

	Surds and Indices	
1	Express $\sqrt{12} + 5\sqrt{3} - \sqrt{27}$ as a surd in its simplest form	3
2	Express $\frac{8}{\sqrt{2}}$ with a rational denominator in the simplest form	2
3	(a) Simplify $\sqrt{2} \times \sqrt{18}$ (b) Simplify $\sqrt{2} + \sqrt{18}$ (c) Hence show that $\frac{\sqrt{2} \times \sqrt{18}}{\sqrt{2} + \sqrt{18}} = \frac{3\sqrt{2}}{4}$	1 1 2
4	Evaluate (a) $2^0 + 2^{-1}$ (b) $8^{\frac{4}{3}}$	2 2
5	Simplify $\frac{10a^5 \times 3a^4}{6a^2}$	3
6	Simplify $(n^2)^4 \times n^{-10}$ , give your answer with a positive power	3
7	Remove the brackets and simplify $\left(\frac{2}{3}p^5\right)^2$	2
8	Express $p^5(p^3 - p^{-5})$ in its simplest form	2
9	Remove the brackets and simplify. $a^{\frac{1}{2}}\left(a^{\frac{1}{2}} + 3\right)$	2
<b>24 marks</b>		

	Surds and Indices		
1	Mark 1 simplify $\sqrt{12}$ Mark 2 simplify $\sqrt{27}$ Mark 3 state answer in the simplest form	$\sqrt{12} = \sqrt{4}\sqrt{3} = 2\sqrt{3}$ $\sqrt{27} = \sqrt{9}\sqrt{3} = 3\sqrt{3}$ $4\sqrt{3}$	
2	Mark 1 fraction with rational denominator Mark 2 simplify the fraction	$\frac{8\sqrt{2}}{2}$ $4\sqrt{2}$	
3	Mark 1 simplify $\sqrt{2} \times \sqrt{18}$ Mark 2 simplify $\sqrt{2} + \sqrt{18}$ Mark 3 express fraction with rational denominator Mark 4 simplify the fraction	$\sqrt{36} = 6$ $2 + \sqrt{9}\sqrt{2} = 2 + 3\sqrt{2} = 4\sqrt{2}$ $\frac{6}{4\sqrt{2}} = \frac{6\sqrt{2}}{4 \times 2}$ $\frac{6\sqrt{2}}{8} = \frac{3\sqrt{2}}{4}$	
4	Mark 1 evaluation of the zero index Mark 2 evaluate the negative index and find answer Mark 3 interpret the fraction index Mark 4 complete evaluation	$2^0 = 1$ $1 + \frac{1}{2} = 1\frac{1}{2}$ $(\sqrt[3]{8})^4$ $2^4 = 16$	
5	Mark 1 simplify powers in the numerator Mark 2 eliminate $a$ from the denominator Mark 3 simplify constants	$\frac{30a^9}{6a^2}$ $\frac{30a^7}{6}$ $5a^7$	
6	Mark 1 simplify $(n^2)^4$ Mark 2 simplify $n^8 \times n^{-10}$ ark 3 express with a positive power	$n^8$ $n^{-2}$ $\frac{1}{n^2}$	
7	Mark 1 start the process Mark 2 complete the process	$\frac{4}{9}$ or $p^{10}$ $\frac{4}{9}p^{10}$	
8	Mark 1 start to multiply out the brackets Mark 2 complete removal of brackets and simplify	$p^8$ $p^8 - p^0 = p^8 - 1$	2
9	Mark 1 start to multiply out the brackets Mark 2 complete removal of brackets	$a^1$ or $3a^{\frac{1}{2}}$ $a + 3a^{\frac{1}{2}}$	2