



MATHEMATICS (US)

0444/21

Paper 2 (Extended)

May/June 2017

MARK SCHEME

Maximum Mark: 70

Published

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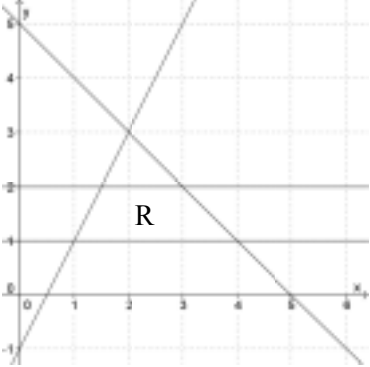
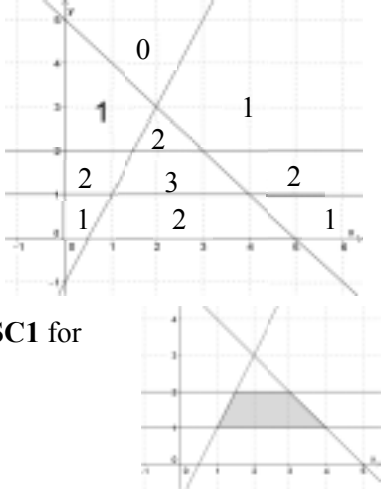
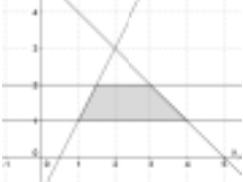
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This document consists of **5** printed pages.

Abbreviations

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

Question	Answer	Marks	Part marks				
1	x^{10}	1					
2	4	1					
3(a)	23.46 cao	1					
3(b)	20 cao	1					
4(a)	Chicago	1					
4(b)	-3	1					
5	$4n(3n - m)$ final answer	2	B1 for $4(3n^2 - mn)$ or $n(12n - 4m)$ or $2n(6n - 2m)$ or $2(6n^2 - 2mn)$				
6(a)	-4	1					
6(b)	$\frac{1}{5}$ or 0.2	1					
7	$2\frac{8}{21}$ cao	3	M2 for $\frac{50}{21}$ or $1\frac{8}{21}$ or $\frac{29}{21}$ or $1\frac{29}{21}$ or M1 for $\frac{14k(\text{or } 35k)}{21k} + \frac{15k}{21k}$				
8	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">rt</td> </tr> <tr> <td style="text-align: center;">$(1 - t)r$</td> </tr> <tr> <td style="text-align: center;">$(1 - r)t$ oe</td> </tr> <tr> <td style="text-align: center;">$(1 - r)(1 - t)$ oe</td> </tr> </table>	rt	$(1 - t)r$	$(1 - r)t$ oe	$(1 - r)(1 - t)$ oe	3	B1 for each
rt							
$(1 - t)r$							
$(1 - r)t$ oe							
$(1 - r)(1 - t)$ oe							
9	1.5 oe	3	M1 for $h = k\sqrt{p}$ oe M1 for $h = \text{their } k\sqrt{p}$ or M2 for $\frac{6}{\sqrt{4}} = \frac{h}{\sqrt{\frac{1}{4}}}$ oe				

Question	Answer	Marks	Part marks
10	Correct region identified 	3	 SC1 for 
11	60	3	M2 for $75 \div \sqrt[3]{\frac{125}{64}}$ or $75 \times \sqrt[3]{\frac{64}{125}}$ or M1 for $\sqrt[3]{\frac{125}{64}}$ soi or $\sqrt[3]{\frac{64}{125}}$ soi or $\left(\frac{h}{75}\right)^3 = \frac{64}{125}$ oe
12	$k - 3$ or $-3 + k$	3	M1 for $5 = \frac{23 - 8}{k - x}$ oe M1 for $5(k - x) = 23 - 8$ or better e.g. $[x =]k - \frac{23 - 8}{5}$
13	3.75 or $3\frac{3}{4}$ or $\frac{15}{4}$	3	M2 for $5 \times \frac{3}{4}$ or M1 for $\frac{4}{3} = \frac{5}{BC}$ oe
14	165	3	M2 for $\frac{360}{8} + \frac{360}{3}$ oe or M1 for [exterior angle of octagon =] $\frac{360}{8}$ or [exterior angle of triangle =] $\frac{360}{3}$ oe
15(a)	$7\sqrt{5}$	2	B1 for $2\sqrt{5}$ or $5\sqrt{5}$
15(b)	$14 + 4\sqrt{6}$ oe final answer	2	B1 for 3 correct from $(\sqrt{2})^2 + \sqrt{2} \times 2\sqrt{3} + \sqrt{2} \times 2\sqrt{3} + (2\sqrt{3})^2$ or better

Question	Answer	Marks	Part marks										
16(a)	Points plotted at (4.5, 33) and (6.5, 35)	1											
16(b)	Positive	1											
16(c)	Correct ruled line	1											
16(d)	33.5 to 37.5	1FT	FT from <i>their</i> line provided positive gradient										
17(a)	[amplitude =] $\frac{1}{2}$ [period =] 1080	2	B1 for each or SC1 for answers reversed										
17(b)	[u =] -3 [v =] 5	2	M1 for $(x-2)^2 + (x-2) + 3$ or better If zero scored, SC1 for $u = 5$ and $v = 9$										
18(a)	2a + b	1											
18(b)	D	1											
18(c)	\overrightarrow{CF} and \overrightarrow{BG}	2	B1 for each										
19	[p =] $\frac{100}{3}$ oe [q =] -50	4	M3 for $2 \times \left\{ \left(\frac{60}{360} \times \pi \times 10^2 \right) - \left(\frac{1}{2} \times 10^2 \times \sin 60 \right) \right\}$ or M2 for $\left[\frac{1}{2} \times \right] 10^2 \times \sin 60$ and $[2 \times] \frac{60}{360} \times \pi \times 10^2$ or M1 for $\left[\frac{1}{2} \times \right] 10^2 \times \sin 60$ or $[2 \times] \frac{60}{360} \times \pi \times 10^2$ or $\sin 60 = \frac{\sqrt{3}}{2}$										
20(a)	<table border="1" style="display: inline-table; vertical-align: middle;"> <tbody> <tr> <td>5</td> <td>7</td> <td>7</td> <td>8</td> <td>10</td> </tr> <tr> <td>7</td> <td>9</td> <td>9</td> <td>10</td> <td>12</td> </tr> </tbody> </table>	5	7	7	8	10	7	9	9	10	12	1	
5	7	7	8	10									
7	9	9	10	12									
20(b)	7	1											
20(c)(i)	$\frac{7}{25}$ or 0.28 or 28%	2FT	FT $\frac{\text{their } 7}{25}$ B1 for $\frac{k}{25}$ If zero scored, SC1 for $\frac{2}{5}$ or $\frac{6}{15}$ if no values in the bottom two rows of the table										
20(c)(ii)	0	1FT	FT $\frac{\text{their } 0}{25}$										

Question	Answer	Marks	Part marks
21(a)	[u =] 35	1	
	[v =] 110	2	B1 for ACB or $ADB = 35$
21(b)	75	2	B1 for 150 or M1 for $\frac{360 - 210}{2}$
22(a)	$\frac{x}{x+3}$ final answer	3	B1 for $x(x-3)$ B1 for $(x-3)(x+3)$
22(b)	$\frac{8x+7}{(x-4)(2x+5)}$ final answer	3	B1 for common denominator of $(x-4)(2x+5)$ M1 for $3(2x+5) + 2(x-4)$ oe with an attempt to expand the brackets