Surds Mark Scheme		
1(a)	$\frac{1}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5}}{5}$	[1]
1(b)	$\frac{\sqrt{7}}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{21}}{3}$	[1]
1(c)	$\frac{\sqrt{3}+1}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}} = \times \frac{3\sqrt{2}+\sqrt{6}}{6}$	[1]
1(d)	$\frac{\sqrt{18}+8}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$	[1] Correct choice of multiplication
	$\frac{3\sqrt{6}+8\sqrt{3}}{3}$	[1] Correct simplification with correct answer
2(a)	$\frac{1}{3-\sqrt{2}} \times \frac{3+\sqrt{2}}{3+\sqrt{2}} = \frac{3+\sqrt{2}}{3^2-\left(\sqrt{2}\right)^2}$	[1] Correct choice of multiplication
	$\frac{3+\sqrt{2}}{7}$	[1] Correct answer
2(b)	$\frac{3}{\sqrt{6}+3} \times \frac{-\sqrt{6}+3}{-\sqrt{6}+3}$	[1] Correct choice of multiplication
	$\frac{9-3\sqrt{6}}{-6+9} = \frac{9-3\sqrt{6}}{3} = 3-\sqrt{6}$	[1] Simplifying and correct answer
2(c)	$\frac{10}{\sqrt{7}-6} \times \frac{-\sqrt{7}-6}{-\sqrt{7}-6}$	[1] Correct choice of multiplication
	$\frac{-60-10\sqrt{7}}{-7+36} = \frac{-60-10\sqrt{7}}{29}$	[1] Simplifying and correct answer
3(a)	$\frac{\sqrt{3}+1}{\sqrt{5}+2} \times \frac{-\sqrt{5}+2}{-\sqrt{5}+2} = \frac{-\sqrt{15}-\sqrt{5}+2\sqrt{3}+2}{-5+4}$	[1] Correct choice of multiplication
	$= \sqrt{15}+\sqrt{5}-2\sqrt{3}-2$	[1] Simplifying and correct answer
3(b)	$\frac{3+\sqrt{2}}{\sqrt{6}+3} \times \frac{-\sqrt{6}+3}{-\sqrt{6}+3} = \frac{-3\sqrt{6}+9+3\sqrt{2}-2\sqrt{3}}{-6+9}$	[1] Correct choice of multiplication
	$-\sqrt{6}+3+\sqrt{2}-\frac{2}{3}\sqrt{3}$	[1] Simplifying and correct answer
3(c)	$\frac{\sqrt{21}+7}{\sqrt{21}-7} \times \frac{\sqrt{21}+7}{\sqrt{21}+7}$	[1] Correct choice of multiplication
	$= \frac{\left(\sqrt{21}\right)^2+2\times7\times\sqrt{21}+7^2}{\left(\sqrt{21}\right)^2-7^2} = \frac{70+14\sqrt{21}}{-28}$	[1] Simplifying
	$= -\frac{5+\sqrt{21}}{2}$	[1] Correct answer

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4(a)	$\frac{8+\sqrt{5}}{4-\sqrt{5}} \times \frac{4+\sqrt{5}}{4+\sqrt{5}}$	[1] Correct choice of multiplication
	$= \frac{32+12\sqrt{5}+\left(\sqrt{5}\right)^2}{(4)^2-\left(\sqrt{5}\right)^2} = -\frac{37+12\sqrt{5}}{11}$	[1] Simplifying
4(b)	$\frac{1}{\left(5-\sqrt{2}\right)^2} \times \frac{\left(5+\sqrt{2}\right)^2}{\left(5+\sqrt{2}\right)^2}$	[1] Correct choice of multiplication (Alternatively multiply out the brackets then rationalise)
	$= \frac{5^2+2\times5\times\sqrt{2}+\left(\sqrt{2}\right)^2}{\left(5^2-\left(\sqrt{2}\right)^2\right)^2} = \frac{27+10\sqrt{2}}{(25-2)^2}$	[1] Simplifying
	$= \frac{27+10\sqrt{2}}{529}$	[1] Correct answer
5	$\frac{6-5\sqrt{5}}{3\sqrt{5}-2} \times \frac{3\sqrt{5}+2}{3\sqrt{5}+2}$	[1] Correct choice of multiplication
	$\frac{18\sqrt{5}+12-10\sqrt{5}-15\times5}{\left(3\sqrt{5}\right)^2-2^2}$	[1] Simplifying
	$\frac{-63+8\sqrt{5}}{41}$	[1] Expansion of brackets and simplifying
	$-\frac{63}{41}+\frac{8}{41}\sqrt{5}$	[1] Answer must be in this format for the final mark.
6	$\frac{4}{3}\sqrt{\frac{300}{4}}+\frac{10}{\sqrt{3}} = \frac{4}{3}\sqrt{75}+\frac{10}{\sqrt{3}}$	[1] Division
	$\frac{4}{3}\sqrt{75}+\frac{10}{\sqrt{3}} = \frac{4}{3}\sqrt{25\times3}+\frac{10}{\sqrt{3}}$	[1] Simplifying the surd
	$= \frac{4\times5}{3}\sqrt{3}+\frac{10}{\sqrt{3}} = \frac{20}{3}\sqrt{3}+\frac{10}{\sqrt{3}} = \frac{20\sqrt{3}}{3}+\frac{10\sqrt{3}}{3}$	[1] Simplifying
	$= 10\sqrt{3}$	[1] Correct answer
7	$\left(\frac{4}{3}\right)^{\frac{1}{2}}+\left(\frac{1}{3}\right)^{-\frac{1}{2}} = \frac{\sqrt{4}}{\sqrt{3}}+\frac{\sqrt{3}}{\sqrt{1}} = \frac{\sqrt{4}}{\sqrt{3}}+\left(\frac{\sqrt{3}}{\sqrt{1}}\times\frac{\sqrt{3}}{\sqrt{3}}\right)$	[1] Fractional powers written in surd form and simplification
	$\frac{\sqrt{4}}{\sqrt{3}}+\frac{3}{\sqrt{3}} = \frac{2}{\sqrt{3}}+\frac{3}{\sqrt{3}} = \frac{5}{\sqrt{3}}$	[1] Simplifying
	$= \frac{5}{3}\sqrt{3}$	[1] Correct answer

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8	$\sqrt{4\frac{12}{9}} = \sqrt{\frac{48}{9}}$	[1] Fractional surd created
	$\left(\frac{1}{3}\right)^{\frac{1}{2}} = \sqrt{\frac{1}{3}}$	[1] Fractional surd created
	$\sqrt{\frac{48}{9}} + \sqrt{\frac{1}{3}} = \frac{\sqrt{48}}{\sqrt{9}} + \frac{1}{\sqrt{3}} = \frac{4\sqrt{3}}{3} + \frac{1}{\sqrt{3}}$	[1] Simplifying
	$\frac{4\sqrt{3}}{3} + \frac{1}{\sqrt{3}} = \frac{4\sqrt{3}}{3} + \frac{\sqrt{3}}{3} = \frac{5\sqrt{3}}{3}$	[1] Rationalising denominator and collecting like terms

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