Question	Scheme	Marks	AOs
10(a)	$17+25\mathrm{e}^{0.08\times T}=62\Rightarrow \mathrm{e}^{0.08\times T}=...$	M1	3.4
	$\mathrm{e}^{0.08\times T}=\dfrac{48}{25}\Rightarrow T=\dfrac{\ln\left(\dfrac{48}{25}\right)}{0.08}$	M1	1.1b
	$T=8.2$ (months)	A1	2.2a
		(3)	
(b)	$\dfrac{\mathrm{d}N}{\mathrm{d}t}=0.08\times 25\mathrm{e}^{0.08t}$	M1	3.3
	$\dfrac{\mathrm{d}N}{\mathrm{d}t}=0.08\times 25\mathrm{e}^{0.08\times 24}=13.6$	dM1	1.1b
	13.6 million users per month	A1	3.4
		(3)	
(c)	The model increases exponentially so not suitable for large values of *t*	B1	3.5b
		(1)	
			(7 marks)

Notes

(a)

M1: Sets $17+25\mathrm{e}^{0.08\times T}=62$ and rearranges to $\mathrm{e}^{0.08\times T}=...$

M1: Proceeds from an expression of the form $A\mathrm{e}^{0.08\times T}=B$ where $A,B>0$, takes lns of both sides and proceeds to find an expression for *T*

A1: awrt 8.2 (months)

(b)

M1: Attempts to differentiate with respect to *t*. Score for an expression of the form $...\mathrm{e}^{0.08t}$.
Do not allow for $\dfrac{\mathrm{d}N}{\mathrm{d}t}=17+25\mathrm{e}^{0.08t}$

dM1: Substitutes in $t=24$ and proceeds to find a value for $\dfrac{\mathrm{d}N}{\mathrm{d}t}$

A1: 13.6 million users per month o.e. Must have units. Do not condone 13.6 for this mark.

(c)

B1: E.g. the model suggests that the number of users would increase without bound which is unrealistic / the number of users is unlikely to keep increasing exponentially.