

系級：_____ 學號：_____ 姓名：_____

1. 試解下述一階高次微分方程式：

(1) $x^2(y')^2 + 4xyy' + 3y^2 = 0$

(2) $xy(y')^2 + (x + y)y' + 1 = 0$

(3) $(y')^4 - (x + 2y + 1)(y')^3 + (x + 2y + 2xy)(y')^2 - 2xyy' = 0$

(4) $y = xy' - \frac{1}{y'}$

2. 試以全微分法求解下述微分方程

(1) $(2x^2y + 3y^3)dx - (x^3 + 2xy^2)dy = 0$

(2) $y' = \frac{y + xy^3(1 + \ln x)}{x}$

(3) $(3xe^y + 2y)dx + (x^2e^y + x)dy = 0$

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

3. 試以皮卡德(Picard)法求解：

$y' = 1 + y^2, \quad y(0) = 0$