

Surds Past Paper Answers Edexcel – None Calculator

1.

(a)	$5\sqrt{9 \times 3}$	$15\sqrt{3}$	2	M1 for sight of $\sqrt{9 \times 3}$ or $\sqrt{9} \sqrt{3}$ or $3\sqrt{3}$ A1 for $15\sqrt{3}$ (accept $n = 15$)
(b)		$7\sqrt{3}$	2	M1 for $\frac{21\sqrt{3}}{\sqrt{3}\sqrt{3}}$ A1 for $7\sqrt{3}$ (accept $\frac{21\sqrt{3}}{3}$)

2.

(b)	$\frac{12}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}} = \frac{12\sqrt{6}}{6}$	$2\sqrt{6}$	2	M1 for multiplying numerator and denominator by $\sqrt{6}$ A1 for $2\sqrt{6}$ (accept $\frac{2\sqrt{6}}{1}$)
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3.

		$30 - 10\sqrt{5}$	2	M1 for 4 terms correct with or without signs or 3 out of exactly 4 terms correct (the terms may be in an expression or table) or $25 - 10\sqrt{5} + 5$ A1 cao
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4.

	$\frac{\sqrt{3}}{5} + \frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$ $= \frac{3\sqrt{3}}{15} + \frac{10\sqrt{3}}{15}$; $\frac{\sqrt{3}\sqrt{3} + 10}{3\sqrt{3}} = \frac{13\sqrt{3}}{5\sqrt{3}\sqrt{3}}$	$\frac{13}{15}$	3	M1 for rationalising a denominator M1 for finding same denominator (dep M1 or with $\sqrt{3}$) A1 oe Accept $\frac{13}{15}\sqrt{3}$
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5.

Question	Working	Answer	Mark	Notes
(a)	$\frac{15}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$	$3\sqrt{5}$	2	M1 for $\frac{15}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$ A1 for $\frac{15\sqrt{5}}{5}$ or better
(b)	$(1 + \sqrt{3})(1 + \sqrt{3})$ $= 1 + \sqrt{3} + \sqrt{3} + 3$ $= 4 + 2\sqrt{3}$	4, 2	2	M1 for $1 \times 1 + 1 \times \sqrt{3} + 1 \times \sqrt{3} + \sqrt{3} \times \sqrt{3}$ oe A1 cao

6.

		1	3	<p>M1 $(\sqrt{5})^2 - 1$ or $\sqrt{25} - 1$ or $\sqrt{5} \times \sqrt{5} - \sqrt{5} + \sqrt{5} - 1$ or $\sqrt{25} - \sqrt{5} + \sqrt{5} - 1$</p> <p>M1 (indep) use of $(\sqrt{5})^2 = 5$ or $\sqrt{5} \times \sqrt{5} = 5$ A1 cao</p>
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7.

$6 \times 6 + 6 \times \sqrt{5} - 6 \times \sqrt{5} - \sqrt{5}$ $\times \sqrt{5}$ $\frac{31}{\sqrt{31}} \times \frac{\sqrt{31}}{\sqrt{31}}$	$\sqrt{31}$		3	<p>M1 for $6 \times 6 + 6 \times \sqrt{5} - 6 \times \sqrt{5} - \sqrt{5} \times \sqrt{5}$ or $6^2 - (\sqrt{5})^2$ (for 3 out of not more than 4 terms including signs or 4 terms correct ignoring signs)</p> <p>M1 $\frac{31}{\sqrt{31}} \times \frac{\sqrt{31}}{\sqrt{31}}$ or for [expression in surd form] $\times \frac{\sqrt{31}}{\sqrt{31}}$ A1 cao</p>
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8.

		$2\sqrt{7}$	3	<p>M1 for multiplying numerator and denominator by $\sqrt{7}$ M1 for correct method to expand $(4 + \sqrt{2})(4 - \sqrt{2})$ with 3 out of no more than 4 terms correct with correct signs or the 4 terms seen, ignoring signs A1 for $2\sqrt{7}$ (accept $\sqrt{28}$)</p>
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