

SULIT
3472/1
Additional
Mathematics
Paper 1
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2009

ADDITIONAL MATHEMATICS

Paper 1

MARKING SCHEME

This marking scheme consists of 7 printed pages

PAPER 1 MARKING SCHEME

3472/1

Number	Solution and marking scheme	Sub Marks	Full Marks
1 (a)	4	1	2
(b)	One to many relation	1	
2 (a)	$4x^2 + 20x + 21$ $(2x+5)^2 - 4$	2 B1	3
(b)	-3	1	
3 (a)	$\frac{5x-2}{3}$ $y = \frac{3x+2}{5}$	2 B1	3
(b)	$\frac{11}{5}$	1	
4	$p < \frac{49}{8}$ $49 - 8p > 0$ $(-5)^2 - 4(2)(p - 3) > 0$	3 B2 B1	3
5	$x^2 + 4x - 18 = 0$ $3\alpha + 3\beta = -4$ or $3\alpha(3\beta) = -18$ $\alpha + \beta = -\frac{4}{3}$ and $\alpha\beta = -2$	3 B2 B1	3

Number	Solution and marking scheme	Sub Marks	Full Marks
6 (a) (b) (c)	5 13 $x = 3$	1 1 1	3
7	$x \leq -1, x \geq 2$ $(x-2)(x+1) \geq 0$ $x^2 - x - 2 \geq 0$	3 B2 B1	3
8	$x = -\frac{5}{3}$ $2x + 5 = -x$ $3^3 \times 3^{2(x+1)} = 3^{-x}$ or $3^{3+2x+2} = 3^{-x}$	3 B2 B1	3
9	$x = 1$ $\frac{x+3}{3x-1} = 2$ or IE $\log_2 \frac{x+3}{3x-1} = 1$ or IE	3 B2 B1	3
10 (a) (b)	21 $d = \frac{3}{2}[7(2)^2 - 3(2)] - 2 \times \frac{1}{2}[7(1)^2 - 3(1)]$ or IE 216	2 B1 1	3
11	$\frac{7}{33}$ $\frac{0.21}{1-0.01}$ $a = 0.21$ and $r = 0.01$	3 B2 B1	3

Number	Solution and marking scheme	Sub Marks	Full Marks
12	$r = 2$ $q = -6$ $\frac{y}{x} = x + 3^*$ $p = 3$	B1 B1 B1 B1	4
13	$M(1, 5)$ $M\left(\frac{3(-3)+2(7)}{3+2}, \frac{3(3)+2(8)}{3+2}\right)$ $AM : BM = 2 : 3$	3 B2 B1	3
14	$a = -\frac{4}{b}$ $-a \times \left(-\frac{b}{4}\right) = -1$ $m_1 = -a$ or $m_2 = -\frac{b}{4}$	3 B2 B1	3
15 (a)	$-3\underline{u} - 4\underline{v}$ $-\frac{5}{3}(6\underline{v}) - 3\underline{u} + 6\underline{v}$ or Use TL	2 B1	4
(b)	$-3\underline{u} + \underline{v}$ $\frac{1}{2}\left(\frac{5}{3}\right)6\underline{v} + (-3\underline{u} - 4\underline{v})$ or Use TL	2 B1	
16 a)	$\overline{PQ} = 12\underline{i} - 5\underline{j}$	1	
b)	$\frac{24\underline{i} - 10\underline{j}}{13}$ $\frac{12\underline{i} - 5\underline{j}}{13}$ or $2 \times \frac{12\underline{i} - 5\underline{j}}{13}$	2 B1	3

Number	Solution and marking scheme	Sub Marks	Full Marks
17	$210^\circ, 270^\circ, 330^\circ$ $\sin \theta = -\frac{1}{2}$ and $\sin \theta = -1$ $(2 \sin x + 1)(\sin x + 1) = 0$ $2 \sin^2 x + 3 \sin x + 1 = 0$	4 B3 B2 B1	4
18 (a) (b)	4.8 cm 8×0.6 81.33 $\frac{1}{2}(8)^2(\pi - 0.6)$ or $\pi - 0.6$	2 B1 2 B1	4
19	$\left(\frac{3}{4}, \frac{151}{16}\right)$ $2x - \frac{3}{2} = 0$ or $x = \frac{3}{4}$ $\frac{dy}{dx} = 2x - \frac{3}{2}$	3 B2 B1	3
20	$\frac{dx}{dt} = -10$ $10 = \left(3 - \frac{16}{x^2}\right) \cdot \frac{dx}{dt}$ $\frac{dy}{dx} = 3 - \frac{16}{x^2}$	3 B2 B1	3

Number	Solution and marking scheme	Sub Marks	Full Marks
21 (a)	-6	1	3
(b)	$\frac{16}{27}$	2	
	$2 + \left[\frac{kx^2}{2} \right]_3^6 = 10$	B1	
22	Mean = 13 AND Standard deviation = 8	3	3
	Mean = 13 AND Variance (new) = 64	B2	
	Mean = 13 OR Variance (new) = 64	B1	
23 (a)	$\frac{7}{20}$	1	3
(b)	$\frac{29}{60}$	2	
	$\left(\frac{2}{5} \times \frac{7}{12} \right) + \left(\frac{3}{5} \times \frac{5}{12} \right)$	B1	
24 (a)	336	2	4
	8P_3	B1	
(b)	30 240	2	
	${}^8C_3 \times {}^{10}C_2 \times {}^{12}C_1$	B1	
25 (a)	0.2266	2	4
	$P \left[Z \geq \frac{128-125}{4} \right]$ OR $P[Z \geq 0.75]$	B1	

Number	Solution and marking scheme	Sub Marks	Full Marks
(b)	127.1 $P\left[Z \geq \frac{m-125}{4}\right] = 0.3 \quad \text{OR} \quad \frac{m-125}{4} = 0.524$	2 B1	