

## SKEMA JUJ SET 2 2014

No.		Solution and Mark Scheme	Sub Marks	Total Marks
1	(a)	-2, 0	1	2
	(b)	one to many	1	
2	(a)	6	1	4
	(b)	$-\frac{1}{2}$	3	
		$g^{-1}(1) = \frac{-1}{3-1}$ $g^{-1}(x) = \frac{-x}{3-x}$	B2 B1	
3	(a)	$4 - 2x^2$	2	4
	(b)	$f^{-1}(x) = 3 - x$ $x = -\frac{1}{2}, 1$ $2x^2 - 1 = x$	B1 2 B1	
4		$k = 3, 1$ $(k - 3)(k - 1) = 0$ $(2k)^2 - 4(1)(4k - 3) = 0$	3 B2 B1	3
5	(a)	$h = 3$	1	4
	(b)	$k = 5$	1	
	(c)	$m = \frac{1}{3}$ $8 = m(0 - 3)^2 + 5$	2 B1	
6		$-1 \leq x \leq \frac{1}{2}$ $(2x - 1)(x + 1) \leq 0$ $2x^2 + x - 1 \leq 0$	3 B2 B1	3

7	$x = -\frac{2}{3}$ $3x + 1 = -1$ $4^{3x+1} = 4^{-1} \text{ or } 4^{3x+1} = \frac{1}{4}$	3 B2 B1	3
8	$x = 62$ $\frac{8x - 1}{x - 7} = 9$ $\log_3 \frac{8x - 1}{x - 7} = 2$	3 B2 B1	3
9 (a) (b)	$d = -3$ $S_{10} = 10y + 75$ $a = y + 21$	1 2 B1	3
10	$r = \frac{1}{2}$ $32 = 64 - 64r$ $\frac{32}{1 - r} = 64$	3 B2 B1	3
11 (a) (b)	$k = -4$ $\text{gradient, } m = 2$ $\text{Midpoint, } (0, 5)$	2 B1 1	3
12	$x^2 + y^2 - 10x - 12y + 21 = 0$ $(x - 1)^2 + (y + 6)^2 = 4((x - 4)^2 + (y - 3)^2)$ $PA = 2PB$	3 B2 B1	3
13	$ 2u + 3v  = 10$ $2u + 3v = 6i + 8j$	2 B1	2

14	(a)	$k = 5, 1$	2	
	(b)	$\mu = \frac{k+1}{3}$ $PQ:RS = 2:1$ $\mu = \frac{5+1}{3} = 2$	B1 2 B1	4
15	(a)	<i>Interquartile range</i> , $84 - 68 = 16$	1	
	(b)	58 <i>New mean</i> $72 - 2 = 70$ $\frac{40 + 68 + 72 + 78 + 84 + 90}{6}$	3 B2 B1	4
16		$k = 2, h = 1$ $k = 2$ or $h = 1$ $\log_3 y = k \log_3 x + 1$	3 B2 B1	3
17		$p = 4, q = \frac{1}{4}$ $p = 4$ , or $q = \frac{1}{4}$ $4p(px + 1)^3 = 16\left(\frac{x}{q} + 1\right)^3$	3 B2 B1	3
18	(a)	$k = 3$	3	
	(b)	34 $2(5)^2 - 2(2)^2 - 8$ or $[2x^2]_2^5 - 8$	2 B1	3
19		$2y = x^2 + 6x - 3$ OR $y = \frac{x^2}{2} + 3x - \frac{3}{2}$ $c = -\frac{3}{2}$ or $2 = \frac{(1)^2}{2} + 3(1) + c$ $y = \frac{x^2}{2} + 3x + c$	3 B2 B1	3

20	(a)	$\frac{1}{h}$	1	
	(b)	$2h\sqrt{1-h^2}$ $2 \sin 40^\circ \cos 40^\circ$ or $\sin 2(40^\circ)$	2 B1	3
21		$x = 120^\circ, 150^\circ, 300^\circ, 330^\circ$ $2x = 240^\circ, 300^\circ, 600^\circ, 660^\circ$ $\sin 2x = -\frac{\sqrt{3}}{2}$ $2(\sin 2x) = -\sqrt{3}$	4 B3 B2 B1	4
22	(a)	1.287 rad	1	
	(b)	16.35 cm <sup>2</sup> $A = \frac{1}{2}(10)^2(1.287) - \frac{1}{2}(12)(8)$	2 B1	3
23	(a)	700 ${}^8C_4 \times {}^5C_3$	2 B1	
	(b)	60 ${}^6C_4 \times {}^4C_3$	2 B1	4
24		$\frac{8}{15}$ $\frac{4}{10} \times \frac{6}{9} + \frac{6}{10} \times \frac{4}{9}$ $\frac{4}{10} \times \frac{6}{9}$ or $\frac{6}{10} \times \frac{4}{9}$	3 B2 B1	3
25		0.6826 ${}^5C_3 \times 0.6^3 \times 0.4^2 + {}^5C_4 \cdot 0.6^4 \times 0.4 + {}^5C_5 \cdot 0.6^5 \times 0.4^0$ $P(X > 2) = P(X = 3) + P(X = 4) + P(X = 5)$	3 B2 B1	3