7. (a) Show that the transformation $y = xv$ transforms the equation

$$3\frac{d^2y}{dx^2} - \frac{6}{x}\frac{dy}{dx} + \frac{6y}{x^2} + 3y = x^2 \qquad x \neq 0 \qquad \text{(I)}$$

into the equation

$$3\frac{d^2v}{dx^2} + 3v = x \qquad \text{(II)}$$

(6)

(b) Hence obtain the general solution of the differential equation (I), giving your answer in the form $y = f(x)$

(6)

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(Total for Question 7 is 12 marks)

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