p**	**u**
B241	Raw	50								27	14	0
	UMS	35								24	12	0
B242	Raw	50							36	19	12	0
	UMS	42							36	24	(18)	0
B243	Raw	50							31	16		0
	UMS	47							36	24		0
B244	Raw	50						38	19	12		0
	UMS	54						48	36	(30)		0
B245	Raw	50						25	12			0
	UMS	59						48	36			0
B246	Raw	50					28	14				0
	UMS	71					60	48				0
B247	Raw	50				26	12					0
	UMS	83				72	60					0
B248	Raw	50			30	15						0
	UMS	95			84	72						0
B249	Raw	50		31	15							0
	UMS	107		96	84							0

Notes
The above table shows the raw marks and the corresponding key uniform scores for each unit (module test) available in the June 2007 session.

Raw marks falling between two raw marks in the appropriate row above are converted, by a linear map, to a uniform score between the uniform scores that correspond to the two raw marks.

The grade shown in the above 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 B241 (M1) and B242 (M2). It is not a valid grade within GCSE Mathematics and will not be awarded to candidates when they aggregate for the full GCSE (J516).

For a description of how UMS marks are calculated see;
http://www.ocr.org.uk/exam_system/understand_ums.html

Statistics are correct at the time of publication.

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