OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics C

General Certificate of Secondary Education **GCSE 1966**

Mark Schemes on the Units

March 2007

1966/MS/R/07M

Oxford Cambridge and RSA Examinations

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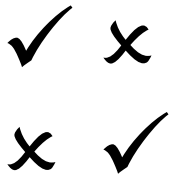
General Certificate of Secondary Education
GCSE Mathematics C - 1966

MARK SCHEMES FOR THE UNITS

Mark Scheme 2332
March 2007

SECTION A

1			**2**	**1** for 3 correct Accept "yes" or "no"
2	(a)	1500	**1**	
	(b)	128	**2**	**M1** for 4 x 32 seen or implied or **M1** for digits 128 seen
	(c)	4437	**1**	
	(d)	$(60 \text{ to } 80)^0$ inclusive	**1**	
	(e)	(15 to 25) (m) inclusive	**1**	
3	(a)	Orange or 27	**1**	
	(b)	Right 2nd Left Right	**2**	**1** for two correct responses
	(c)	Phone 4U or 30	**1**	
4	(a)	(i) 10:40 or equivalent	**1**	Any common time format
		(ii) 25 (minutes)	**1**	Allow follow through from 4(a)(i)
	(b)	6	**1**	
5		acute c; obtuse e; reflex a, b, f; right d	**3**	All correct, half for each correct, then round down,
6	(a)	105	**1**	
	(b)	35	**1**	
7		£11·72(p) or 1172 p	**2**	**M1** for digits "1172" or "6·45+5·27" seen or clear attempt to add.

8	2·6	**3**	**M1** for 49·1 or 47·5 + 1·6 seen **M1** for 51·7 – ("their 49·1") Or **M1** for 51·7 – 47·5 (=4·2) seen or implied **M1** for "their 4·2" – 1·6 seen or implied Or **M1** for 51.7 – 1.6 (=50.1) seen or implied **M1** for 50.1 – 47.5 seen or implied

Section A Total: 25

SECTION B

9	(a)	cuboid cylinder cone sphere		**2**	Award 1 for two or three correct,
	(b)	D C		**1** **1**	Or equivalent indication for D Or equivalent indication for C
10	(a)	(£)3·10		**2**	**M1** for sight of 0·25 *or* $\frac{1}{4}$ *or* ÷ 4 *or* digits "31" *or* "62" seen
	(b)	75(%)		**1**	
11	(a)	(i)	10	**1**	
		(ii)	"add 2" "up in 2s"	**1**	"direction" + "quantity" ignore subsequent or extra working. Condone "to/too" for "two/2".
	(b)	(i)	16	**1**	
		(ii)	"double number of circles and take 2" or equivalent or "add 2" "up in 2s"	**1**	Condone what is effectively a repeat of the correct answer for a(ii) ignore subsequent or extra working. "direction" + "quantity "Condone "to/too" for two/2.
12	(a)	(i)	3	**1**	
		(ii)	Any number or range in the (inclusive) range 13·9 to 17·1	**1**	Allow range or number within range
	(b)	(i)	85	**1**	
		(ii)	100	**1**	If *zero* scored in (i) and (ii) **SC1** for 170 ÷ 2 seen or implied e.g. "85"
	(c)	(i)	9	**1**	
		(ii)	10·5	**2**	**M1** for sight ordered list (either way): 8 9 9 9 10 11 12 15 17 25 condone two missing numbers

13	(a)	Comedy or C	**1**	
	(b)	(4 to 6)%	**1**	
	(c)	Wrong/no	**1**	Dependent on some – not necessarily correct – working/wording to support "wrong/no" or equivalent negative response.
		(44 – 48)% (is less than half) or 2% - 6% (too low)	**1**	Need a numerical argument involving or implying percentages.
14		B: (0 ± 2 mm) from zero	**1**	Indicated unambiguously.
		A: (0.2 to 2) cm from zero	**1**	
		C: (8 to 9.8) cm from zero	**1**	**SC1** if zero for events in correct order i.e. from left B A C

