Question	Scheme	Marks
7(a)	$\left(\frac{ar^2}{a}=r^2=\right)\frac{\frac{2704}{625}}{16}$ oe	M1
	$(r=)\pm\frac{13}{25}$ oe	A1 [2]
(b)	$(S_\infty=)\frac{16}{1-"\frac{13}{25}"}=\frac{100}{3}$ oe	M1A1 [2]
(c)	$\frac{16\left(1-\left("\frac{13}{25}"\right)^n\right)}{1-"\frac{13}{25}"}>33\left(\Rightarrow 1-\left(\frac{13}{25}\right)^n>0.99\right)$ oe	M1
	$\Rightarrow\left("\frac{13}{25}"\right)^n<0.01$ oe	dM1
	$n\lg\left("\frac{13}{25}"\right)<\lg(0.01)$ oe	M1
	$\Rightarrow n>\frac{\lg(0.01)}{\lg\left("\frac{13}{25}"\right)}\Rightarrow n>7.04...\text{oe}\Rightarrow(n=)8$	dddM1A1 [5]
		Total 9 marks

Part	Mark	Notes
(a)	M1	For any correct unsimplified expression for r or r^2.
	A1	For $r = \pm\frac{13}{25}$ oe
(b)	M1	Uses the correct formula for the sum to infinity of a geometric series using their positive $r < 1$ and the given first term.
	A1	For $\frac{100}{3}$ oe . Allow 33.33……, 33.3^r, $33.\dot{3}$ etc. The question demand is for an exact answer so there must be some indication of recurrence. This could be min 1 dp with dots after ie 33.3….., but cannot be a terminating decimal.
(c)	M1	Uses the correct formula for the sum of a geometric series to set up an **inequality or equation** in terms of n, *f*t their **positive** $r < 1$, must be using $a = 16$ Allow < or > or =
	dM1	For simplifying (allow errors in simplification) their **inequality or equation** in n to the form $\left("\frac{13}{25}"\right)^n < d \quad d \neq 0$. Allow $"\frac{13}{25}"$ to be their positive $r < 1$. Allow < or > or =. Dependent on the 1st method mark.
	M1	Takes logarithms (any base) of their **exponential equation or inequality <u>correctly</u>** on both sides and correctly uses the power law to reach $n\lg(a) < \lg(b)$. or 'de-logs' their **exponential equation or inequality <u>correctly</u>** to get $\log_c d < e$ This isn't a dependent mark, but the candidate must be able to correctly take logs of both sides and use the power law or correctly de-log their equation/inequality. r can be any value carried through from part (a) for this mark. Allow < or > or =, the inequality doesn't need to have been reversed at this point.
	dddM1	For finding a value for n setting up the correct inequality (with their positive $r < 1$) from the beginning and where the inequality sign has been reversed at the appropriate point during their work. Dependent on all previous method marks. If candidates give a final answer of (n =) 8 – this mark can be implied even if the inequality sign is not correctly reversed.
	A1	For (n =) 8