CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

MARK SCHEME for the October/November 2014 series

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

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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
soi seen or implied

Question	Answers	Mark	Part marks
1 (a)	41 006	1	
(b)	240 000	1	
2 (a)	12	1	
(b)	(0).08	1	
3 (a)	$\frac{3}{100}$ cao	1	
(b)	82	1	
4 (a)	64	1	
(b)	67	1	
5	$(2a - 3b)(c + 2d)$	2	**B1** for one of the partial factorisations $c(2a - 3b)$; $2d(2a - 3b)$; $2a(c + 2d)$; $-3b(c + 2d)$ or their negatives, seen.
6 (a)	$\frac{8}{9}$	1	
(b)	28	1	
(c)	90	1	
7	A correct method to eliminate one variable	M1	
	Either $x = 4$ or $y = -1$ WWW.	A1	
	Both $x = 4$ and $y = -1$ WWW.	A1	If [0] earned, then award **C1** for a pair of values that satisfy either equation.

8	**(a)**	9	1	
	(b)	8	1	
	(c)	25	1	
9		8 WWW	3	**M1** for a recognisable attempt at Pythagoras' Theorem with sides 10 and 6. **M1** for $(AT^2 =)\ 10^2 - 6^2$ oe
10	**(a)**	$P \cap Q \cap R'$ oe	1	
	(b)	47	2	**M1** for Cricket set inside the Football set, e.g. in a Venn diagram; Ans. = 30+8+9; "30 play both cricket and football".
11	**(a)**	$\begin{pmatrix} 330 \\ 417 \end{pmatrix}$	2	B1 for 330 or 417 in a (2 by 1) matrix, or for (330 417).
	(b)	P shows the amount earned in Week 1 and Week 2, oe	1 dep	Must refer to (i) the amount earned (money, earings, $, etc) and (ii) the two weeks.
12	**(a)**	930	1	
	(b)	$\frac{2s - an}{n}$ oe	2	**M1** for correct first step, e.g. $2s = an + bn$; $s = na/2 + nb/2$ or **B1** for a correct expression for b seen in working, but followed by an error.
13		$d = \frac{5v^2}{64}$ 125	3	**M1** for $d=kv^2$, or for $5 = k \times 64$; **B1** for $k = 5/64$, or for $\frac{d}{5} = \frac{40^2}{8^2}$
14	**(a)**	3.65	1	
	(b)	60 WWW	3	**B1** for 192; or for cost price = \$120, soi by (profit =) \$72. **M1** for $\left(\frac{their192 - their120}{their120}\right) \times 100$ oe
15	**(a)**	Triangle ABC drawn with an acceptable C.	2	**B1** for $AC = 7$ cm or B1 for $\angle CAB = 130°$
	(b)	21 to 22 inclusive, WWW; Or FT their triangle, provided the perp. height is not one of the sides, WWW.	2√	**M1** for ½ base × height with matching base and height.

16	**(a)**	$x + y = 6$ drawn correctly	1	
	(b)	$2y + x = 4$ drawn correctly	1	
	(c)	Correct region shaded, (FT for sloping lines with one correct line).	2√	**B1** for **R** correctly bordered by the lines $y = 2$ and $x = –1$; or FT appropriate shading between their sloping lines, provided one is correct
17	**(a)**	Valid method, with $\frac{1}{2}(11+7)\times 4\times 5$ oe, leading to 180	1	**AG**
	(b)	20 WWW	3	**B1** for 22 500 or 0.18 and **M1** for $\sqrt[3]{\frac{figs\,225}{figs\,18}}$ soi
18	**(a)**	14 41	1	
	(b)	149	1	
	(c)	**(i)** 2 5 10 17	1	
		(ii) $n^2 – 1$ oe	1	
19	**(a)**	1.36×10^9	1	
	(b)	**(i)** 5.6×10^9	1	
		(ii) 7.93×10^5	2	**B1** for figs 793, or for $N \times 10^5$ with $1 < N < 10$.
20	**(a)**	F	1	
	(b)	C	1	
	(c)	B	1	
	(d)	E	1	
21	**(a)**	**(i)** … alternate (angles) …	1	
		(ii) 119^o	2	**M1** for $\frac{180-58}{2}$, or **B1** for a base angle = 61^o
	(b)	120 WWW	2	**C1** for 240. **M1** for $2x + 80 + 95 + 125 = 540$, oe

22	**(a)**	42	1	
	(b)	Correct plots at 20, 40, 60, 90, 120 and CF curve drawn	2	**B1** for three or four correct plots
	(c)	**(i)** 62 to 64 inclusive	1√	FT from their CF graph
		(ii) 41 to 46 inclusive WWW, FT (F_{80}–F_{50}) from their graph.	2√	**M1** for attempt to calculate (F_{80}–F_{50}) from their graph.
23	**(a)**	**(i)** the point *B* marked correctly	1	
		(ii) the point *C* marked correctly	1	
		(iii) the point *D* marked correctly	1	If [0] scored in (a), in (aiii) award **B1** for the vector $\begin{pmatrix} -6 \\ 1 \end{pmatrix}$ soi.
	(b)	**(i)** $\mathbf{q} - \mathbf{p}$	1	
		(ii) $\frac{2}{3}\mathbf{p} + \frac{1}{3}\mathbf{q}$	1√	
		(iii) $\frac{1}{3}\mathbf{q} - \left(\frac{4}{3}\right)\mathbf{p}$, or FT *their***(ii)** $- 2\mathbf{p}$	2√	**M1** for **OT = OR + RT** Or for **OT = OP + PR + RT** Or for **OT = OQ + QR + RT** Or equivalents in terms of **p** and **q**.