CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2012 series

4024 MATHEMATICS (SYLLABUS D)

4024/12 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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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
soi seen or implied

Qu.	Answers	Mark	Part Marks
1	**(a)** 10.6	1	
	(b) $\frac{3}{50}$ cao	1	
2	**(a)** $2\frac{11}{12}$	1	
	(b) 4 cao	1	
3	**(a)** 34	1	
	(b) 10	1	
4	**(a)** $3\frac{1}{2}$ oe	1	
	(b) oe	1	
5	$-1, -\frac{17}{20}, -\frac{4}{5}, 0, \frac{3}{4}$	2	**C1** for 4 correct when one is covered or **C1** for reversed answer
6	**(a)** 3 (h)	1	
	(b) 35 or ft $\frac{50 + 90}{\text{their (a)} + 1}$	1 √	
7	**(a)** $8k + 1$	1	
	(b) $2x^2 + 5x - 12$	1	
8	**(a)** 255°	1	
	(b) (0)7 h 53 min	1	
9	**(a)** 6	1	
	(b) 11	1	
10	**(a)** $2^2 \times 3^2 \times 5$ oe	1	
	(b) 11 www	1	

11	**(a)** 6 **(b)** $\frac{1}{3}$	**1** **1**	
12	18	**2**	**B1** for "k" = 2 or **B1** for $\frac{32}{4^2} = \frac{y}{3^2}$ oe
13	**(a)** 9.45 **(b)** 1.95 or *their* **(a)** – 7.5	**1** **1**√	
14	**(a)** Both $p = 6$ and $q = 4$ **(b)** 33 or f.t. 29 + their q (provided q has a value) **(c)** 34	**1** **1**√ **1**	
15	**(a)** $4p\,(4 + p)$ **(b)** $(x + 2a)(y + 3a)$	**1** **2**	 **B1** for **any** partial factorisation
16	**(a)** 0 **(b)** **(c)** $\frac{1}{3}$ or f.t from table $\frac{\text{their (number of 7s)}}{\text{total no. of outcomes}}$ provided (number of 7s) > 0	**1** **1** **1**√	

A	A	B	B	C	C
B	C	A	C	A	B
5	6	5	7	6	7

17	**(a)** 0.0406 **(b)** $6.8(00..) \times 10^{-4}$ **(c)** 4	**1** **1** **1**	
18	**(a)** 3 **(b)** $13\frac{1}{2}$ oe **(c)** $4\frac{1}{2}$ oe	**1** **1** **1**	
19	**(a)** **(b)** or $\begin{pmatrix} \frac{3}{4} & -\frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix}$ oe	**2** **2**	**C1** for 2 or 3 correct elements **B1** for det M = 4 or for $\frac{1}{4} \times$ (2 × 2 matrix) or **B1** for used or seen

20	**(a)** **(i)** 4 **(ii)** 2 **(b)** Both $a = 1$ and $b = 2$. $c = 6$	**1** **1** **1** **1**	
21	**(a)** **(b)** (one way) stretch Parallel to y-axis/x-axis invariant **and** (stretch/scale) factor $\frac{1}{2}$.	**2** **1** **1 dep.**	**C1** for 4 or 5 correct elements in a 2 × 3 derived matrix
22	**(a)** (11, 3) **(b)** parallelogram **(c)** 27	**1** **1** **2**	 **M1** for their (BC) × their 9 or **M1** for 9 × (their BC + 2) – 2 × $\frac{1}{2}$ × 9 × 2
23	**(a)** 124 **(b)** 118 **(c)** 31 **(d)** 38	**1** **1** **1** **1**	
24	**(a)** 18 **(b)** **(i)** 10 **(ii)** 20	**2**	**M1** for $\frac{360}{\text{their } (180 - 160)}$ or **M1** for $(n - 2) \times 180 = 160n$ oe
25	**(a)** $\frac{u}{5}$ or any equiv. **(b)** **(i)** correct method $u = 2$ **(ii)** continuous graph from (0, 0) to (10, 40),without any horizontal or vertical lines. Curve, concave upwards	**1** **M1** **A1** **1** **1 ind.**	 e.g. $40 = \frac{1}{2} \times (u + 3u) \times 10$, or $40 = 10u + \frac{1}{2} \times 10 \times 2u$

26	**(a)** 2011	**2**	**B1** for (n =) 223 seen
	(b) 36	**1**	
	(c) **(i)** $9x - 9y$, or $9y - 9x$, or any equiv.	**1**	
	(ii) "123 is not a multiple of 9" oe	**1**	
27	**(a)** 126° to 128° inclusive	**1**	
	(b) acceptable quadrilateral $ABCD$	**1**	
	(c) **(i)** acceptable circular arc, centre C	**1**	
	(ii) acceptable bisector of angle ABC	**1**	
	(d) DP = 2 to 2.5cm with correct P	**1**	dep. on an acceptable D and both **(c)** marks