

**MARK SCHEME for the October/November 2010 question paper
for the guidance of teachers**

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 must be read in conjunction with the question papers and the report on the examination.

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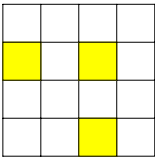
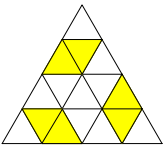
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Abbreviations

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)	$7.7, 7\frac{7}{10}$, only	1	
	(b)	0.039 oe	1	
2	(a)	$\frac{16}{21}$ oe	1	
	(b)	$\frac{3}{4}$ oe	1	
3	(a)	$\frac{3}{5}$ cao	1	
	(b)	725	1	
4	(a)	5	1	
	(b)	16	1	
5	(a)		1	
	(b)		1	
6	(a)	40.5	1	
	(b)	12.15 ft $0.3 \times$ their (a)	1ft	
7	9		2	or B1 for “ k ” = 36 (oe), or for $4 \times 3^2 = y \times 2^2$ (oe)
8	10 from using 0.4, 7^2 and 2		2	M1 for 0.4 and (49 or 50), or for $\sqrt[3]{8.11} = 2$
9	(a)	$(x) > 4\frac{1}{2}$	1	Must be “ $x >$ ”
	(b)	-3, -2	1	
10	(a)	2	1	
	(b)	$\frac{1}{2}$, or 0.5, only	1	

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11	(a)	40	1	
	(b)	74	1	
	(c)	246 ft 360 – (their (a) + their (b))	1ft	
12	(a)	$13x$	1	
	(b)	$\frac{1}{12y}$	1	
	(c)	$12a^3b^4$	1	
13	(a)	$2a(8a - 3)$, $2a(-3 + 8a)$, only	1	Not $2a(8a + -3)$
	(b)	$(3x - 4)(y + 2)$	2	Or C1 for $(3x \pm 4)(y \pm 2)$ or B1 for any factorisation of any two terms; e.g. $3x(2 + y)$, $x(6 + 3y)$, $-2(2y + 4)$
14	(a)	1.8×10^7	1	
	(b)	5×10^{-4}	2	or C1 for figs 5
15	(a)	15.7	2	or B1 for $\frac{100}{360} \times 2 \times \pi \times 9$ oe with “ π ” as π , 3.14, 3.142 or $\frac{22}{7}$
	(b)	33.7 ft their (a) + 18	1ft	
16	(a)	$-\frac{1}{3}$	1	
	(b)	Correct region indicated by shading.	2	Or C1 for region below $y = x + 3$ and above $3y + x = 3$ indicated by shading or by R.
17	(a)	$\begin{pmatrix} 3 & -2 & 1 \\ 0 & 6 & -6 \end{pmatrix}$	2	or C1 for 4 or 5 correct elements
	(b)	$(8 \ 0 \ -2)$	1	
18	Both $x = -6$ and $y = 7$		3	or C2 for either 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.
19	(a)	$\frac{4}{25}$ or 0.16	1	
	(b)	0	1	
	(c)	$\frac{12}{25}$ or 0.48	2	or C1 for $\frac{6}{25}$, or $\frac{8}{25}$, or $\frac{10}{25}$, or $\frac{16}{25}$ (or for 0.24, 0.32, 0.4, 0.64)
20	(a)	1 : 6	1	
	(b)	(i) $(3, 2)$	1	
		(ii) $k = -5$	2	or B1 for $4 \times 5 + 6k$

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21	(a)	0.32	2	or B1 for $\cos ABD = -0.53$ soi
	(b)	2.12	2	or B1 for $\cos b = \frac{BC}{4}$ soi or M1 for a valid method.
22	(a)	36, 52, 62, 70	1	
	(b)	$3 < t < 4$	1	
	(c)	10 4	1 1	
23	(a)	$8^2 - 6^2 = 4 \times 7$	1	
	(b)	$(n+1)^2 - (n-1)^2 (= 4n)$	1	
	(c)	2080 cao	1	
	(d)	Both $x = 122$ and $y = 120$	1	
24	(a)	Reflection $y = -\frac{1}{2}$	1 1	
	(b) (i)	ΔC has vertices $(-1, 0)$, $(-2, 0)$ and $(-2, 2)$	1	
	(ii)	$\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$	1	
25	(a)	$(-\frac{4}{5}, (-)0.8, \text{ only})$	1	
	(b)	[Rectangle = 4×20] + [triangle = $\frac{1}{2} \times 5 \times 4$]; or trapezium = $\frac{1}{2} \times 4(20 + 25)$ or $\frac{1}{2} \times 4 \times 45$	1	
	(c)	Straight line from $(0, 0)$ to $(20, 80)$. Curve, concave downwards, from $(20, 80)$ to $(25, 90)$.	1 1	If zero scored, then C1 for any graph starting at $(0, 0)$ and ending at $(25, 90)$ with a positive (not zero) gradient throughout.
26	(a)	Both $\angle A = \angle C$ (given) and $\angle B$ is common or $\angle ABC = \angle DBC$ oe with no incorrect statements.	1	
	(b)	5 www	3	or M1 for $\frac{AB}{6} = \frac{6}{4}$ oe e.g. $x + 4$ for AB and A1 for $AB = 9$

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27	(a)	96° to 98° inclusive	1	
	(b)	(i) Arc of circle, centre <i>C</i> , radius 8 cm	1	
		(ii) Bisector of angle <i>BAC</i>	1	
	(c)	Correct region shaded	1	
				Dep. on reasonable attempts at loci in (b) .