Section B Total: 25

Mark Scheme 2333
March 2007

SECTION A

1	(a) 2800	**1**	Cao
	(b) 3·2	**1**	Cao
	(c) 1·3	**1**	Cao
	(d) 15	**2**	**W1** for 5 seen or 20 ÷ 4 seen or 60 ÷ 4 seen
2	(a) Second shape indicated	**1**	
	(b) E C	**1** **1**	
3	210 seen 0·2(oe) × 'their 210' 42 isw **Alternative method** 0·2(oe) × 6 or 0·2(oe) × 35 1·2 or 7 'their 1·2' × 35 or 'their 7' × 6 42	**W2** **M1** **A1** **M1** **A1** **M1** **A1**	or **M1** for attempt at 6 × 35 or **W1** for 10% of 'their 210' correctly calculated cao or **W4** for 42 as answer or **W1** for 0·6 or 3·5 seen cao or **W4** for 42 as answer
4	(a) 600 (p) or £6(·00) (£)12·5(0) or 1250 p (£)0·15 or 15p	**1** **1** **1**	
	(b) 6	**2**	**W1** for 3 seen or 15 ÷ 5 seen or 30 ÷ 5 seen
	(c)(i) 6·1 to 6·3	**1**	
	(ii) 4·7 to 5	**1**	
5	(a) 60	**2**	**W1** for 5 × 3 × 4 or 15 seen
	(b)(i) 2·5 or 2½	**2**	**W1** for 5 or 10 seen or **SC1** for 3 (m) as answer
	(ii) Yes AND (patio doors) 1·5 m **or** (cupboard) 2·4 cm	**2**	**W1** 1·5 or 2·4 seen or **W1** for yes with unquantified comparison

Section A Total: 25

SECTION B

6	(a) $\frac{5}{12}$ oe	**1**	
	(b) 2 squares shaded	**1**	Clear indication
	(c) (0)·2 (000..)	**1**	
7	(a)(i) 1 8	**1** **1**	
	(ii) 38	**2**	**W1** for answer in range 36 to 40 or 11, 13, 8, 4, 1, 1 seen or **SC1** for 19 as answer
	(b) 8·5	**3**	**M1** for attempt to add (implied by 45 to 55 seen) **M1** for division by 6 seen Or **SC2** for 41 as answer
8	(a) ⁻4	**1**	
	(b) warmer (±) 6	**1** **1**	Correct OR **ft** their negative (a)
9	(a) 12	**1**	
	(b) 11	**1**	
	(c) 5	**1**	
10	(a) 200 or £2(·00)	**1**	
	(b) 230 or £2·3(0)	**2**	**M1** for 2 × 90 + 50 or 180 seen or £1·8(0) seen or figs 23
11	(a) 70 to 100 or 0·7 to 1 cm or m	**1** **1**	Accept correctly matched units only Or **SC2** for 2½ to 3 feet or 30 to 36 inches or 1 yard
	(b) 2 metres is about 6 feet, or 5 feet is about 1.5 m	**2**	**W1** for 3 feet = 1 metre or 30cm = 1 foot or 5 feet = a value between 1.5m and 1.7m
	(c) 1·8	**2**	**M1** for 2 × 0·9 or figs 18 seen

Section B Total: 25

Mark Scheme 2334
March 2007

SECTION A

1		E T I S X	**3**		all letters correctly placed condone correct additional items
				W2	one error/omission
				W1	3 letters correctly placed
2	(a)	11, 8	**2**	**W1**	each number, only; either way round
				or	
				M1	pair with product of 88 seen
	(b)	¼, ¾	**2**	**W1**	each fraction, only; either way round
				or	
				M1	2 fractions with sum of 1
3	(a)	straight line … 180 angles … straight line	**1**		accept 'half/semi circle … 180' *or* 'half turn … 180'
	(b)	73 and opposite (angles) (equal)	**3**	**W1**	accept '73 and X angles (equal)'
		155		**W1**	
		full turn … 360 *or* circle … 360 *or* angles (at a) point … 360		**W1**	not turn … 360'
4	(a)	3, 10	**1**		both, only
	(b)	18	**1**		only
	(c)	4	**1**		only
5	(a)	1/20	**2**		accept correct equivalent probabilities condone 'unlikely' or equivalent and correct probability
				W1	incorrect form *or* 20 seen
	(b)	'yes' and clear explanation	**1**		implies the need to check all 5 *or* that prize could be any of the 5
6		213	**2**	**M1**	Complete attempt at multiplication (need a carry fig to be convinced in traditional method)
				or	
				W1	figs 213(00) *or* 10 65(0) seen *or* 3 correct rectangles (grid methods)
		65 with working	**3**	**M1**	Complete attempt at division
				&	
				W1	figs 6✷(00) as a final answer *or* 90 *or* 150 seen (www)
				or	
				W1	answer only
7	(a)	1 ½	**1**		accept equivalents
	(b)	3/8	**2**	**M1**	(1) ½ - $^1/_8$ seen *or* 4/8 or other correct pair of equivalents seen
		Total	**25**		

