

SURDS-SET-2

1

Simplify $(5 + \sqrt{3})^2$.

Answer [2]

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TABLE 1

	$28 + 10\sqrt{3}$ or $2(14 + 5\sqrt{3})$ final answer
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2

M1 for $25 + 5\sqrt{3} + 5\sqrt{3} + \sqrt{3} \times \sqrt{3}$ or better

2

(a) Simplify.

$$\sqrt{3}(4\sqrt{12} - 7\sqrt{3})$$

..... [2]

..... [2]

MS-2

(a)	3
(b)	$3 + \sqrt{2}$ final answer

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2
2

B1 for $4\sqrt{36}$ oe or $7\sqrt{9}$ oe soi

2	
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M1 for $\times \frac{3+\sqrt{2}}{3+\sqrt{2}}$
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3	By rationalising the denominator, simplify $\frac{12}{\sqrt{6}-2}$ [3]		
MS-3	$6\sqrt{6}+12$ or $6(\sqrt{6}+2)$	3	M2 for $\frac{12(\sqrt{6}+2)}{6-4}$ or better or M1 for $\frac{\sqrt{6}+2}{\sqrt{6}+2}$ oe seen
4	(a) Simplify. $(4-\sqrt{3})(4+\sqrt{3})$ [2] (b) Rationalise the denominator. $\frac{5}{\sqrt{7}}$ [1]		
MS-4	(a) 13 (b) $\frac{5\sqrt{7}}{7}$	2 1	M1 for $4^2-(\sqrt{3})^2$ or better or for three of the terms of $16+4\sqrt{3}-4\sqrt{3}-3$ correct

5	(a) Simplify fully. $\sqrt{700}$ [1] (b) Rationalise the denominator. $\frac{1}{7-\sqrt{2}}$ [2]			
MS-5	(a)	$10\sqrt{7}$	1	
	(b)	$\frac{7+\sqrt{2}}{47}$	2	M1 for $\frac{7+\sqrt{2}}{7+\sqrt{2}}$
6	Simplify. $\sqrt{75} - \sqrt{12} + \sqrt{27}$ [2]			
MS-6		$6\sqrt{3}$	2	M1 for $5\sqrt{3}$ or $2\sqrt{3}$ or $3\sqrt{3}$

7	Rationalise the denominator and simplify. $\frac{14\sqrt{2}}{3+\sqrt{2}}$ [3]		
MS-7	$6\sqrt{2} - 4$ or $2(3\sqrt{2} - 2)$ final answer	3	M1 for $\times \frac{3 - \sqrt{2}}{3 - \sqrt{2}}$ B1 for $(3 + \sqrt{2})(3 - \sqrt{2}) = 7$
8	(a) Simplify $\sqrt{75}$. Answer(a) [2] (b) Find the value of $\log_{10}1000$. Answer(b) [1]		
MS-8	(a) $5\sqrt{3}$ (b) 3	B2 B1	Award M1 for evidence of $\sqrt{25 \times 3}$ [3]

9	(a) Simplify $\sqrt{72}$. <i>Answer(a)</i> [1] (b) $\frac{\sqrt{2}+2}{\sqrt{2}-1} = p+q\sqrt{2}$ Find the values of p and q. <i>Answer(b)</i> $p =$ $q =$ [3]								
MS-9	<table><tr><td>(a)</td><td>$6\sqrt{2}$</td><td>1</td><td></td></tr><tr><td>(b)</td><td>4, 3</td><td>3</td><td>M1 for $\times \frac{\sqrt{2}+1}{\sqrt{2}-1}$ or $\sqrt{2}+2 = (p+q\sqrt{2})(\sqrt{2}-1)$ A1 for 4, A1 for 3</td></tr></table>	(a)	$6\sqrt{2}$	1		(b)	4, 3	3	M1 for $\times \frac{\sqrt{2}+1}{\sqrt{2}-1}$ or $\sqrt{2}+2 = (p+q\sqrt{2})(\sqrt{2}-1)$ A1 for 4, A1 for 3
(a)	$6\sqrt{2}$	1							
(b)	4, 3	3	M1 for $\times \frac{\sqrt{2}+1}{\sqrt{2}-1}$ or $\sqrt{2}+2 = (p+q\sqrt{2})(\sqrt{2}-1)$ A1 for 4, A1 for 3						
10	Simplify $\sqrt{75} - \sqrt{27}$. <i>Answer</i> [2]								
MS-10	<table><tr><td></td><td>$2\sqrt{3}$</td><td>2</td><td>B1 for $5\sqrt{3}$ or $3\sqrt{3}$ or M1 for $\sqrt{25} \times \sqrt{3} - \sqrt{9} \times \sqrt{3}$</td></tr></table>		$2\sqrt{3}$	2	B1 for $5\sqrt{3}$ or $3\sqrt{3}$ or M1 for $\sqrt{25} \times \sqrt{3} - \sqrt{9} \times \sqrt{3}$				
	$2\sqrt{3}$	2	B1 for $5\sqrt{3}$ or $3\sqrt{3}$ or M1 for $\sqrt{25} \times \sqrt{3} - \sqrt{9} \times \sqrt{3}$						

11	(a) Simplify $\sqrt{125}$. <i>Answer(a)</i> [1] (b) Simplify $\frac{1}{\sqrt{6}-\sqrt{3}}$ by rationalising the denominator. <i>Answer(b)</i> [2]			
MS-11	(a)	$5\sqrt{5}$	1	
	(b)	$\frac{\sqrt{6}+\sqrt{3}}{3}$ o.e.	2	M1 for intention to $\times \frac{\sqrt{6}+\sqrt{3}}{\sqrt{6}+\sqrt{3}}$