

<b>6</b>	<b>(a)</b>	<p><b>DR</b> <math>(x - 2)(x + 3) &gt; 0</math></p> <p><math>x &lt; -3, x &gt; 2</math></p> <p><math>\{x: x &lt; -3\} \cup \{x: x &gt; 2\}</math></p>	<p><b>M1</b></p> <p><b>A1</b></p> <p><b>A1</b></p> <p><b>B1ft</b></p> <p><b>[4]</b></p>	<p><b>3.1a</b></p> <p><b>1.1</b></p> <p><b>1.1</b></p> <p><b>2.5</b></p>	<p>Attempt factorise</p> <p>Correct factors <b>and</b> <math>&gt; 0</math> or <math>y &gt; 0</math></p> <p>Any notation. Allow "and", "or", comma etc But NOT <math>-3 &lt; x &gt; 2</math></p> <p><math>x &lt; -3, x &gt; 2</math> seen, with no working or muddled working; SC B1</p> <p>Allow <math>()</math> instead of <math>\{ \}</math> Allow <math>x \in (-\infty, -3) \cup (2, \infty)</math></p> <p>ft their factors, dep two separate ranges.</p>
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Question		Answer	Marks	AO	Guidance
6	(b)	<p><b>DR</b> <math>(x^{\frac{3}{2}} + 1)(x^{\frac{3}{2}} - 8) = 0</math></p> <p><math>x^{\frac{3}{2}} = -1</math> gives no solution</p> <p><math>x^{\frac{3}{2}} = 8</math> or <math>x^3 = 64</math></p> <p><math>x = 4</math></p>	<p><b>M1</b></p> <p><b>B1</b></p> <p><b>A1</b></p> <p><b>A1</b></p> <p><b>[4]</b></p>	<p><b>1.1</b></p> <p><b>3.2b</b></p> <p><b>1.1</b></p> <p><b>1.1</b></p>	<p>Attempt factors of form <math>(x^{\frac{3}{2}} \pm k)</math> or <math>(y \pm k)</math></p> <p>or <math>(y + 1)(y - 8)</math> or <math>y = -1</math> or <math>y = 8</math> AND <math>y = x^{\frac{3}{2}}</math> so</p> <p>Allow <math>(x + 1)(x - 8)</math> AND <math>x = x^{\frac{3}{2}}</math> seen</p> <p>Condone inadequate reason</p> <p><math>y = 8</math> not enough for this mark</p> <p>Indep of previous A1</p>
6	(c)	<p><b>DR</b> <math>\ln[(3^x)^2] = \ln[3 \times 2^x]</math></p> <p><math>2\ln(3^x)</math> or <math>\ln(3^{2x})</math> or <math>x\ln(3^2)</math> or <math>\ln(9^x)</math> or <math>2x\ln 3</math></p> <p><math>= \ln 3 + \ln(2^x)</math> oe</p> <p><math>2x\ln 3</math> or <math>x\ln 9 = \ln 3 + x\ln 2</math></p> <p><math>x = \frac{\ln 3}{\ln \frac{9}{2}}</math></p>	<p><b>M1</b></p> <p><b>A1</b></p> <p><b>A1</b></p> <p><b>A1</b></p> <p><b>A1</b></p>	<p><b>3.1a</b></p> <p><b>1.1</b></p> <p><b>1.1</b></p> <p><b>2.1</b></p> <p><b>2.2a</b></p>	<p>Attempt take logs. Allow errors, eg RHS = <math>\ln 3 \times \ln(2^x)</math></p> <p>LHS correct after one further step</p> <p>RHS correct after one further step</p> <p>Both sides correct with <math>x</math> removed from index</p> <p>or any equivalent correct form e.g. <math>\frac{1}{2 - \log_3 2}</math> Must be exact ISW</p>
		<p><b>Alternative methods</b></p> <p><math>\ln(3^{2x-1}) = \ln(2^x)</math> or <math>\log_3(2^x) = 2x - 1</math> M1</p> <p><math>(2x - 1)\ln 3 = x\ln 2</math> or <math>x\log_3 2 = 2x - 1</math> A1</p> <p>A1</p> <p>A1</p> <p><math>x = \frac{\ln 3}{2\ln 3 - \ln 2}</math> or <math>x = \frac{1}{2 - \log_3 2}</math> A1</p>			<p>Attempt take logs.</p> <p>LHS correct after one further step</p> <p>RHS correct after one further step</p> <p>Both sides correct with <math>x</math> removed from index</p> <p>ISW</p>
		<p><math>9^x = 3 \times 2^x</math> M1</p> <p><math>\left(\frac{9}{2}\right)^x = 3</math> M1</p> <p><math>4.5^x = 3</math> A1A1</p> <p><math>x = \log_{4.5}(3)</math> A1</p>			<p>Divide by <math>2^x</math> and arrange into <math>a^x = b</math> form</p> <p>A1 for each side correct</p> <p>ISW</p>
			<b>[5]</b>		