SECTION B

8	(a)	46	**3**	**M1** *&* **M1** *or* **M2**	13 seen attempt to add at least 3 sides implied by intermediate/final answers eg 30 www 43 seen www
	(b)	$P = 6h$	**2**	**W1**	acc $P = h + h + h + h + h + h$ etc $6h$, $h6$ exactly or equivalent seen (not 5h)
9		A, B, F and C (29·38/29·40) *or* A, B, F and E (29·89/29·90) with correct working Not D (Louder than Loud, The Beards, 13·49) + Only one of C (Hits to Hum, 10·99) E (Whistling Bob Harris, 11·50) & other three	**3**	**M1** *or* **M2** *or* **W1** *or* **W2**	may be these letters, list of prices, list of titles or artists working includes final total shown, intermediate totals shown, estimates shown correct sum of at least 2 CDs *or* correct subtraction of 1 CD from £30 18·39 (ABF, no incorrect working) *or* 29·38/29·40 *or* 29·89/29·90 seen correct 4 chosen, no working correct 4 but unconvincing/inaccurate working
10	(a)	correct vertical line drawn	**1**		need not be ruled, may be dashed etc mark intention
	(b)	(-9, 3)	**1**		
	(c)	(-7, -5) plotted	**1**		centre of their mark ±2mm
	(d)	(-8, -1) *or* **ft** midpoint of A(-9, 3) and *their* F	**2**	**M1** *or* **sc1**	point identified on grid *or* **ft** midpoint of A(-9, 3) and *their* F if 0 for F, M [ie (c) and (d)] both plotted correctly, labels reversed or ambiguous
11	(a)i	46	**1**		
	(ii)	114	**1**	**sc1**	If 0 scored so far, for (i) 43 and (ii) 107
	(iii)	4	**1**		
	(iv)	2	**1**		
	(b)i	23 www	**3**	**M1** **&** **M1**	total 161 soi a total divided by 7 seen
	(ii)	longer swimming *or* swimming has higher mean	**1**		**ft only** from their mean
	(c)	13 200	**2**	**M1**	132 × 100 soi *or* 13000

(d)	76(·56..), 76·6, 77	**2**	**M1** 25×1·75×1·75 or equivalent seen *or* 43·75 seen/rounded/truncated *or* 3·0625 seen/rounded/truncated *or* figs 765, 766, 7656..
	Total	**25**	

Mark Scheme 2335
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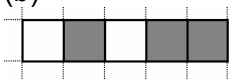
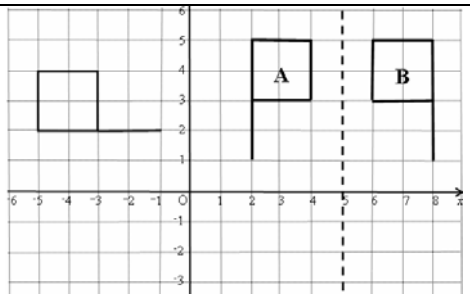
Section A

1	(a) $\frac{20}{30}$ ringed and no other one ringed (b)(i) $\frac{7}{10}$ oe (ii) $\frac{2}{10}$ oe	1 2 2 **[5]**	accept any indication of the correct answer M1 for $\frac{2}{10}$ or $\frac{5}{10}$ seen or both fractions having a common multiple of 2 and 5 as a denominator M1 for $\frac{5}{10}$ seen or both fractions having a common multiple of 2 and 10 as a denominator
2	(a) 14*a* (b) 7*b* + 3*c*	2 2 **[4]**	M1 for 5*a* + 2*a* + 5*a* + 2*a* or better W1 for either term
3	(a) second one ticked and no other (b) 	1 2 **[3]**	allow crosses on incorrect ones and allow Y/N allow 90° or 180° rotations of this answer M1 for five squares in a line
4	(a) 18 (b) $\frac{10}{4}$ oe	1 2 **[3]**	M1 for 4*x* = 7 + 3 or better
5	$\sqrt{100}$ 4^2 5^2 3^3	2 **[2]**	W1 for three in the correct order, for reversed order or two correct items converted, eg $\sqrt{100}=10$ and $4^2=16$
6	(a) (i) 17·29 (ii) 20 (b) 30 (×) 40 (=) 1200 or 30 (×) 35 (=) 1050 or 25 (×) 40 (=) 1000	1 1 2 **[4]**	 allow either way round M1 for either 29 or 37 rounded to 1 s.f.
7	(a) 135 (b)(i) (0)50 – (0)55 (ii) 42 – 45	1 1 2 **[4]**	 M1 for 8·4 – 8·9 (cm)

