

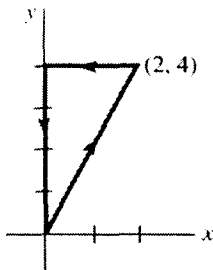
中 華 大 學

九十五學年度轉學生招生入學考試試題紙

別：機械工程學系三年級 科目：工程數學 共1頁第1頁

科目可使用計算機*

1. Given the differential equation $y''(x) - 2y'(x) + y(x) = xe^x$, find the general solution of this equation by (20%)
 - (a) method of undetermined coefficients,
 - (b) method of variation of parameters.
2. Given the linear first order inhomogeneous differential equation $y'(x) + y(x) = e^{-x}$ with initial condition $y(0) = 1$, solve this problem by (20%)
 - (a) using the method of Laplace transform,
 - (b) finding the integrating factor, and then integrate.
3. Given the differential equation $x^2y''(x) + xy'(x) - y(x) = 0$, use the method of Frobenius to solve the equation. (10%)
4. For the given system of equations
$$\begin{aligned}x_1 + 2x_2 + 5x_3 &= -1 \\2x_1 + 3x_2 + 8x_3 &= 4 \\-x_1 + x_2 + 2x_3 &= 6\end{aligned}$$
write the system in the form $\mathbf{Ax} = \mathbf{c}$, and then use $\mathbf{x} = \mathbf{A}^{-1}\mathbf{c}$ to solve the system. (15%)
5. Evaluate $\oint_C x^2y^3dx - xy^2dy$ on the given closed curve C . (15%)



6. Use Green's theorem to evaluate $\oint_C (x^5 + 3y)dx + (2x - e^{y^3})dy$, where C is the circle $(x-1)^2 + (y-5)^2 = 4$. (20%)