Question			Answer	Marks	AO	Guidance
10	**(a)**	**(i)**	When $t = 0, L = 2800$ She invests £2800	**B1**	**3.1b**	cao
				[1]		
10	**(a)**	**(ii)**	Each year the amount is multiplied by 1.023 which is 2.3% annual interest	**B1**	**3.1b**	cao
				[1]		
10	**(b)**		$A = 3000 \times 1.02^t$ So $a = 3000$ And $b = 1.02$	**B1** **B1**	**1.1b** **1.1b**	Allow for a and b given explicitly or embedded in an exponential expression
				[2]		

10	**(c)**		Equal amounts if $3000\times1.02^t = 2800\times1.023^t$ $\ln 3000 + t\log 1.02 = \ln 2800 + t\ln 1.023$ $t = \dfrac{\ln 3000 - \ln 2800}{\ln 1.023 - \ln 1.02} = 23.5$	**M1** **M1**	**3.1b** **1.1a**	Use of laws of logarithms leading to a linear equation in t using their values of a and b Collecting terms
			So they have equal amounts after 23.5 years	**A1**	**1.1b**	Cao must be 1 d.p.
			Alternative method Equal amounts if $3000\times1.02^t = 2800\times1.023^t$ $\dfrac{3}{2.8} = \left(\dfrac{1.023}{1.02}\right)^t$ so $t = \dfrac{\log\frac{3}{2.8}}{\log\frac{1.023}{1.02}} = 23.5$	**M1** **M1**		Equating and attempt to collect terms using their values of a and b leading to an equation in which t appears only once Uses logarithms leading to a value for t allow $\log_{1.003}1.07$ or $\frac{\log 1.07}{\log 1.003}$ or better for the method mark
			So they have equal amounts after 23.5 years	**A1**		Cao must be 1 d.p. Note this is obtained from exact values or using 1.00294 and 1.0714 or better Allow full credit for trial and improvement that gives 23.5 and £4778 to the nearest pound
						If M0M0 given, allow SC2 for 23.5 seen, without £4778 If M0M0 given, allow SC1 for at least 2 trials clearly seen even if a root not found
				[3]		