LOGS AND SURDS-SET-1

1

(a) Write as a single logarithm.

$$\log 6 + \log 3 - \log 2$$

Answer (a) ..... [1]

(b) Simplify.

$$\sqrt{98} - \sqrt{50} + \sqrt{8}$$

Answer (b) ..... [2]

MS-1

(a)	$\log 9$	**B1**	Accept $2 \log 3$
(b)	$4\sqrt{2}$ or $2\sqrt{8}$ or $\sqrt{32}$	**B2**	**B1** for two of $7\sqrt{2}$ or $5\sqrt{2}$ or $2\sqrt{2}$ seen

[3]

2

(a) $3\log 2 + 2\log 3 = \log k$

Find the value of k.

Answer(a) $k =$ ..... [2]

(b) Find the value of $\dfrac{\log 25}{\log 5}$.

Answer(b) ..... [1]

MS-2

(a)	72	B2	If B0 award M1 for $\log(2^3 \times 3^2)$ or $\log 2^3 + \log 3^2$ or better seen e.g. log72
(b)	2	B1	[3]

3

Simplify.

(a) $\log 9 + 3 \log 2 - 2 \log 6$

Answer(a) ..... [3]

(b) $\left(\frac{81}{16}\right)^{-\frac{3}{4}}$

Answer(b) ..... [2]

MS-3

(a)	For correct use of $n\log a = \log a^n$	M1	E.g. $\log 2^3$ or $\log 8$ or $\log 6^2$ or $\log 36$.
	For correct use $\log a + \log b = \log ab$ **or** $\log a - \log b = \log \frac{a}{b}$	M1	Using their figures
	$\log 2$ www3	A1	
(b)	$\frac{8}{27}$ or $\left(\frac{2}{3}\right)^3$ Final Answer	B2	If B0 give B1 for answers with numerator 8 or denominator 27 **OR** SC1 for answers of $\frac{27}{8}$ or $\frac{1}{(27/8)}$ or $\left(\frac{3}{2}\right)^{\pm 3}$ **[5]**

4

(a) Find the value of $\log_2 8$.

Answer(a) ..... [1]

(b) Write the following as a single logarithm.

$3\log 2 - \log 4 + 2\log 5$

Answer(b) ..... [3]

MS-4

(a)	3	B1	
(b)	For correct use of $n\log a = \log a^n$ For correct use of $\log a + \log b = \log ab$ or	M1	E.g. $\log 2^3$, $\log 8$, $\log 5^2$, $\log 25$
	$\log a - \log b = \log \frac{a}{b}$	M1	Using their figures
	$\log 50$ www3	A1	**[4]**

5

(a) Write as a single logarithm.

$$\log 3 + \log 4 - \log 2$$

Answer(a) ..... [1]

(b) Make x the subject of $y = \log_3 x$.

Answer(b) $x =$ ..... [1]

(c) Simplify completely.

$$\frac{\sqrt{27}}{\sqrt{3}}$$

Answer(c) ..... [1]

MS-5

(a)	log 6	**1**		
(b)	3^y	**1**		
(c)	3	**1**	Accept ±3 or –3	**[3]**

6

(a) Write $2\log(x+1) - \log(x-1)$ as a single logarithm.

Answer(a) ..... [2]

(b) $\log_3 p = 4$ where p is an integer.

Find the value of p.

Answer(b) $p =$ ..... [2]

MS-6

(a)	$\log\left(\frac{(x+1)^2}{x-1}\right)$	**2**	**M1** for $\log(x+1)^2$ or $\log\left(\frac{1}{x-1}\right)$
(b)	81	**2**	**M1** for $p = 3^4$

7

Solve.

$$\log x + \log 5 - \log 25 = \log 10$$

Answer $x =$ ..... [3]

MS-7

	50	**3**	**M2** for $\left[\log\right]\left(\frac{5x}{25}\right)=\left[\log\right]10$ oe or **M1** for a correct use of logs

8

Solve the following equations.

(a) $\log x + \log 3 = \log 12$

Answer(a) $x =$ ..... [1]

(b) $\log x = 3$

Answer(b) $x =$ ..... [1]

(c) $2\log x - \log 5 = \log 20$

Answer(c) $x =$ ..... [3]

MS-8

(a)	4	**1**	
(b)	1000	**1**	
(c)	10	**3**	**M1** for correct use of a $a\log x = \log a^x$ **M1** for correct use of $\log a + \log b = \log ab$ or $\log a - \log b = \log\frac{a}{b}$

9

(a) Find $\log_5 \frac{1}{25}$.

Answer(a) ..... [1]

(b) Find x when

(i) $\log x - \log 2 = \log 6$,

Answer(b)(i) ..... [1]

(ii) $\log_x 4 = \frac{1}{2}$.

Answer(b)(ii) ..... [1]

MS-9

(a)	–2	**1**	
(b) **(i)**	12	**1**	
(ii)	16	**1**	

10

$$\log y = 2\log 3 + 3\log 2 - \log 6$$

Find the value of y.

$y =$ ..... [3]

MS-10

	12	**3**	**B1** for $2\log 3 = \log 9$ or $3\log 2 = \log 8$ and **M1** for correct use of $\log a + \log b = \log ab$ or $\log a - \log b = \log\left(\frac{a}{b}\right)$

11	Simplify. $2\log 3 - 3\log 2 + 2\log\frac{2}{3}$ ..... [3]
MS-11	$\log\frac{1}{2}$ or $-\log 2$ final answer **3** **M2** for $\log\left(\frac{3^2}{2^3}\times\left(\frac{2}{3}\right)^2\right)$ or better or **M1** for one correct use of log rules.