

系級：_____ 學號：_____ 姓名：_____

1. 試解下述 Riccati 微分方程：

(1) $y' = e^{-x}y^2 - 3y + 3e^x$

(2) $xy' + 3xy = y^2 + 2x^2 + y$

2. 試以全微分法求解下述微分方程

(1) $(2y^2 - 6xy)dx + (3xy - 4x^2)dy = 0$

(2) $(x - y^3)dy = ydx$

(3) $(e^x \sin y + 3y)dx + (3x + e^x \cos y)dy = 0$

(4) $2xydx + (1 + x^2)dy = 0$

(5) $(2y + e^y + 6x^2)\frac{dy}{dx} + 4 + 12xy = 0$

3. 試以 Picard 法求解：

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