UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2010 question paper

for the guidance of teachers

4024 MATHEMATICS (SYLLABUS D)

4024/12 Paper 12, maximum raw mark 80

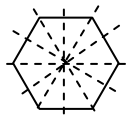
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, 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 May/June 2010 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

UNIVERSITY of CAMBRIDGE
International Examinations

Qu	Answers	Mark	Part Marks
1	**(a)** 0.7	1	
	(b) 60	1	
2	**(a)** $\frac{11}{35}$	1	
	(b) $\frac{18}{35}$	1	
3	**(a)** 22	1	
	(b) 1380	1	
4	**(a)** 10	1	
	(b) $\frac{1}{3}$	1	
5	0.5	2	B1 for two of 50, 0.2 and 4 seen
6	**(a)** 2.5	1	
	(b) $\frac{p+r}{2}$	1	
7	**(a)** 	1	
	(b) Rectangle, parallelogram or rhombus drawn	1	
8	**(a)** 81	1	
	(b) 24	1	
9	**(a)** $2^2 \times 5 \times 7$	1	
	(b) 28	1	
	(c) 42	1	
10	**(a)** 40 24	2	C1 for one correct or M1 for $\frac{x}{x-16}$ or $\frac{y+16}{y}=\frac{5}{3}$ or $\frac{5}{8}z=\frac{3}{8}z+16$
	(b) 2.5	1	
11	**(a)** –1.5	1	
	(b) $\frac{5}{3x+2}$	2	C1 for $\frac{5}{3y+2}$ or $\frac{5}{ax+b}$ with $a = 3$ or $b = 2$ or B1 for $3xy = 5 – 2x$ or $3yx = 5 – 2y$ or better seen

© UCLES 2010

12	**(a)** $\frac{12}{x^2}$	2	C1 for $\frac{k}{x^2}$ or B1 for $k = 12$ seen or $y = \frac{k}{x^2}$ with k or k any number
	(b) 2 –2	1	
13	$(x =)$ 5 $(y =) -4$	3	C2 for one correct with working. M1 for a correct method to eliminate one variable, reaching such as $11x = k$, $hx = 55$, $11y = p$ or $qy = -44$
14	**(a)** –2 5.5	1	
	(b) $y = -0.75x + 4$	2	C1 for $y = -0.75x + c$ or $y = mx + 4$ or B1 for $m = -0.75$ or $c = 4$ soi or a line through either point (–8, 10) or (4, 1)
15	**(a)** 52	1	
	(b) 52	1	Accept their **(a)** ft
	(c) 38	1	Accept 90 – their **(b)** ft
16	**(a)** Correct completion with $\frac{4}{10}$, $\frac{4}{9}$, $\frac{6}{9}$ and $\frac{3}{9}$	1	
	(b) $\frac{7}{15}$	2	C2 for a correct ft from **(a)** M1 for $\frac{6}{10}\times\frac{5}{9}+\frac{4}{10}\times\frac{3}{9}$
17	**(a)** $2\mathbf{p} + 3\mathbf{q}$	1	
	(b) $2\mathbf{p} + 2\mathbf{q}$	1	
	(c) $-2\mathbf{p} + \mathbf{q}$	1	Accept $3\mathbf{q}$ – their **(b)** ft
18	**(a)** $\frac{\pi r^2}{6}$	1	
	(b) $2r + \frac{\pi r}{3}$	2	B1 for $\frac{60}{360} \times 2\pi r$ seen
19	**(a)** $\begin{pmatrix} 3 & -1 \\ 0 & -1 \end{pmatrix}$	1	
	(b) $\begin{pmatrix} \frac{3}{2} & -1 \\ \frac{1}{2} & 0 \end{pmatrix}$ o.e.	2	B1 for $\frac{1}{2}$ or $\begin{pmatrix} 3 & -2 \\ 1 & 0 \end{pmatrix}$ or (det =) 2

© UCLES 2010

20	**(a)** 39	1	
	(b) 14	2	B1 for 46 or 32 seen
	(c) 9	1	
21	**(a)** **(i)** $3x(x-4)$	1	
	(ii) $(x+y)(x-2y)$	1	
	(b) $\frac{x}{x-4}$	2	B1 for $x(x+4)$ or $(x+4)(x-4)$ seen
22	**(a)** 2 500 000	1	
	(b) **(i)** 395	1	
	(ii) 340	2	B1 for 5.5 seen
23	**(a)** 34	2	M1 for $\frac{16}{AB} = \cos\theta$ soi
	(b) 480	2	B1 for height of $ABC = 16\tan\theta$ o.e. or for $\frac{1}{2} \times 32 \times$ their $34 \times \sin\theta$ or M1 for any correct method
24	**(a)** T with vertices (5, 6), (3, 6) and (3, 2)	2	C1 for two vertices correct or for T same orientation as P and correct size
	(b) Rotation 90˚ anticlockwise about (0, 0)	2	B1 for Rotation or 90˚ anticlockwise about (0, 0) oe
	(c) $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$	1	
25	**(a)** 108	1	
	(b) 0.5 – 0.9 with tangent drawn at $t = 18$	2	C1 for 0.5 – 0.9 or B1 for tangent at $t = 18$
	(c) Correct distance / time graph	2	B1 for curve from (0, 0) to (8, 36) with correct curvature or straight line from (8, 36) to (16, 108ft)
26	**(a)** Correct triangle	2	B1 if no arcs seen or arcs seen but sides in the wrong order or arcs seen, but only one side the correct length
	(b) Correct region shaded	3	B1 for arc radius 7, centre B B1 for perp. bisector of AB

© UCLES 2010