國立嘉義大學 100 學年度
土木與水資源工程學系碩士班招生考試試題

科目：工程數學

說明：如條件不足，請自行假設。

1. Please find the value of $\oint_C \frac{z}{(z+1)^2(z+3)} dz$, where $z=x+iy$, C is the circle of $|z| = 2$. (20%)

2. Solve the following differential equations: (20%)

   $(1) xy' - y - x\sin(\frac{y}{x}) = 0$

   $(2) y''' + 9y' = 0$

3. Please find the unit surface normal vector of surface $xz^2 - 2xy - 6x = 8$ at point (1, -1, 2), and please find the tangent plane at that point. (20%)

4. Find the complex Fourier integral of $xe^{-|x|}$. (20%)

5. Find $\int_0^\infty \frac{\sqrt{x}}{x^2-1}$ =? (20%)