※ 考生請注意：本試題不可使用計算機。　　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. *Solve the first − order differential equations*（20%）
   (a) $(2x − 4y + 5)y' + x − 2y + 3 = 0$
   (b) $xy' + y + 4 = 0$

2. *Use the calculations of residues, calculate the following integral* $P=\int_0^{2\pi} \frac{d\theta}{(1−b\cos\theta)^2}$ *where b < 1* （15%）

3. *Let* $f(x) = \begin{cases} 0 & −\pi \le x < 0 \\ x^2 & 0 \le x < \pi \end{cases}$

   Find the Fourier series of f(x) on the given interval　　（15%）

4. *Find the inverse Laplace transform of* $F(s) = \dfrac{1}{s(s+2)} e^{-4s}$. (15%)

5. *Solve the initial value problem below, which involves a Dirac delta function.* (20%)
   $$y'' − 4y' + 13y = 4\delta(t−3); \quad y(0) = y'(0) = 0$$

6. *Evaluate* $\displaystyle\int_{-\infty}^{\infty} \frac{1}{x^6 + 64} dx$. (15%)