7. (a) Show that $e^{k\sin^2 x}$ is an integrating factor of the differential equation

$$\sec x \frac{dy}{dx} - 2y\sin x = e^{x+\sin^2 x}$$

where k is a constant to be determined.

(2)

(b) Hence find the general solution of the differential equation.

(6)

Given that $y = 2$ at $x = 0$

(c) determine the particular solution of the differential equation.

(2)

(Total for Question 7 is 10 marks)