

系級：\_\_\_\_\_ 學號：\_\_\_\_\_ 姓名：\_\_\_\_\_

1. 試以正合法求下述微分方程式：

(1)  $2y^2 - 9xy + (3xy - 6x^2)y' = 0$

(2)  $e^{-y}dx + e^{-x}(-e^{-y} + 1)dy = 0$  (hint:  $\mu = e^{x+y}$ )

2. 試解下述一階線性微分方程：

(1)  $y' - y = 2e^{4x}$ ,  $y(0) = 3$

(2)  $y' + \frac{1}{x-2}y = 3x$ ,  $y(3) = 4$

(3)  $y' + (\sec x)y = \cos x$

(4)  $y' - \frac{3}{x}y = 2x^2$

3. 試解下述 Bernoulli 微分方程：

(1)  $y' = -\frac{1}{x}y^2 + \frac{2}{x}y$

(2)  $y' = \frac{x}{y} + \frac{y}{x}$

**參考解答：**

1. (1)  $x^2y^3 - 3x^3y^2 = C$

(2)  $e^x - y + e^y = c$

2. (1)  $y = \frac{2}{3}e^{4x} - \frac{11}{3}e^x$

(2)  $y = x^2 - x - 2$

(3)  $y = \frac{x \cos x - \cos^2 x + c \cos x}{1 + \sin x}$

(4)  $y = cx^3 + 2x^3 \ln|x|$

3. (1)  $y = \frac{2}{cx^{-2} + 1}$

(2)  $\frac{y^2}{x^2} = 2\ln|x| + c$