Section B

8	(a) (PS) PH PE PC DS DH DE DC (b) $\frac{1}{8}$	2 1 **[3]**	W1 for 4 correct ones (not PS) accept decimal and percentage equivalents follow through from (a)
9	(a) square and rhombus (only) (b) trapezium	1 1 **[2]**	
10	(a)(i) add 4 (ii) 43 (b) 2 ¯3	1 2 2 **[5]**	allow any correct statement M1 for 4*n* + 3 or 23 and 27 or attempt at 19 + 6×4 1 for each term
11	334·8	2 **[2]**	M1 for 6·2 × 4·5 × 12
12	 (a) correct line (*x* = 5) (b) correct rotation	1 3 **[4]**	W2 for correct rotation but wrong direction W1 for the correct angle but the wrong centre
13	(a) 55 (b) home <u>mean</u> is higher	3 1 **[4]**	M1 for attempt at ∑ *n*(or 440) **and** M1(dep) for their 440 ÷ 8 soi accept any correct statement on the mean
14	49	5 **[5]**	M2 for 0·55 × 420 oe or 231 seen **or** M1 for 420 ÷ 100 **and** M2 for $\frac{2}{3} \times 420$ or 0·66… x 420 or 280 seen **or** M1 for 420 ÷ 3 or 140 seen

Mark Scheme 2336
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Section A

1(a)	Correct reflection	**W1**	
(b)(i)	(×)3	**W1**	
(b)(ii)	(0,1)	**W1**	
2(a)(i)	6·18	**W1**	
(ii)	1·15 i.s.w.	**W2**	**W1** for 1·1(…) or 2·3 **W1** for figs 115
(b)	$\frac{5}{24}$	**W2**	**M1** for $\frac{5}{6} \times \frac{1}{4}$
3(a)	5 correct points plotted and no extras	**W2**	**W1** for 3 correct points plotted
(b)	Negative	**W1**	
(c)(i)	Line of best fit between (1,70)(11, 57·5) and (1,74)(11, 61·5)	**W1**	
(ii)	61 to 65 only	**W1**	
4(a)	36	**W1**	
(b)	-6	**W2**	**W1** for 4 or -10 seen
5(a)	5·5 or $5\frac{1}{2}$ or $\frac{11}{2}$ i.s.w	**W2**	**M1** for 2x =4+7 or better
(b)	-3	**W3**	**M2** for $3x = -9$ or $-3x = 9$ or **M1** for $kx = -9$ or $3x = k$ or $3x + 2 = -7$ or $7x = 4x - 9$ or $7x - 4x = -7 - 2$
6	140	**W2**	**M1** for $360 - (70 + 130 + 120)$ **or** **W1** for 40 or 320 seen.
	(Angles in a) quadrilateral =360°	**W1**	
	(Angles on a) straight line = 180°	**W1**	

Section B

7	0·65	**W2**	**M1** for 1 –(0·05 +0·3) or 0·35 seen
8(a)	13·75	**W1**	
(b)	39·6	**W2**	**W1** figs 395 to 396, or 33·24 or 0·84 seen **SC1** for answer 25·0
9(a)	Final answer 6x+10	**W1**	
(b)	Final answer 4(2x+3)	**W1**	
10(a)	12·5 or $12\frac{1}{2}$ cao	**W1**	
(b)	Final answer 728	**W3**	**M2** for 1120 x $\frac{(100-35)}{100}$ **or** 1120 x 0·65 **M1** for 1120 x $\frac{35}{100}$ **or** 1120 x 0·35 **or** 392 **and dependent** **M1** 1120- their 1120 x 0·35 (=392)
11(a)	12	**W1**	
(b)	1·3	**W2**	**W1** for 2·7 seen or **SC1** for answer 13
12(a)	11 : 7	**W2**	**W1** for 11n : 7n **SC1** for 7 : 11 or 1·57.. : 1 or 1·6 : 1
(b)	29·60	**W2**	**M1** for $\frac{24\cdot05}{26}(\times 32)$ or **W1** for figs 925 seen or **W1** for 5·55 or 29·6 **SC1** 29·76 or 29·63
13	136 to 137	**W4**	**W2** for 28 to 29 seen or **M1** for π x 3^2 and **M1** for 15 x 11 – their π x 3^2 s.o.i
14	168	**W3**	**M2** for 3·5 x 48 or $\frac{210\times 48}{60}$ or 144+24 or 48+48+48+24. **W1** for 3·5 seen or **M1** 3·3 x 48 (implied by 158·4) or 210 x 48 (implied 10080)

