Question			Answer	Marks	AOs	Guidance	
15	(a)		$a = 0.01$ and $r = 0.99$	B1	2.1		
			a and r substituted in $\frac{a}{1-r}$ **oe** seen	M1	1.1	a or r must be correct	
			$\frac{0.01}{1-0.99}$ **oe** = 1	A1	2.4		
				[3]			
15	(b)		(n =) 312	M1	3.1a	allow 313	
			$\frac{0.01(1-0.99^n)}{1-0.99}$ or $\sum_1^n 0.99^{n-1} \times 0.01$ evaluated	M1	1.1	n = 312 or 313; condone n = 6	
			awrt 0.9565 or 0.9570 > 0.95 so model predicts Layla will beat him within 6 years **oe**	A1	3.4		
				[3]			
			Alternative $\frac{0.01(1-0.99^n)}{1-0.99} = 0.95$	M1		may use cdf from geometric distribution; allow > or ≥ instead of =	
			$0.99^n = 0.05$	M1		attempt to simplify as far as "$0.99^n =$ "	
			n = 298.1 weeks < 312 (or 313) so model predicts Layla will beat him within 6 years **oe**	A1			
				[3]			
15	(c)		Layla thinks she will improve (by practising), so she should become increasingly likely to beat Kofi **oe** or Layla thinks she is more likely to beat Kofi because he doesn't practise (but Layla does) **oe**	B1	3.5a		
				[1]			
15	(d)		probability of Layla winning increases as r increases **oe**	B1	2.4	**B0** for eg probability of Layla winning increases exponentially	
				[1]			

Question			Answer	Marks	AOs	Guidance	
15	(e)		$k(1 + 4 + 9 + 16 + 25 + 36 + 49 + 64) = 1$ **soi**	M1	3.3		
			$k = \frac{1}{204} (= 0.00490 \ldots)$	A1	1.1		
			$P(X \leq 6) = \frac{91}{204}$ $(0.44607 \ldots) < 0.95$ so Layla's statement not consistent with her model **oe**	A1	3.5a		
				[3]			