Question number	Scheme	Marks
3	$\ln 12 = \ln a + (2-1)\ln b$ oe	M1
	$ab = 12$ oe	A1
	$\ln 768 = \ln a + (5-1)\ln b$ oe	M1
	$ab^4 = 768$ oe	A1
	$\frac{768}{12} = \frac{ab^4}{ab}$ $(b^3 = 64)$	ddM1
	$b = 4$ $a = 3$	A1 A1
	ALT 1	
	$\ln a + (2-1)\ln b = \ln 12$ oe $\ln a + (5-1)\ln b = \ln 768$ oe	M1 A1
	$3\ln b = \ln b^3$ $\ln 768 - \ln 12 = \ln 64$	M1 A1
	$b^3 = 64$	ddM1
	$b = 4$ $a = 3$	A1 A1
	ALT 2	
	$d = \ln 12 - \ln a$	M1
	$(d = \ln b = \ln 12 - \ln a \Rightarrow \ln b = \ln\left(\frac{12}{a}\right)) \Rightarrow b = \frac{12}{a}$	A1
	$\ln 768 = \ln a + \ln\left(\frac{12}{a}\right)^4$	M1
	$\ln 768 = \ln\left(\frac{12^4}{a^3}\right)$	A1
	$a^3 = \frac{20736}{768}$	ddM1
	$b = 4$ $a = 3$	A1 A1
	ALT 3	
	$(u_2 =)$ $u_1 + d = \ln 12$ $(u_5 =)$ $u_1 + 4d = \ln 768$	M1 A1
	$3d = \ln 768 - \ln 12$	M1
	$d = \ln 4$	A1
	$u_1 = \ln 12 - \ln 4 = \ln 3$ $(= \ln a)$	ddM1
	$b = 4$ $a = 3$	A1 A1 **[7]**

Part	Mark	Additional Guidance
	M1	Correct equation as shown oe
	A1	Correct equation as shown oe
	M1	Correct equation as shown oe
	A1	Correct equation as shown oe
	ddM1	**Dependent on both previous method marks**, uses any clear, valid method to reduce to an equation in a (or less likely, b)
	A1	For correct b
	A1	For correct a
ALT 1	M1	One correct equation as shown oe
	A1	Both correct equations as shown oe
	M1	Clear valid attempt to subtract one equation from the other
	A1	Achieves the two terms shown
	ddM1	**Dependent on both previous method marks,** uses a valid method to eliminate the logs and achieves an equation in b only
	A1	For correct b
	A1	For correct a
ALT 2	M1	Finds a correct equation as shown for the common difference, d
	A1	Correct equation as shown oe
	M1	Correct equation as shown oe (subs to get u_5)
	A1	Correct equation as shown oe
	ddM1	**Dependent on both previous method marks,** eliminates the logs and achieves an equation in a only
	A1	For correct b
	A1	For correct a
ALT 3	M1	One correct equation as shown oe
	A1	Both correct equations as shown oe
	M1	Clear attempt to subtract one equation from the other
	A1	Achieves the correct value for d in any single ln form
	ddM1	**Dependent on both previous method marks,** arrives at a single term log for u_1
	A1	For correct b
	A1	For correct a
	Allow full marks in general for just $b = 4$ and $a = 3$	