Mark Scheme 2337
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Section A

1(a)	18	**2**	**M1** for 36 seen or 'their 36'÷ 2 seen, implied by answer 16.5 to 19
(b)	correct horizontal line (12:00,36) to (13:00, 36)	**1**	Acc to ± ½ square for both lines.
	correct sloping line or curve through ('13:00',36) to ('13:30',46)	**2ft**	Ft. dep. on a horizontal line drawn condone ('13:00',36) to ('13:30', 26) ft from their horizontal line **M1** for any other line or curve **ending** at (…. , 46) or (.... , 26) **or** 20 × 0.5 o.e. seen
2(a)	triangle correct and ruled ±2 mm	**1**	Point R is 8 cm from P and Q
(b)	arcs and bisector for P correct ±2°	**2 ft**	Ft their angle P **W1** for correct ruled bisector ±2° with no/wrong arcs
(c)	full arc, centre P, with 4 cm radius ±2 mm	**M1**	Must use compasses
	correct shading (inside arc and below bisector)	**A1**	dep. on at least **W1** in (b) **After M0**, **SC1** for shading below their ruled bisector of angle P with no arc **or** inside their arc with no bisector **or** for shading between PQ, their ruled bisector of angle P and their arc centre P
3(a)	0.35 o.e. (accept 0.35/1)	**2**	**M1** for 1 − (0.4 + 0.25) implied by answer 0.71
(b)	20	**2**	**M1** for 0.25 × 80 o.e.
4(a)	$2^3 \times 5$ o.e.	**2**	**M1** for 2 **and** 5 seen (may be in division or tree)
(b)(i)	120 (or 2³ × 3 × 5)	**2**	**M1** for any multiple of 120 selected as answer or a product that gives 120
(ii)	8 (or 2³)	**1**	After 0 in (b)(i) and (ii) **SC2** for both answers reversed **or SC1** for 8 or 2³ in (b)(i) **or** 120 or 2³ × 3 × 5 in (b)(ii)
5(a)(i)	75	**1**	
(ii)	5	**3**	**M2** for $3x - 2x = 18 - 13$ or better **or M1** for $3x + 13 = 2x + 18$ or better after **M0** allow **SC1** for correct f.t method collecting terms after bracket slip e.g. $3x - 2x = 9 - 13$ dep on x term and number term from bracket expansion
(b)	$\frac{P-2h}{2}$ or $\frac{P}{2}-h$ o.e. final answer	**2**	**M1** for $2b = P - 2h$ or $-2b = 2h - P$ or **W1** for $\frac{\pm P \pm 2h}{\pm 2}$ o.e. or correct answer seen

Section A Total: 25

Section B

6(a)	0.17, 0.51	**2**	**M1** for 1 correct or 0.68 ÷ 4 soi or for figs 17 and 51 seen
(b)	0.97(2)	**2**	**M1** for 0.54 × 1800 ÷ 1000 o.e. or figs 97(2) seen
7	2, 3, 4, 5	**3**	**W2** for 3 correct with no more than 1 incorrect or all correct with 1 extra ans. **M1** for $2 \leq n < 5.5$ seen – could be separate inequalities **or W1** for 2 correct integers given with no more than 2 incorrect
8(a)	1 **and** 1	**1**	
(b)	at least 6 points plotted correct or ft smooth curve thro at least 5 correct pts **and** correct shape	**P1** **C1ft**	to nearest square curve within 1 small square of the 5 points must be reasonable U shape
(c)	1.6 to 1.8 **and** −1.6 to −1.8	**1ft**	ft their intersections with *x*-axis provided at least 2 intersections
9(a)	5	**1**	Accept 5/1 but not 10/2
(b)	1.51 final answer	**2**	1 for 1.51.... seen **or** answer 2.29 **or** 0.484
10(a)	360 ÷ 5 o.e.	**1**	or 540 (÷ 5) = 108 **and** 180 – 108 = 72 with no errors seen
(b)	540	**2**	**M1** for 180 − 72 or 108 seen or (5 -2) × 180
11	128	**4**	**M3** for 6400/50 or $\sum fx / 50$ with correct mid-values allow 1 slip on mid-values/products **or M2** for 6400 or at least 3 of 1040, 2400, 1760, 1200 seen **or** their $\sum fx$ where *x* is in the correct range. **or M1** for at least 3 of 80, 120, 160, 200 s.o.i. After **M0**, **SC2** for 108 or 148 final answer
12(a)	Angle in **semi-circle** (is 90)	**1**	
(b)	7.2(1....)	**3**	**M2** for $\sqrt{6^2 + 4^2}$ **M1** for $6^2 \pm 4^2$ implied by 52 or 20 seen www For 3 marks accept ans 7 after **M2** earned

