

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
GCE Ordinary Level

**MARK SCHEME for the October/November 2011 question paper
for the guidance of teachers**

<p style="text-align: center;">4024 MATHEMATICS (SYLLABUS D)</p> <p>4024/12 Paper 1, maximum raw mark 80</p>

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.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

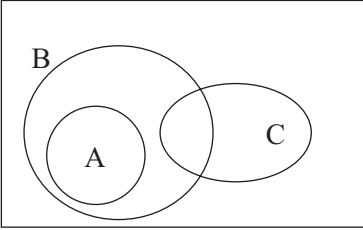
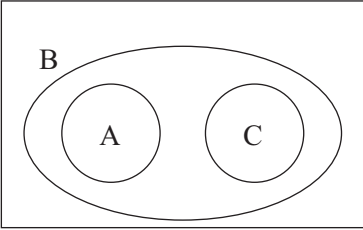
Cambridge is publishing the mark schemes for the October/November 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

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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

Qu	Answers	Mark	Part marks
1	(a) $\frac{35}{36}$	1	
	(b) 0.4	1	
2	(a) 18	1	
	(b) $1\frac{3}{4}$ (hours), 6 500 (seconds), 110 (minutes)	1	
3	(a) 6	1	
	(b) 5	1	
4	(a) 0 cao	1	
	(b) $2x - 3$	1	
5	(a) 4.2×10^{-5}	1	
	(b) 2.1×10^7	1	
6	(a) $(x) > 6$ cao	1	
	(b) -5	1	
7	(a) $\frac{15}{16}$	1	
	(b) $8x^6$ cao	1	
8	(a) 25	1	
	(b) $57 - 2^n + n$ oe	1	
9	(a) $\frac{180}{p+1}$	1	
	(b) $2p + 2$, or any equivalent	1	

10	 <p>OR</p> 	2	<p>or C1 for A inside B or C1 for C intersecting B, but not A (if A drawn) or for C inside B and not intersecting A (if A drawn)</p>
11	$\sqrt{(110 - 0.2(0) \times 370)}$ as the first line of working $(\pm) 6$ www	M1 A1	<p>or B1 for two of 110, 0.2(0), 370 seen or C1 for 6(.0)(0) www, following other approximations or without any working or B1 for 74</p>
12	20	2	<p>or C1 for 12 or M1 for 8×2.5 oe; or for $8 + 8 \times 1.5$ oe</p>
13	<p>(a) 15 oe (b) 12 oe (c) $\frac{60}{n}$</p>	1 1 1	
14	<p>(a) 94° (b) 133° (c) 43°</p>	1 1 1ft	ft $(180 - \text{their(a)})/2$
15	<p>(a) correct ruled line (b) $\frac{7}{15}$ cao (c) 240</p>	1 1 1	
16	<p>(a) 4 (b) rectangles base 4 to 5, height 4 base 5 to 8, height 1</p>	1 1 1	

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17	(a) 57.5 (b) 23 www	1 2ft	ft 4 × their(a) / 10 or M1 for 4 × figs 575, or 4 × figs {their(a)} with no further working except conversion to cm
18	(a) (0)6 18 (h) (b) $26\frac{2}{3}$	1 2	Accept (0)6:18; (0)6.18; or similar. or M1 for $\frac{200}{7.5}$ oe or M1 for $\frac{150 + \text{their second distance}}{7.5}$
19	$x = 9$ and $y = -6$	3	or C2 for one answer correct www; 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.
20	(a) $180 - x - y$ or $180 - (x + y)$ only (b) $3\frac{3}{4}$ or any equiv. (c) $\frac{9}{16}$	1 1 1	
21	(a) (-) 5 (b) 3 400	1 2	or M1 for clearly trying to find the correct area.
22	(a) $\begin{pmatrix} 11 & -6 \\ -1 & -2 \end{pmatrix}$ (b) $\begin{pmatrix} \frac{1}{2} & 1 \\ \frac{1}{2} & 2 \end{pmatrix}$ or $\frac{1}{2}\begin{pmatrix} 1 & 2 \\ 1 & 4 \end{pmatrix}$	2 2	or C1 for 3 or 2 correct elements or B1 for $\det A = 2$, or for $k\begin{pmatrix} 1 & 2 \\ 1 & 4 \end{pmatrix}$ oe

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23	(a) $(3x - 1)(3x + 1)$	1	<p>or C2 for one correct value from correct factors</p> <p>or B1 for the factors $(2y - 1)$ and $(y + 15)$ seen but not necessarily multiplied together</p> <p>If a clear, incorrect pair of linear factors is used, then award C1 for each correctly obtained ft solution, possibly unsimplified – (max. of 2 marks).</p>
	(b) Using factors:		
	both -15 and $\frac{1}{2}$ from correct factors	3	
	Using the formula:		
	for $\frac{p \pm (\text{or } + \text{ and } -)\sqrt{q}}{r}$	1	<p>for all three of $p = -29$, $r = 4$ (or 2×2), and $q = 961$ (or $\sqrt{q} = 31$ from $q = 961$)</p>
	-15 www	1	
	$\frac{1}{2}$ www	1	
24	(a) 0	1	<p>or M1 for an attempt at $\sum fx$, possibly implied by sum = 64.</p>
	(b) 1	1	
	(c) 1.6 or $1\frac{3}{5}$ or $\frac{8}{5}$	2	
25	(a) $x > 2$ oe	1	<p>if zero scored, then C1 for $x \dots 2$ oe</p> <p>and $x + y \dots 12\frac{1}{2}$ oe with incorrect (in)equalities for “...”</p>
	$x + y < 12\frac{1}{2}$ oe	1	
	(b) (i) $(9, 3)$	1	
	(ii) 4	1	
26	(a) correct triangle	1	<p>dep. on correct loci in (b)</p>
	(b) (i) one or two st. line(s), parallel to AC , 2.5 cm from AC	1	
	(ii) bisector of angle ABC	1	
	(c) $PQ = 5.4$ to 5.7	1	

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27	(a) (i) 270°	1	
	(ii) $(2, 0)$	1	
	(b) (i) 2 cao	1	
	(ii) $x = -1$ oe	1	
28	(a) (i) $-p + q$ oe	1	
	(ii) $-4p + 2q$ oe	1	
	(b) (i) $3p + k(-4p + 2q)$ oe	1ft	ft $3p + k \times$ their (a)(ii)
	(ii) $c \times$ their(a)(i) = their(b)(i) oe where $c \neq k, \frac{1}{k},$ or 1, provided their (b)(i) consists of a vector expression and k .	M1ft	or C1 for 1.5 oe, with no appropriate working, and no wrong working
	1.5 oe	A1	