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**MATHEMATICS (SYLLABUS D)**

**4024/11**

Paper 1

**October/November 2017**

MARK SCHEME

Maximum Mark: 80

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**Published**

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.

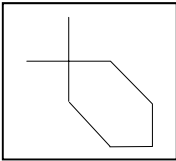
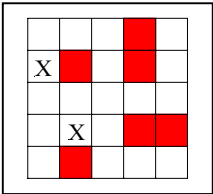
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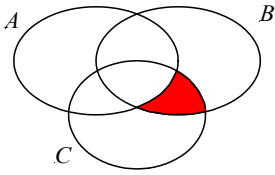
**Abbreviations**

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfw	not from wrong working
soi	seen or implied

Question	Answer	Marks	Partial Marks
1(a)	$\frac{17}{24}$	<b>1</b>	
1(b)	0.52	<b>1</b>	
2(a)	80	<b>1</b>	
2(b)	$(\pm)\frac{1}{3}$	<b>1</b>	
3(a)	24	<b>1</b>	
3(b)	120	<b>1</b>	
4	Initial statement containing 1000 and 0.02	<b>M1</b>	If M0, award <b>C1</b> for 50 000 nfw.
	50 000	<b>A1</b>	
5(a)		<b>1</b>	
5(b)		<b>1</b>	
6	11	<b>2</b>	<b>M1</b> for $1\frac{1}{2} \times 10 + 7$
7(a)	16.6	<b>1</b>	
7(b)	$\frac{x-7}{3}$ oe	<b>1</b>	

Question	Answer	Marks	Partial Marks
8	80	2	<b>B1</b> for “ $k$ ” = $\frac{4}{5}$ if $y = “k” \times x^2$ used or <b>M1</b> for $\frac{\frac{1}{5}}{(\frac{1}{2})^2} = \frac{y}{10^2}$ oe or FT <b>M1</b> for $y = (their\ k) \times 100$ when $y = “k” \times x^2$ used
9(a)	$x > 4$	1	
9(b)	-3 and -2	1	
10(a)	-2	1	
10(b)	-1	1	
10(c)	0	1	
11(a)	$1.2 \times 10^{-4}$	1	
11(b)	$5.29 \times 10^7$	2	<b>C1</b> for figs. 529; or for $5.3 \times 10^7$ or <b>B1</b> for $55 \times 10^6$ ; or for $0.21 \times 10^7$ ; or for figs 529
12	Correct method to eliminate one variable	<b>M1</b>	Either equating one set of coefficients, or equating expressions in either $[m]x$ or in $[m]y$ , or substituting for $x$ or for $y$ .
	Both $x = -2$ and $y = 5$ nfw. .	<b>A2</b>	<b>A1</b> for either $x = -2$ or $y = 5$ nfw. . After A0, <b>C1</b> for a pair of values that satisfies either original equation.
13(a)	Correct line	1	
13(b)	$\frac{7}{15}$ cao	1	
13(c)	240	1	
14(a)	0.106	1	
14(b)	5.678 to 5.68[0]	1	
14(c)	3180	1	
15(a)	$5 - 6t$	1	
15(b)	$\frac{4x^2}{3y}$ or $\frac{4x^2y^{-1}}{3}$	2	<b>C1</b> for two of $\frac{4}{3}$ , $x^2$ , denominator $y$ (or $y^{-1}$ in numerator) correct. or <b>B1</b> for $8x^6y^3$

Question	Answer	Marks	Partial Marks
16(a)	( 5, 3 )	1	
16(b)	164 nfw	2	<b>M1</b> for $[0 - 10]^2 + [7 - (-1)]^2$ or for $[10 - 0]^2 + [-1 - 7]^2$
17(a)	Correct curve from (4, 77) to (6, 90) via (5, 87)	1	
17(b)(i)	2.8	1	
17(b)(ii)	67 or 68	1	
18(a)	14	1	
18(b)	36	1	
18(c)	72 nfw; or FT 90 – their(b)/2 nfw	2	<b>B1</b> for angle $OB2 = 18^\circ$ , where $B$ is the bottom point. or <b>M1</b> for correct angle clearly identified.
19(a)	$5a ( 5a - 1 )$	1	
19(b)	$( 3b - 4 )( 3b + 4 )$	1	
19(c)	$( 2x + 3 )( 2y + t )$	2	<b>B1</b> for one of the partial factorisations: $2y(2x + 3)$ ; $t(2x + 3)$ ; $2x(2y + t)$ ; $3(2y + t)$
20(a)	Acceptable quadrilateral with visible arcs	1	
20(b)(i)	Acceptable bisector of angle $ABC$	1	
20(b)(ii)	Acceptable perpendicular bisector of $BC$	1	
20(c)	Acceptable $PQ$ – dep. on correct types of loci in (b).	1	
21(a)	( 18, 6 )	1	
21(b)	Both $y > 6$ and $y < \frac{x}{3}$	1	
21(c)	$h = 22$ and $k = 7$	2	<b>C1</b> for one correct
22(a)	$\frac{v}{10}$ oe	1	
22(b)	20 nfw	3	<b>M1</b> for $\frac{1}{2} \times (40 + 80) \times v$ oe or <b>B1</b> for two of $15v$ , $40v$ , $5v$ . <b>M1</b> for <i>their</i> $60v = \text{their}(1200)$

Question	Answer	Marks	Partial Marks
23(a)		1	
23(b)(i)	4	1	
23(b)(ii)	$\frac{1}{-1}, \frac{1}{1}, \frac{1}{2}, \frac{4}{-1}, \frac{4}{1}, \frac{4}{2}$ oe and isw	2	C1 for 4 or 5 correct members
24(a)	$6a + 2b$ oe	1	
24(b)(i)	3	1	
24(b)(ii)(a)	$3b$ ; or FT $kb$	1	
24(b)(ii)(b)	$-3a$	1	
25(a)	11, 36	1	
25(b)(i)	$2N + 1$	1	
25(b)(ii)	$(N + 1)^2$ oe	1	
25(c)	169	2	B1 for their <b>(b)(i)</b> = 25; or for $N = 12$
26(a)	$\begin{pmatrix} -6 & -6 \\ 3 & 3 \end{pmatrix}$ oe	2	C1 for 2 or 3 correct elements; or for 3 or 4 correct elements of $\begin{pmatrix} 6 & 2 \\ -1 & 3 \end{pmatrix}$ or B1 for the correct matrix in the Wkg. and simplified, incorrectly, to give the response in the Ans.Space.
26(b)	$\begin{pmatrix} -2 & -6 \\ 3 & 7 \end{pmatrix}$	2	C1 for 2 or 3 correct elements
26(c)	$\frac{1}{2}$ ; or 0.5 ; only	1	