Section B Total: 25

Mark Scheme 2338
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SECTION A

1	(a) triangle with vertices at (6, 3) (9, 3) and (6, 9)	**3**	**2** if two vertices correct or **2** for enlargement sf 1·5 using wrong centre **1** for enlargement centre (0,0) but wrong sf
	(b) angle or orientation	**1**	
2	(a) 4	**1**	
	(b) +11 or -11	**2**	**1** each
	(c) $24x^{10}y^3$	**2**	**1** for 2 'terms' correct
	(d) 125	**2**	**1** for 5^3 or 5 × 5 × 5 or 5 × 5^2 seen
3	1/6 and 5/7	**2**	**1** each; **SC1** for 1/6 and 5/7 and **one** extra
4	(a) pattern has squares of stars rh column has 1 star or 'there is 1 extra' must be a clear reference to the diagrams not just numbers	**1** **1**	 Using Differencing Method allow **1** for 'the second difference is 2 so there is an n^2 term' and **1** for a correct substitution seen for one given pattern to establish the +1
	(b) $3n + 1$ as final answer	**2**	**1** for $3n$ seen
5	(a) $[r =]\sqrt{\frac{3F}{\pi h}}$	**3**	These marks can be gained in any order **M1** for multiplying by 3 **M1** for dividing by πh (but $3f \div \pi \div h$ would not score the mark) **M1** for square root of their complete expression for r^2
	(b) Volume **and** $L \times L^2 = L^3$ o.e.	**1**	
6	(a) 390 (accept 380 to 400)	**2**	**1** for 640 to 660 or 250 to 270 seen
	(b) valid comparisons	**2**	**1** for each valid comparison, with at least one of them in context

Section A Total: 25

SECTION B

7	(a) $15x - 3y = 48$ or $5x + 15y = 40$ subtraction or addition as appropriate to eliminate variable $x = 3{\cdot}5$ and $y = 1{\cdot}5$	**M1** **M1** **A1**	condone one error condone one error; must be correct operation for their equations or **M2** for complete method of rearranging and substituting (condone one error in each stage)
	(b) correctly evaluated trial of value between 2 and 3 correct trials of 2·7 and 2·8 or better (one pos, one neg outcome) answer 2·7	**1** **1** **1**	<table><tr><td>2.1</td><td>-4.739</td><td>2.71</td><td>-0.197489</td></tr><tr><td>2.2</td><td>-4.352</td><td>2.72</td><td>-0.076352</td></tr><tr><td>2.3</td><td>-3.833</td><td>2.73</td><td>0.046417</td></tr><tr><td>2.4</td><td>-3.176</td><td>2.74</td><td>0.170824</td></tr><tr><td>2.5</td><td>-2.375</td><td>2.75</td><td>0.296875</td></tr><tr><td>2.6</td><td>-1.424</td><td>2.76</td><td>0.424576</td></tr><tr><td>2.7</td><td>-0.317</td><td>2.77</td><td>0.553933</td></tr><tr><td>2.8</td><td>0.952</td><td>2.78</td><td>0.684952</td></tr><tr><td>2.9</td><td>2.389</td><td>2.79</td><td>0.817639</td></tr></table>
8	(a) 58·8 or 59	**3**	**M2** for $120 \times 0{\cdot}7^2$ o.e.; or **M1** for $120 \times 0{\cdot}7$ o.e. or 84
	(b) 120·5 and 119·5	**2**	**1** each; condone 119·5 first allow $120 \cdot 4\dot{9}$, condone 120·499…
	(c) 5·50	**3**	**W2** for 5·5 or **M2** for £6·16 ÷ 112 (× 100) or **M1** for 112% = 6·16 or for 1·12 or $\frac{112}{100}$ seen
9	184(·2...) www	**4**	**W3** for 97(·2...) www seen or **M2** for 230 × sin 25 or 230 x cos 65 or **M1** for sin 25 = $\frac{opp}{230}$ or cos 65 = $\frac{adj}{230}$
10	(a) 0·2, 0·8, 0·2 on branches	**1**	
	(b) 0·14	**2**	**M1** for $0{\cdot}7 \times 0{\cdot}2$ or for 0.7 x their branch or for figs 14 as final answer

11	$18\,000 \times h = 12$ 1 litre = 1000 (cm^3) seen or used 0·66 to 0·67 cm	**M1** **M1** **A1** **U1**	**W4** www for 0·66 to 0·67 **and cm** or **W3** www for 0·66 to 0·67 allow 0.7 if **M2** earned allow if no conversion to other units attempted; allow mm if conversion to mm attempted in working etc allow **W4** www for 6·6 to 6·7 **and mm**

