

Solve the differential equation $y' = 1/(6e^y - 2x)$. [106 南大綠能 4]

$$\text{[解]原式} \Rightarrow \frac{1}{y'} = 6e^y - 2x \Rightarrow \frac{dx}{dy} + 2x = 6e^y$$

$$F = e^{\int 2dy} = e^{2y}$$

$$x = \frac{1}{F} [\int F \cdot 6e^y dy + C] = \frac{1}{e^{2y}} [\int e^{2y} \cdot 6e^y dy + C]$$

$$= e^{-2y} [\int 6e^{3y} dy + C] = e^{-2y} [2e^{3y} + C] = 2e^y + Ce^{-2y}$$