

※注意：請於試卷上「非選擇題作答區」標明題號並依序作答。

不得使用計算機 每題十分 總分100分

1. Lemniscate $(x^2 + y^2)^2 = x^2 - y^2$ At the point $(x,y) = (\sqrt{6}/4, \sqrt{2}/4)$ $dy/dx = ?$
2. If $x^3 + y^3 = 3xy$, then $x + y \leq \max = ?$
3. The probability density function of an exponential distribution is $f(x) = 3e^{-3x}$ if $x \geq 0$, $f(x) = 0$ if $x < 0$. Find the expected value $E(x) = ?$
4. $f(x) = (\sin x)^{\cos x}$ $f'(x) = ?$
5. $f(x) = 1/(x^2 - x - 2) = \text{Taylor series} = \sum a_n x^n$, $a_n = ?$
6. $A = (-1,0)$, $B = (0,1)$, $C = (2,2)$. Use the method of least squares to find a line $y = mx+b$ that best fits A, B, C. $m = ?$, $b = ?$.
7. $\lim_{x \rightarrow 0} (\sin x)^{(\cos x - 1)} = ?$
8. Find the area of the surface $z = xy$, $x^2 + y^2 \leq 1$.
9. $y = f(x)$, $y' = 2y(10 - y)$, $f(0) = 1$, $f(x) = ?$
10. Polar coordinate $x = r \cos \theta$, $y = r \sin \theta$. Cardioid $r = 1 - \sin \theta$. At the point $(x,y) = (1,0)$ $d^2y/dx^2 = ?$

試題隨卷繳回