Section B Total: 25

Mark Scheme 2339
March 2007

SECTION A

1	(a) $\frac{1}{27}$, $\frac{3}{81}$, $\frac{9}{243}$	**2**	**M1** for 3^{-3} or $\frac{1}{3^3}$ or $9 \times \frac{1}{3^5}$
	(b) 1	**1**	
	(c) $3{\cdot}2 \times 10^{-2}$	**2**	**M1** for 32×10^{-3} o.e. or $0{\cdot}032$ or $\frac{32}{1000}$
2	$\frac{1}{16}$ or $\frac{4}{64}$ or $\frac{2}{32}$ or $0{\cdot}0625$	**2**	**M1** for $\frac{2}{8} \times \frac{2}{8}$ o.e.
3	(a) Correct histogram	**3**	**W3** for All bars correct or **W2** for Any 3 bars correct or **W1** for Freq densities: 8, 5, 1·5, 0·7, 0·3 (at least 4)
	(b) Any two of the following: A statement comparing the means / modes, a statement comparing the range / spread or a statement comparing an interval from each distribution.	**2**	eg Weekend calls last longer on average eg Lengths of calls at weekend have greater range/spread eg There are more calls between 5 – 10 minutes on weekends than weekdays.
4	(a) $^{-}1$ and 5	**3**	**M1** $y = x + 3$ drawn **W1** for each solution f.t. any line passing through $y = 3$ (excluding $y = 3$). Allow a tolerance of half a square for their x - values
	(b) $x^2 - 5x + 4$ ringed	**1**	
5	(a) $6x^2 - 11x - 10$	**3**	**M2** for 3 terms, with 2 correct or all of $6x^2 - 15x + 4x - 10$ or **M1** for 2 out of the 4 expanded terms correct
	(b) $4a(a + 2b)$	**2**	**M1** for $a(4a + 8b)$ or $4(a^2 + 2ab)$ or $2a(2a + 4b)$ or $2(2a^2 + 4ab)$
	(c) $(x - 5)(x + 3)$	**2**	**M1** for $(x \pm 5)(x \pm 3)$
	(d) $\frac{x-5}{x+5}$	**2**	**M1** for $x^2 - 25 = (x - 5)(x + 5)$ seen

Total section A: 25

SECTION B

6	(a) 112 (Opposite angles of a) cyclic quad 50 Alternate segment theorem	**1** **1** **1** **1**	 Dependent on 112 or 180 – 68 seen Dependent on 50
	(b) Angle B (or D or *x*) is not a right angle or evidence of 62 + their $y \neq 90$	**1**	No ft from incorrect x
7	(a) $(3, 2, 0)$	**1**	
	(b)(i) AG = $\sqrt{77}$ or AG² = 77 or AG = 8·7749… following Pythag	**2**	**M1** for $4^2 + 5^2 + 6^2$ or 4^2 + their $7{\cdot}8^2$ (or better)
	(b)(ii) 27 to 27·2	**3**	**M2** for $\sin^{-1}\left(\frac{4}{8{\cdot}77}\right)$ or $\tan^{-1}\left(\frac{4}{7{\cdot}81}\right)$ or $\cos^{-1}\left(\frac{7{\cdot}81}{8{\cdot}77}\right)$ **M1** for $\sin A = \frac{4}{8{\cdot}77}$ or $\tan A = \frac{4}{7{\cdot}81}$ or $\cos A = \frac{7{\cdot}81}{8{\cdot}77}$
8	(a) $u = \sqrt{v^2 - 2as}$	**2**	**W1** for $u^2 = v^2 - 2as$ or $\sqrt{v^2 - 2as}$ or $u = \sqrt{v^2 + 2as}$ or $u = \sqrt{2as - v^2}$
	(b) $y = \frac{x}{2x - 3z}$ or $y = \frac{-x}{3z - 2x}$	**3**	**W1** for $x = 2xy - 3yz$ or $-x = 3yz - 2xy$ **W1** strict f.t. for $y(\pm 2x \pm 3z)$ **W1** strict f.t. for $\frac{x}{\text{(their bracket)}}$
9	(a) 12	**3**	**M2** for $\frac{8^2}{320} \times 720$ or 144 or $\sqrt{\frac{720}{320}} \times 8$ **M1** for $\frac{8^2}{320}$ or $\frac{1}{5}$ or 0·2 or $\sqrt{\frac{720}{320}}$ or √2·25 or 1·5 (accept all inverted) or $E = kv^2$ or $\sqrt{E} = kv$ or $v^2 = kE$ or $v = k\sqrt{E}$
	(b) C	**1**	
10	(a)(i) $\frac{2\pi r^3}{3} + \frac{16\pi r^3}{3}$	**2**	**M1** for $\frac{2\pi(2r)^3}{3}$ or better
	(a)(ii) 6·55 or 6·5499 seen and used in $6\pi r^3$ or in two separate volume calculations (fully correct method). Answer in the range 5294 – 5298	**M1** **A1**	**W2** 5296 to 5297
	(b) One term is area, the other is length	**1**	

