Q	Marking instructions	AO	Mark	Typical solution
8(a)	Uses model with $t = 0$ and $\theta = 75$ to form an equation	3.4	M1	$75 = 5\left(4 + \lambda e^{0}\right)$
	Obtains correct λ	1.1b	A1	$\lambda = 11$
	Uses model with $t = 2$, $\theta = 68$ and their λ to form an equation	3.4	M1	$68 = 5\left(4 + 11e^{-2k}\right)$
	Solves their equation correctly to find k	1.1a	M1	$k = 0.068066$
	Obtains correct k AWRT 0.07 **OE**	1.1b	A1	$\theta = 5\left(4 + 11e^{-0.068066\times 15}\right)$
	Uses model with their λ and their k and $t = 15$	3.4	M1	$= 39.8^{\circ}C$
	Obtains correct temperature Condone missing units **AWRT** 39.8	1.1b	A1	
8 (b)(i)	States correct room temperature Condone missing units **CAO**	3.4	B1	$20^{\circ}C$
	Explains that the temperature predicted by the model will approach room temperature as t increases. **OE**	2.4	E1	As t gets large the temperature predicted by the model will get close to room temperature
8 (b)(ii)	Uses the model with their k and their room temperature+1 to form equation for t	3.4	M1	$5\left(4 + 11e^{-0.068066t}\right) = 21$
	Obtains the correct value of t **AWRT 59** **ISW**	1.1b	A1	$t = 58.87$
8(c)	Room temperature change/higher/lower Cooling rate change/higher/lower or identifies a factor that may be different in a different place.	3.5a	E1	The new room temperature might change
	Total		**12**	