CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2013 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.

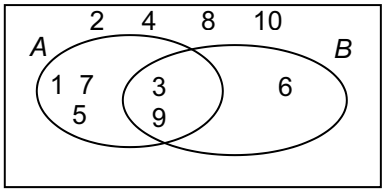
Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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Qu		Answers	Mark	Part Marks
1	(a)	$\frac{6}{35}$	1	
	(b)	$\frac{15}{16}$	1	
2	(a)	$\frac{8}{23}$ Final ans.	1	
	(b)	11 : 12	1	
3	(a)	5 cm, 500 mm, 500 m, 50 km	1	
	(b)	4160	1	
4	(a)	$-\frac{1}{3}$	1	
	(b)	– 1	1	
5	(a)	F	1	
	(b)	E	1	
6	(a)	Correct reflection	1	
	(b)	Correct rotation	1	
7	(a)	– 1.3	1	
	(b)	3.2	1	
	(c)	– 1.5	1	
8	(a)	64	1	
	(b)	13	1	
	(c)	Any irrational number in range $1 < n < 2$	1	
9	(a)	0.0041	1	
	(b)	11 ($< \sqrt{131} <$) 12	1	
	(c)	$(3 \times 2 + 1\ )^2 = 49$	1	

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10	**(a)**		1	
	(b)	6	1	
	(c)	1, 5, 7.	1	
11	**(a)**	12	1	
	(b)	1.44 : 1	2	B1 for 1.2^2 seen or $6^2 : 5^2$ soi.
12	**(a)**	Perpendicular bisector of AB.	1	
	(b)	Correct region shaded	2	B1 for arc radius 6 cm, centre C After 0 for (a) and (b), Allow 1 for an accurate bisector of any side.
13	**(a)**	$\begin{pmatrix} 4 & -1 \\ 1 & -1 \end{pmatrix}$	1	
	(b)	$\frac{1}{6}\begin{pmatrix} 0 & -3 \\ 2 & 2 \end{pmatrix}$ oe isw	2	B1 for determinant = 6 soi or $\begin{pmatrix} 0 & -3 \\ 2 & 2 \end{pmatrix}$ soi
14	**(a)**	62.7(0)	2	C1 for 66.5(0) or B1 for 8.25 soi
	(b)	35	1	
15	**(a)**	$(P =) \frac{1}{4}Q^2$ oe seen	1	
	(b)	10, – 10	2	B1 for $25 = \frac{1}{4}Q^2$ oe

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16	**(a)**	$\frac{1}{16}$	1	
	(b)	$\frac{3y^2}{x}$	2	C1 for 2 out of 3 terms correct. B1 for $\frac{(9)y^4}{x^2}$ soi or for $\frac{3x^{\frac{1}{2}}y^3}{x^{\frac{3}{2}}y}$ soi
17	**(a)**	$\frac{5\pi}{8}$ cao	2	M1 for $\frac{45}{360}\pi r^2$
	(b)	3	1	
18	**(a)**	4.8×10^7 cao	1	
	(b)	9.3×10^6 oe	2	M1 for $1.85\times10^7 - 9.2\times10^6$ oe
	(c)	5.1×10^8 cao	1	After 0 in (a) and (c), Allow 1 for a correct (c) in any form.
19	**(a)** **(i)**	1	1	
	(ii)	2.1 r $2\frac{1}{10}$ only.	2	M1 for $\frac{\Sigma fx}{20}$
	(b)	34	1	
20	**(a)**	2	2	M1 for $3x + 2(2x - 1) = 12$ or better soi or for $\frac{3x}{4} + \frac{2x}{2} = 3 + \frac{1}{2}$
	(b)	$\frac{7x+3}{(x+4)(x-1)}$ Final answer	2	M1 for $\frac{5(x-1)+2(x+4)}{(x+4)(x-1)}$ soi

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21	**(a)**	4 16 30 52 70 80	1	
	(b)	Correct ft curve	2	B1 for at least 5 correct ft points
	(c)	16 to 18	2	B1 for their CF at $m = 45$ ft After 0, allow B1 for 80 – their CF at $m = 44$
22	**(a)**	Line from (13 10,12) to (13 55,0)	2	B1 for start of line correct or for a line with the correct gradient. Or for a line from (13 10,0) to (13 55, 12)
	(b)	6.9 to 7.4	1	
	(c)	18	1	
	(d)	Correct graph	2	B1 for final speed 20 km/h soi or for first two lines of the graph correct.
23	**(a)**	Congruency shown	3	Maximum of 2 independent B marks for $A\hat{B}0 = A\hat{D}O = 90^\circ$ or $AB = AD$ or $BO = DO$ *or* AO is common
	(b)	Kite or Cyclic Quadrilateral	1	
	(c)	44	2	B1 for $B\hat{O}D = 136^\circ$
24	**(a)**	$t^2 - 2t - 15$ seen	1	
	(b)	$(8x - 3y)(8x + 3y)$	1	
	(c)	$(3a + 2)(2b - a)$	2	B1 for any factorisation of any two terms, at any stage.
	(d) (i)	$(x - 3)^2 - 6$	1	
	(ii)	$3 \pm \sqrt{6}$	1ft	FT from **(d)(i)**

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