Total section B: 25

Mark Scheme 2340
March 2007

SECTION A

1	(a) 13.13(…..)	**1**	
	(b) $\frac{13}{99}$	**1**	
2	(a) 10	**2**	**M1** $\sqrt{100}$ **or** $\sqrt{2} \times 5\sqrt{2}$ **or** $2\sqrt{25}$ **or** $\sqrt{2}\times\sqrt{2}\times\sqrt{5}\times\sqrt{5}$
	(b) $3\sqrt{2}$	**2**	**M1** multiplying num and denom by $\sqrt{2}$ **or** $\sqrt{18}$ or better
3	(a) (i) **b** – **a** (o.e.)	**1**	
	(ii) 3**b** (o.e.)	**1**	
	(iii) 3**b** – 3**a** (o.e.)	**2**	**M1** OC = - 3**a**
	(b) Trapezium with reason Eg because AB parallel to DC	**2**	**W1** Trapezium **W1** AB parallel to DC
4	(a) (3,0)	**1**	
	(b) (1,2)	**1**	
	(c) (3,4)	**1**	
5	(a) 25cm	**2**	**M1** (SF) 2.5 o.e. eg 20/8 seen
	(b) 420 π (c.a.o.) www	**3**	**M1** $\pi\times$ 8×10 or $\pi\times$20 ×25 (FT their (a)) And **M1** subtraction based on consistent statements involving π isw **A1** 420 π or 620π (only from AD = 35cm in (a))
6	-1.5 and 5 www	**5**	Stage 1 **M2** $2x^2 - 2x - 5x - 15$ (= 0) **Or M1** $2x(x - 1) - 5(x + 3)$ Stage 2 **And M2** $(2x + 3)(x - 5) = 0$ **Or M1** $(2x \pm 3)(x \pm 5)$ (=0) FT their quadratic for **M2** or **M1** **A1** -1.5 and 5 If **M0**, **W1** -1.5 or 5 www leading to their solution

Section A Total: 25

SECTION B

7	(a) 80	**1**	
	(b) 452 to 453	**2**	**M1** $80 \times 2^{2.5}$
8	9 www	**2**	**M1** $\frac{39}{176} \times 40$ **A1** 9 or 8 from 8.8…
9	116.3… to 116.4	**3**	**M2** cos x = -0.44.. or -160/360 Or **W2** x = 63.6 to 63.7 **Or M1** $23^2 = 15^2+12^2- 2\times15\times12\times\cos x$ **A1** 116 to 116.4
10	(a) Moving averages plotted	**2**	**W1** horizontal position correct (any 5) **W1** vertical position correct (any 5)
	(b)(i) 360 to 370	**1**	
	(ii) estimate correct (their (i) × 4) - 950	**2**	**M1** their (i) **×** 4 = 320 + 240 + 390 + n **A1** their n (FT (i))
11	Ruled straight line through two of our correct points (within ½ square) between their 1.96 and 51.84 a = 0.69 to 0.71 www b = 14.5 to 15.5 www	**2** **2** **1**	**W1** squares calculated 1.96, 9.61,27.04, 51.84 Or 3 plots within 1/2 square **W2** 0.69 to 0.71 **Or** **M1A1** If answer in range 0.65 - 0.75 and triangle seen on their line (no need to see numbers or division) **Or** **M1A1 FT** for triangle seen on their line with numbers or correct division seen, and correct FT answer **M1** gradient attempted FT from their straight line **W1** FT their intercept within ½ square
12	(a) $x^2 + (3 - 2x)^2$ (=12) $x^2 + 9 -6x -6x +4x^2 =12$ $5x^2 -12x + 9 -12 = 0$	**1** **1** **1**	**M1** **M1** Allow $5x^2 -12x - 3 = 0$ for final mark if **M2** scored already
	(b) x = 2.6(2...) or 2.63 with y = - 2.2(5...) or -2.26 or -2.3 And x = -0.2(2...) or -0.23 with y = 3.4(5…) or 3.46 or 3.5 **www**	**4**	**M2** $\frac{12 \pm\sqrt{204}}{10}$ **Or** M1 $\frac{\mathbf{12\pm\sqrt{(144+4\times5\times3)}}}{10}$ **condone** 2 errors **And** **W1** both x coordinates correct or one pair correct Or **W2** both pairs correct

Section B Total: 25

General Certificate of Secondary Education (Mathematics C – Graduated Assessment) (1966)
March 2007 Assessment Series

Unit Threshold Marks

Unit		Maximum Mark	a*	a	b	c	d	e	f	g	p	u
2332	Raw	50							40	24	15	0
	UMS	42							36	24	(18)	0
2333	Raw	50							27	13		0
	UMS	47							36	24		0
2334	Raw	50						38	24	15		0
	UMS	54						48	36	(30)		0
2335	Raw	50						29	15			0
	UMS	59						48	36			0
2336	Raw	50					27	12				0
	UMS	71					60	48				0
2337	Raw	50				26	13					0
	UMS	83				72	60					0
2338	Raw	50			30	15						0
	UMS	95			84	72						0
2339	Raw	50		26	12							0
	UMS	107		96	84							0
2340	Raw	50	29	14								0
	UMS	120	108	96								0

Notes

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

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 2331 (M1) and 2332 (M2). It is not a valid grade within GCSE Mathematics and will not be awarded to candidates when they aggregate for the full GCSE (1966).

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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