Name: _____

IGCSE (9–1) Maths new topics: Rationalising the denominator where the denominator isn’t a pure surd

Date:

Time: 15 minutes

Total marks available: 13

Total marks achieved: _____

Q1. Show that $\frac{\sqrt{12}-1}{2-\sqrt{3}}$ can be written as $4+3\sqrt{3}$.

Show your working clearly.

(Total 4 marks)

[GCSE]

Q2. Show that $\frac{3+\sqrt{2}}{5+\sqrt{8}}$ can be written $\frac{11-\sqrt{2}}{17}$

(Total 3 marks)

[GCSE]

Q3. Show that $\frac{1}{1+\frac{1}{\sqrt{2}}}$ can be written as $2-\sqrt{2}$.

(Total 3 marks)

[GCSE]

Q4. Show that $\frac{4}{\frac{1}{\sqrt{3}}+\sqrt{3}}$ can be written as $\sqrt{3}$

(Total 3 marks)

Mark Scheme

Q1.

Question	Working	Answer	Mark	AO	Notes
	$\frac{(\sqrt{12}-1)(2+\sqrt{3})}{(2-\sqrt{3})(2+\sqrt{3})}$			AO1	M1 method to rationalise
	$\frac{2\sqrt{12}-2+\sqrt{12}\sqrt{3}-\sqrt{3}}{4-3}$				M1 correct expansion of brackets
	$\sqrt{12}=2\sqrt{3}$				B1 may be seen before expansion
		shown	4		A1 answer from fully correct working with all steps seen

Q2.

Mock Paper 1MA1: 1H					
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 ignoring signs or 4 correct terms ignoring signs. A1 for fully correct working leading to $\frac{11-\sqrt{2}}{17}$

Q3.

Paper 1MA1: 1H			
Question	Working	Answer	Notes
		Given result	C1 Correct first step towards simplifying expression eg. $\frac{\sqrt{2}}{\sqrt{2}+1}$ C1 Correct step to rationalise denominator C1 Conclusion to given result

Q4.

Mock Paper 1MA1: 1H					
Question		Answer	AO	Mark	Notes
		$\sqrt{3}$	2.2	C1	first step shown towards simplifying for example, $\frac{4\sqrt{3}}{1+\sqrt{3}\sqrt{3}}$
			2.2	C1	simplifies denominator for example, $\frac{4\sqrt{3}}{1+3}$
			2.2	C1	conclusion to get result