UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

4024 MATHEMATICS (SYLLABUS D)

4024/12 Paper 1, maximum raw mark 80

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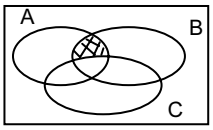
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Abbreviations

cao correct answer only
cso correct solution only
dep dependent
ft follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
www without wrong working

Qu	Answers	Mark	Part marks
1	**(a)** 7	1	
	(b) 0.52 oe	1	
2	**(a)** Any decimal n such that $0.2 < n < 0.25$	1	
	(b) 80	1	
3	**(a)** $\frac{7}{24}$ oe Final ans.	1	
	(b) $\frac{7}{18}$ cao	1	
4	**(a)** $(y) > 7.5$ oe	1	
	(b) –2, –1, 0, 1	1	
5	**(a)** $\begin{pmatrix} -2 \\ 10 \end{pmatrix}$	1	
	(b) 10	1	
6	$\frac{9\pi}{2} + 27$ oe	2	B1 for $\frac{\pi \times 3^2}{2}$ or $\frac{1}{2} \times 9 \times 6$ soi or for $\frac{\pi r^2}{2} + \frac{1}{2}bh$ with r, b and h clearly identified.
7	**(a)** $\frac{4}{9}$ oe	1	
	(b) 840	1	
8	12.5 oe	2	B1 for $y = kx^2$ or $(k =) \frac{1}{8}$ soi or $2 : 4^2 = y : 10^2$ oe

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9	$y \quad 3$ $y \quad -2x$	2	C1 for either inequality correct or both statements y ( ) 3 and y ( ) $-2x$ given ( ) may contain =, < etc
10	18	2	B1 for attempt at $\sqrt[3]{8} : \sqrt[3]{27}$ or M1 for $12^3 : x^3 = 8 : 27$ oe
11	50	2	M1 for $\frac{35-21}{AD} = \cos\theta$ oe
12	**(a)** 	1	
	(b) **(i)** 2	1	
	(ii) 2, 3, 4, 5, 7	1	
13	**(a)** $2\ (.\ 0) \times 10^{-5}$	1	
	(b) **(i)** 7.6×10^6, 2.1×10^7, 8.0×10^7, 1.2×10^8	1	
	(ii) 1.34×10^7	1	
14	**(a)** $2^2 \times 3^3$	1	
	(b) $(p =)\ 3$, $(q =)\ 2$, $(r =)\ 1$	2	C1 for two correct
15	**(a)** $3q(3p - 4q)$	1	
	(b) $(4p - 3)(2x + y)$	2	M1 for $4p(2x + y) - 3(2x + y)$ or $2x(4p - 3) + y(4p - 3)$ oe or B1 for the correct extraction of a common factor at any stage
16	**(a)** (0)57°	1	
	(b) 237°	1 ft	ft their **(a)** + 180
	(c) 237.5	1	
17	**(a)** 5.963	1	
	(b) 6999	1	
	(c) 381 cao	1	

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18	**(a) (i)** Bisector of *SPQ* **(ii)** Perpendicular bisector of *QR* **(b)** Correct region shaded	1 1 1	
19	**(a)** 0.05 cao **(b)** 14 **(c)** 1000	1 1 2	 B1 for two of 200, 2 and 0.8 seen
20	**(a)** $20 < n \quad 40$ **(b)** 37.5	1 3	 B1 for $\sum fn$ and independent B1 for dividing by (5 + 20 + 10 + 5)
21	**(a)** 16 **(b)** 16 **(c)** $\frac{2y^4}{x}$	1 1 2	 C1 for two of 2, y^4 and x correct or B1 for $\frac{4y^8}{x^2}$ seen or $\frac{4^{\frac{1}{2}}xy^{\frac{9}{2}}}{x^2y^{\frac{1}{2}}}$ or better
22	**(a)** 140 **(b)** 70 **(c)** Congruency established	1 1ft 3	 ft $\frac{1}{2}$ their **(a)** B2 for *AB* = *CD* stated, *EAB* = *EDC* soi or *DCE* = *ABE* and *DEC* = *BEA* or B1 for any correct pair of equal angles.
23	**(a) (i)** 560 **(ii)** 76.8(0) **(b)** 150	1 2 2	 B1 for 19.2 or 3.2 oe soi B1 for figs $\frac{270}{1.8}$ seen

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24	**(a)** (0.5, 4) oe	1	
	(b) 1.2 oe	1	
	(c) **(i)** 4	2	B1 for substitution of (–2,1) in $2y + 3x + k = 0$ SC1 for answer – 23 or any correct ft after substitution of (±2, ±1)
	(ii) –1.5 oe	1	
25	**(a)** $\frac{1}{13}$ oe	2	M1 for $10 – 6x + 3 = 3x + 1$ or better
	(b) $(x =)$ 5, $(y =) – 3$ oe	3	C2 for one correct with supporting working or both answers without working or M1 for correct method to eliminate one variable reaching such as $26x = k$, $hx = 130$, $13y = p$, $qy = –39$ or multiples of these.
26	**(a)** Correct reduction to $2x^2 + x – 15 = 0$	2	M1 for $(2x + 3)(x – 1) = 12$
	(b) 2.5 –3	2	C1 for one correct with supporting working or both with signs reversed or both correct and no working or B1 for $(2x – 5)(x + 3)$ or $\frac{-1 \pm \sqrt{1^2 - 4 \times 2 \times (-15)}}{2 \times 2}$ seen
	(c) 19	1ft	ft 6(their positive x) + 4

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