

Q	Marking Instructions	AO	Marks	Typical Solution
5(a)	Differentiates $2^t$ or $2^{-t}$ to obtain $\pm A \ln 2 \times 2^{\pm t}$	AO1.1a	M1	
	Obtains $\frac{dy}{dt} = (\pm A \ln 2) 2^t$ and $\frac{dx}{dt} = (\pm B \ln 2) 2^{-t}$	AO1.1b	A1	$\frac{dy}{dt} = (3 \ln 2) 2^t$ $\frac{dx}{dt} = (-4 \ln 2) 2^{-t}$
	Uses chain rule with correct $\frac{dy}{dt}$ and $\frac{dx}{dt}$ and completes rigorous argument to obtain fully correct printed answer	AO2.1	R1	$\frac{dy}{dx} = \frac{(3 \ln 2) 2^t}{(-4 \ln 2) 2^{-t}}$ $= -\frac{3}{4} \times 2^{2t}$
(b)	Rearranges to write $2^{-t}$ in terms of $x$ or $2^t$ in terms of $y$ Or Writes given expression in terms of $t$	AO3.1a	M1	$2^t = \frac{y+5}{3}$ $2^{-t} = \frac{x-3}{4}$
	Eliminates $t$ Or Compares coefficients PI by $a=5$ or $b=-3$	AO1.1a	M1	$1 = \left(\frac{y+5}{3}\right)\left(\frac{x-3}{4}\right)$ $12 = xy + 5x - 3y - 15$ $xy + 5x - 3y = 27$
	Completes rigorous argument to obtain correct values of $a$ , $b$ and $c$ and write the Cartesian equation in the required form ISW	AO2.1	R1	<b>ALT</b> $xy + ax + by = (4 \times 2^t + 3)(3 \times 2^t - 5) + a(4 \times 2^t + 3) + b(3 \times 2^t - 5)$ $= 12 - 15 + (4a - 20)2^t + (3b + 9)2^t + 3a - 5b$ $a = 5, b = -3$ $xy + 5x - 3y = -3 + 15 + 15$ $= 27$
<b>Total</b>			<b>6</b>	