UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2010 question paper for the guidance of teachers

4024 MATHEMATICS (SYLLABUS D)

4024/11 Paper 1, maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

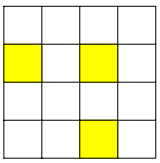
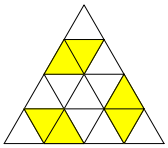
Mark schemes must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2010 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

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
art anything rounding to
soi seen or implied

1	**(a)**	7.7, $7\frac{7}{10}$, only	1	
	(b)	0.039 oe	1	
2	**(a)**	$\frac{16}{21}$ oe	1	
	(b)	$\frac{3}{4}$ oe	1	
3	**(a)**	$\frac{3}{5}$ cao	1	
	(b)	725	1	
4	**(a)**	5	1	
	(b)	16	1	
5	**(a)**		1	
	(b)		1	
6	**(a)**	40.5	1	
	(b)	12.15 ft 0.3 × their **(a)**	1ft	
7	9		2	or **B1** for "k" = 36 (oe), or for $4 \times 3^2 = y \times 2^2$ (oe)
8	10 from using 0.4, 7^2 and 2		2	**M1** for 0.4 and (49 or 50), or for $\sqrt[3]{8.11} = 2$
9	**(a)**	$(x) > 4\frac{1}{2}$	1	Must be "$x >$"
	(b)	–3, –2	1	
10	**(a)**	2	1	
	(b)	$\frac{1}{2}$, or 0.5, only	1	

11	**(a)**	40	1	
	(b)	74	1	
	(c)	246 ft 360 – (their **(a)** + their **(b)**)	1ft	
12	**(a)**	$13x$	1	
	(b)	$\frac{1}{12y}$	1	
	(c)	$12a^3b^4$	1	
13	**(a)**	$2a(8a - 3)$, $2a(-3 + 8a)$, only	1	Not $2a(8a + -3)$
	(b)	$(3x - 4)(y + 2)$	2	Or **C1** for $(3x \pm 4)(y \pm 2)$ or **B1** for any factorisation of **any** two terms; e.g. $3x(2 + y)$, $x(6 + 3y)$, $-2(2y + 4)$
14	**(a)**	1.8×10^7	1	
	(b)	5×10^{-4}	2	or **C1** for figs 5
15	**(a)**	15.7	2	or **B1** for $\frac{100}{360} \times 2 \times \pi \times 9$ oe with "π" as π, 3.14, 3.142 or $\frac{22}{7}$
	(b)	33.7 ft their **(a)** + 18	1ft	
16	**(a)**	$-\frac{1}{3}$	1	
	(b)	Correct region indicated by shading.	2	Or C1 for region below $y = x + 3$ **and** above $3y + x = 3$ indicated by shading or by R.
17	**(a)**	$\begin{pmatrix} 3 & -2 & 1 \\ 0 & 6 & -6 \end{pmatrix}$	2	or **C1** for 4 or 5 correct elements
	(b)	(8 0 –2)	1	
18	Both $x = -6$ and $y = 7$		3	or **C2** for either or **C1** for a pair of values that fits either equation, provided that this pair has been obtained by the method of substitution, equal coeffs., or matrices/determinants and **not** by trial and error.
19	**(a)**	$\frac{4}{25}$ or 0.16	1	
	(b)	0	1	
	(c)	$\frac{12}{25}$ or 0.48	2	or **C1** for $\frac{6}{25}$, or $\frac{8}{25}$, or $\frac{10}{25}$, or $\frac{16}{25}$ (or for 0.24, 0.32, 0.4, 0.64)
20	**(a)**	1 : 6	1	
	(b)	**(i)** (3, 2) **(ii)** $k = -5$	1 2	or **B1** for $4 \times 5 + 6k$

21	**(a)**	0.32	2	or **B1** for cos $ABD = -0.53$ soi
	(b)	2.12	2	or **B1** for cos $b = \frac{BC}{4}$ soi or **M1** for a valid method.
22	**(a)**	36, 52, 62, 70	1	
	(b)	$3 < t < 4$	1	
	(c)	10 4	1 1	
23	**(a)**	$8^2 - 6^2 = 4 \times 7$	1	
	(b)	$(n + 1)^2 - (n - 1)^2$ $(= 4n)$	1	
	(c)	2080 cao	1	
	(d)	Both $x = 122$ and $y = 120$	1	
24	**(a)**	Reflection	1	
		$y = -\frac{1}{2}$	1	
	(b)	**(i)** ΔC has vertices (–1, 0), (–2,0) and (–2, 2)	1	
		(ii) $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$	1	
25	**(a)**	$(-)\frac{4}{5}$, (–)0.8, only	1	
	(b)	[Rectangle = 4×20] + [triangle = $\frac{1}{2} \times 5 \times 4$]; or trapezium = $\frac{1}{2} \times 4(20 + 25)$ or $\frac{1}{2} \times 4 \times 45$	1	
	(c)	Straight line from (0, 0) to (20, 80). Curve, concave downwards, from (20, 80) to (25, 90).	1 1	If zero scored, then **C1** for any graph starting at (0, 0) and ending at (25, 90) with a positive (not zero) gradient throughout.
26	**(a)**	Both $\angle A = \angle C$ (given) and $\angle B$ is common or $\angle ABC = \angle DBC$ oe with no incorrect statements.	1	
	(b)	5 www	3	or **M1** for $\frac{AB}{6} = \frac{6}{4}$ oe e.g. $x + 4$ for AB and **A1** for $AB = 9$

27	**(a)**	96° to 98° inclusive	1	
	(b)	**(i)** Arc of circle, centre *C*, radius 8 cm	1	
		(ii) Bisector of angle *BAC*	1	
	(c)	Correct region shaded	1	Dep. on reasonable attempts at loci in **(b)**.