

TAKE 10 ... SIMPLIFICATION OF SURDS

Q1.

$\sqrt{75} = \sqrt{25} \sqrt{3}$	$5\sqrt{3}$	2	M1 for $\sqrt{25 \times 3}$ or $\sqrt{25} \sqrt{3}$ oe A1 cao
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Q2.

Question	Working	Answer	Mark	Notes
(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 $\frac{21\sqrt{3}}{3}$)

Q3.

PAPER: IMA0_1H				
Question	Working	Answer	Mark	Notes
	$3 - \sqrt{2} + 3\sqrt{2} - \sqrt{2}\sqrt{2}$	$1 + 2\sqrt{2}$	2	M1 for 4 terms correct ignoring signs or 3 out of no more than 4 terms correct A1 cao

Q4.

(b)		$\sqrt{5} + 29$	2	M1 expand brackets, with at least 3 correct terms including signs or 4 correct terms ignoring signs eg $2\sqrt{5} \times 3\sqrt{5} - 2\sqrt{5} + 3\sqrt{5} - 1 \times 1$ A1 for $\sqrt{5} + 29$ or $29 + \sqrt{5}$
(c)		$\sqrt{3}$	2	M1 for $\frac{6}{\sqrt{12}} \times \frac{\sqrt{12}}{\sqrt{12}}$ oe or $\sqrt{12} = 2\sqrt{3}$ A1 cao

Q5.

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

Q6.

Question	Working	Answer	Mark	Notes
		$\frac{1}{4} - \frac{\sqrt{6}}{12}$	3	M1 for $\frac{1}{2} \times \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2}$ or $\frac{1}{2} \times \frac{\sqrt{2}}{2} \times \frac{\sqrt{3}}{3}$ M1 for $\frac{1}{2} \times \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} - \frac{1}{2} \times \frac{\sqrt{2}}{2} \times \frac{\sqrt{3}}{3}$ A1 for $\frac{1}{4} - \frac{\sqrt{6}}{12}$ oe OR M1 for (BC \Rightarrow) $\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{3}$ M1 for $\frac{1}{2} \times \left\{ \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{3} \right\} \times \frac{\sqrt{2}}{2}$ A1 for $\frac{1}{4} - \frac{\sqrt{6}}{12}$ oe

Q7.

5MB2H November 2016					
Question	Working	Answer	Mark	Notes	Type
	$\frac{(\sqrt{5} + \sqrt{5} + 6)}{2} \times (\sqrt{5} - 2)$ $(\sqrt{5} + 3)(\sqrt{5} - 2)$ $5 + 3\sqrt{5} - 2\sqrt{5} - 6$ $\sqrt{5}(\sqrt{5} - 2) + \frac{6(\sqrt{5} - 2)}{2}$ $5 - 2\sqrt{5} + 3\sqrt{5} - 6$	$\sqrt{5} - 1$	3	M1 for $\frac{(\sqrt{5} + \sqrt{5} + 6)}{2} \times (\sqrt{5} - 2)$ M1 for expansion $5 + 3\sqrt{5} - 2\sqrt{5} - 6$ with 3 terms out of 4 correct including signs or all 4 terms correct ignoring signs A1 cao OR M1 for $\sqrt{5}(\sqrt{5} - 2) + \frac{6(\sqrt{5} - 2)}{2}$ M1 for expansion $5 - 2\sqrt{5} + 3\sqrt{5} - 6$ with 3 terms out of 4 correct including signs or all 4 terms correct ignoring signs A1 cao	E

Q8.

PAPER: 5MB2H 01				
Question	Working	Answer	Mark	Notes
		7.5	3	B1 for length given as $\frac{\sqrt{120}}{4}$ oe M1 for squaring $\frac{\sqrt{120}}{4}$ or $\frac{120}{4 \times 4}$ oe A1 for $\frac{120}{16}$ oe or $7\frac{1}{2}$ or 7.5 oe SC B1 for $\sqrt{30} \times \sqrt{30}$

Q9.

Question	Working	Answer	Mark	Notes
		$16\sqrt{2}$	4	M1 for method to expand $(\sqrt{8} + 2)^2$ with at least 3 correct terms out of 4 terms M1 for method to expand $(\sqrt{8} - 2)^2$ with at least 3 correct terms out of 4 terms M1 (dep on M2) for a method to subtract the two expressions and use of $\sqrt{8} = 2\sqrt{2}$ A1 cao OR M1 for factorising $a^2 - b^2 = (a + b)(a - b)$ M1 for substituting for a and b with simplification (at least 1 of the two terms correct) M1 (dep on M2) for multiplying the 2 terms together and use of $\sqrt{8} = 2\sqrt{2}$ A1 cao

Q10.

Question	Working	Answer	Mark	Notes
		$\frac{11-\sqrt{2}}{17}$	3	M1 for intention to multiply numerator and denominator by $(5-\sqrt{8})$ M1 for correct expansion of either $(3+\sqrt{2})(5-\sqrt{8})$ or $(5+\sqrt{8})(5-\sqrt{8})$, at least 3 terms correct or 4 correct terms ignoring signs. A1 for fully correct working leading to $\frac{11-\sqrt{2}}{17}$