Question	Scheme	Marks
7(a)	4	B1 [1]
(b)	**Working in $\log_2$** $2\log_4 x = \dfrac{2\log_2 x}{\log_2 4} = \dfrac{2\log_2 x}{2} = [\log_2 x]$ $\log_2 16 + \dfrac{2\log_2 x}{2} = \log_2 y$ $\log_2 16x = \log_2 y$ OR $\log_2\left(\frac{x}{y}\right) = -4 \Rightarrow \frac{x}{y} = 2^{-4}$ $y = 16x$ *	M1 M1 M1 A1 cso [4]
	ALT	
	Working in $\log_4$ $\log_2 y = \frac{\log_4 y}{\log_4 2} = \frac{\log_4 y}{\frac{1}{2}} = 2\log_4 y = [\log_4 y^2]$ $\log_4 256 + \log_4 x^2 = \log_4 y^2$ $\log_4\left(256x^2\right) = \log_4 y^2$ OR $2\log_4\left(\frac{y}{x}\right) = 4 \Rightarrow \frac{y}{x} = 4^2$ $256x^2 = y^2 \Rightarrow y = 16x$ *	[M1 M1 M1 A1]
(c)	$16x = 4x + 5$ $16x = 4x + 5 \Rightarrow 12x = 5 \Rightarrow x = \ldots$ $x = \dfrac{5}{12}$	B1 M1 A1 [3]
		Total 8 marks

Part	Marks	Scheme
(a)	**B1**	States 4 only
(b)	**M1**	For an attempt to change the base of $\log_4 x$ to base 2 using $\log_a x = \frac{\log_b x}{\log_b a}$ $\log_4 x = \frac{\log_2 x}{\log_2 4}\left[= \frac{\log_2 x}{2}\right]$
	M1	An attempt to rewrite the equation in terms of $\log_2$ $\log_2 16 + \frac{2\log_2 x}{'2'} = \log_2 y$ F.t. their '2' from attempted change of base.
	M1	Uses $\log A + \log B = \log AB$ to correctly combine the logs $\log_2 16x = \log_2 y$ OR Uses $\log A - \log B = \log\frac{A}{B}$ to correctly combine the logs and removes logs $\log_2\left(\frac{x}{y}\right) = -4$ **and** $\frac{x}{y} = 2^{-4}$ (this approach will score the second and third M marks at this stage)
	A1	For correctly obtaining $y = 16x$ *

Alt – working in $\log_4$		
	M1	For an attempt to change the base of $\log_2 y$ to base 4 using $\log_a y = \frac{\log_b y}{\log_b a}$ $\log_2 y = \frac{\log_4 y}{\log_4 2}\left[= \frac{\log_4 y}{\frac{1}{2}} = 2\log_4 y\right]$
	M1	For dealing with the indices **and** writing $4 = \log_4 256$ $\log_4 256 + \log_4 x^2 = \log_4 y^2$
	M1	Uses $\log A + \log B = \log AB$ to correctly combine the logs $\log_4\left(256x^2\right) = \log_4 y^2$ OR Uses $\log A - \log B = \log\frac{A}{B}$ to correctly combine the logs and removes logs $2\log_4\left(\frac{y}{x}\right) = 4$ **and** $\frac{y}{x} = 4^2$ (this approach will score the second and third M marks at this stage)
	A1	For correctly obtaining $y = 16x$*
(c)	**B1**	For writing down $16x = 4x + 5$
	M1	For an attempt to solve the equation $16x = 4x + 5 \Rightarrow 12x = 5 \Rightarrow x = ...$
	A1	For $x = \frac{5}{12}$
	Note: This is a 'hence' question. Condone candidates working without using given results, but the first mark is not awarded until the candidate reaches $16x = 4x + 5$	