Question Number	Scheme	Notes	Marks
2(a)	$(x+2)\dfrac{dy}{dx}+y=3x^2+6x \Rightarrow$ $\dfrac{dy}{dx}+\dfrac{y}{x+2}=\dfrac{3x(x+2)}{x+2}$ $\Rightarrow \dfrac{dy}{dx}+\dfrac{y}{x+2}=3x$	M1: Reaches $\dfrac{dy}{dx}+f(x)y=g(x)$ A1: Correct equation in required form. Correct answer implies both marks.	**M1** **A1**
			(2)
(b)	$\text{IF}=\left\{e^{\int\frac{1}{x+2}(dx)}\right\}=e^{\ln(x+2)}=x+2$	Correct attempt at the IF for their f(x) – must attempt the integration but need not be fully simplified (may be implied by working)	**M1**
	$"(x+2)"y=\int"3"x"(x+2)"(dx)$	Applies their IF correctly with their kx	**M1**
	$(x+2)y=x^3+3x^2(+c)$	Correct equation after integration condoning omission of the constant	**A1**
	$x=4,\ y=18 \Rightarrow c=108-64-48=-4$	Substitutes correct values to find a value for c in their integrated equation	**M1**
	$y=\dfrac{x^3+3x^2-4}{x+2}=\dfrac{(x+2)(x+2)(x-1)}{x+2}$ $\Rightarrow y=(x+2)(x-1)$ or x^2+x-2	A1: Correct particular solution with g(x) in any form. Condone missing "y = ..." A1: y or $g(x)=(x+2)(x-1)$ or x^2+x-2	**A1** **A1**
			(6)
			Total 8
Note : The question can be completed via a complementary function and particular integral approach, as below. If the CF is never considered a maximum of 011000 is possible.			
(b) Alt	$(x+2)\dfrac{dy}{dx}+y=0 \Rightarrow \dfrac{1}{y}\dfrac{dy}{dx}=-\dfrac{1}{x+2}$ $\Rightarrow \ln y=-\ln(x+2)+c$ $\Rightarrow \ln y=\ln\dfrac{A}{x+2} \Rightarrow y=\dfrac{A}{x+2}$	Considers the homogeneous equation and makes progress integrating to an equation y = … with constant of integration.	**M1**
	$y=ax^2+bx+c \Rightarrow \dfrac{dy}{dx}=2ax+b$ $\Rightarrow (x+2)(2ax+b)+ax^2+bx+c=3x^2+6x$ $x^2: 3a=3 \quad x: 4a+2b=6 \quad x^0: 2b+c=0$ $\Rightarrow a=...,b=...,c=...$	Tries the PI $y=ax^2+bx+c$, differentiates and substitutes into equation to find a, b and c	**M1**
	$y=x^2+x-2$	Correct particular integral	**A1**
	$y=x^2+x-2+\dfrac{A}{x+2} \Rightarrow 18=16+4-2+\dfrac{A}{6}$ $\Rightarrow A=... \ ; \quad A=0$	Uses (4, 18) in their general solution to find the constant ; Correctly shows $A = 0$	**M1** **A1**
	$\Rightarrow y=(x+2)(x-1)$ or x^2+x-2	Correct answer following attempt to combine the CF and PI. Accept y or g(x) as before.	**A1**

Additional Notes:

No need to see method for solving the cubic – if the correct answer follows directly from the unfactorized cubic that is acceptable for the final A.