Question Number	Scheme	Marks
8	$y = e^{3x}\sin 2x \quad \dfrac{dy}{dx} = 2e^{3x}\cos 2x + 3e^{3x}\sin 2x$	M1A1
	$\dfrac{d^2y}{dx^2} = \left(-4e^{3x}\sin 2x + 6e^{3x}\cos 2x\right) + \left(6e^{3x}\cos 2x + 9e^{3x}\sin 2x\right)$	M1A1A1
	$= 12e^{3x}\cos 2x + 5e^{3x}\sin 2x$	
	$\dfrac{d^2y}{dx^2} - 6\dfrac{dy}{dx} + 13y$	
	$= 12e^{3x}\cos 2x + 5e^{3x}\sin 2x - 6\left(2e^{3x}\cos 2x + 3e^{3x}\sin 2x\right) + 13e^{3x}\sin 2x$	dM1
	$= 12e^{3x}\cos 2x + 5e^{3x}\sin 2x - 12e^{3x}\cos 2x - 18e^{3x}\sin 2x + 13e^{3x}\sin 2x$	ddM1
	$= 0$ *	A1cso **[8]**
ALT	$\dfrac{dy}{dx} = 2e^{3x}\cos 2x + 3e^{3x}\sin 2x$	M1A1
	$\dfrac{dy}{dx} = 2e^{3x}\cos 2x + 3y$	
	$\dfrac{d^2y}{dx^2} = \left(-4e^{3x}\sin 2x + 6e^{3x}\cos 2x\right) + 3\dfrac{dy}{dx}$	M1A1A1
	$\dfrac{d^2y}{dx^2} - 6\dfrac{dy}{dx} + 13y = \left(-4e^{3x}\sin 2x + 6e^{3x}\cos 2x + 3\dfrac{dy}{dx}\right) - 6\dfrac{dy}{dx} + 13y$	dM1
	$= -13y + 6e^{3x}\cos 2x + 9e^{3x}\sin 2x - 3\dfrac{dy}{dx} + 13y$	
	$= -13y + 3\dfrac{dy}{dx} - 3\dfrac{dy}{dx} + 13y = 0$ *	ddM1A1cso **[8]**

M1	Attempt the product rule. 2 terms of the form $\pm ke^{3x}\cos 2x$ and $\pm le^{3x}\sin 2x$ with $k = 1$ or 2 and $l = 1$ or 3
A1	Fully correct first derivative
M1	Attempt the second derivative using the product rule *correctly* on either term. Must have at least one of the terms in the first derivative fully correct.
A1 A1	A1 for each fully correct bracket
dM1	Substitute their derivatives and y in $\dfrac{d^2y}{dx^2} - 6\dfrac{dy}{dx} + 13y$ Depends on both previous M marks
	This and the following M mark may be awarded together.
ddM1	Remove the brackets
A1cso	Reach "0" from fully correct work.
ALT M1A1	As above
M1	Replace sin term with a y term and attempt the second derivative using the product rule on first term.
A1A1	A1 Correct bracket A1 Correct second term
dM1	As above
ddM1	Obtain an expression which is either all derivatives plus y terms or all trig terms
A1cso	Reach "0" from fully correct work