

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)

4024/12

Paper 1, maximum raw mark 80

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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
art	anything rounding to
soi	seen or implied

1	(a)	$\frac{17}{21}$ oe	1	
	(b)	$\frac{5}{12}$ cao	1	
2	(a)	70	1	
	(b)	4.05	1	
3	(a)	7.06×10^{-5} cao	1	
	(b)	150	1	
4	(a)	7	1	
	(b)	6	1	
5	(a)	1.65	1	
	(b)	2 : 25	1	
6	(a)	$(2t - 3)(2t + 3)$	1	
	(b)	$(3x - 1)(x + 2)$	1	
7		18	2	or B1 for “k” = 2, or for $\frac{y}{50} = \frac{3^2}{5^2}$ oe
8		$(\pm)\sqrt{\frac{y-3}{2}}$ oe e.g. $(\pm)\left(\frac{y-3}{2}\right)^{\frac{1}{2}}$ (sq. root symbol must extend below the fraction line)	2	or C1 for $\frac{\sqrt{y-3}}{2}$ or for $\sqrt{\frac{y+3}{2}}$ or for $\sqrt{\frac{3-y}{2}}$ or for $\sqrt{y-3/2}$ oe for all
9	(a)	$(\pm) 5$ cao	1	
	(b)	(i) 6	1	
		(ii) (1.5, 0)	1	

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10	(a)	$\frac{4}{5}$, or 0.8, only	1	
	(b)	$25x^6$ cao	1	
	(c)	$\frac{4}{n^8}$	1	
11	(a)	8	1	
	(b)	{5, 6, 7, 8, 9}	1	
	(c)	$\frac{3}{10}$ or 0.3	1	
12	(a)	$3\frac{1}{2}$, or $\frac{7}{2}$, or 3.5, only	1	
	(b)	$12 - 2x$ or any equivalent	2	or C1 for $12 - 2$ “y” or any equivalent or C1 for $6 - 2x$, or for any incorrect linear combination of 12 and $2x$ (but not 2 “y”)
13	(a)	Irrational	1	
	(b)	$(AB^2 =) AC^2 - 5^2$ or $(AB =) \sqrt{AC^2 - 5^2}$ or $AC^2 = AB^2 + 5^2$. AC must be “their” $\sqrt{89}$ ($\pm$) 8	M1 A1	
14		$x = 9$, $y = 6$ both	3	or C2 for one answer correct; 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.
15	(a)	$16(.0)(0)$	1	
	(b)	$75(.0)(0)$ www	2	or M1 for $\frac{60}{0.8}$ oe, e.g. $\frac{3k \times 100}{4k}$
16	(a)	$\begin{pmatrix} -1 & -2 \\ 0 & -2 \end{pmatrix}$	1	
	(b)	$\begin{pmatrix} 0 & -1 \\ -\frac{1}{3} & -\frac{2}{3} \end{pmatrix}$ oe e.g. $-\frac{1}{3} \begin{pmatrix} 0 & 3 \\ 1 & 2 \end{pmatrix}$	2	or B1 for $\det \mathbf{A} = -3$ or for $k \begin{pmatrix} 0 & 3 \\ 1 & 2 \end{pmatrix}$ or for $-\frac{1}{3} \begin{pmatrix} \cdot & \cdot \\ \cdot & \cdot \end{pmatrix}$
17	(a)	$\begin{pmatrix} 490 \\ 520 \end{pmatrix}$	2	or C1 for a 2×1 matrix with one element correct; or for $\begin{pmatrix} 490 & 520 \end{pmatrix}$
	(b)	The cost, (in cents), of each bunch. oe	1	Indep. of (a)
18	(a)	14.7(0) cao	1	
	(b)	30	2	or B1 for 170 seen in working or in Ans. Space

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19	(a) $p = 1, q = 0$	1	
	(b) (i) $\frac{5}{7}$	1	
	(ii) $\frac{2}{7}$ or ft 1 – their (i) or ft $(\frac{1}{7} + \frac{1}{7} \times \text{their } p)$	1ft	ft depends on $0 < \text{Ans.} < 1$
20	(a) $3x > 7$ oe $4x + 4y < 35$ oe	1 1	or C1 for $3x \dots 7$ and $4x + 4y \dots 35$ (oe) with incorrect inequalities for ...
	(b) (5, 3)	1	
21	(a) 53.35°	1	
	(b) 65.15°	2	or C1 for 64.65; or 65.1; or 64.05
22	(a) (i) 16 000 cao (ii) 0.0030 cao	1 1	
	(b) 50 cao	2	Give 0 for multiplication using either original number. or C1 for figs. 5, or 6; or 45; or 48
23	(a) 123°	1	
	(b) 57°	1	
	(c) 33°	1	
	(d) 66°	1	
24	(a) $3p + q$ oe	1	
	(b) (i) Trapezium	1	
	(ii) $p + kq$ oe	1	
	(iii) $\frac{1}{3}$	1	
25	(a) 30	2	or B1 for $10u$ or $\frac{1}{2} \times 20 \times u$ clearly seen
	(b) 90	2	or C1 for 30 (if as the further time from 60) or M1 for $100 - \frac{1}{4} \times 40$, or for $60 + \frac{3}{4} \times 40$
26	(a) $-\frac{4}{5}$, or -0.8, only	1	
	(b) 16	3	or M1 for $\frac{AC}{\sin b} = \frac{10}{\sin a}$ soi and M1 for $AC = \frac{10 \times \frac{24}{25}}{\frac{3}{5}}$ oe

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27	(a)	3	1	
	(b)	80	1	
	(c)	$7\frac{1}{2}$ oe	3	or B1 for $\frac{A}{360} \times 2 \times \pi \times r$ with $A = 40$ or 120, and $\pi = \pi$ or 3 or 3.14 or $\frac{22}{7}$ etc and M1 for adding the appropriate radii ($6r$ or $2r$) to their arc(s) and equating to the appropriate wire length (60 or 20) ($8r = 60$, oe (e.g. $\frac{8}{3}r = 20$), gets B1 and M1)