

**※禁止使用計算機****※ 注意：請於答案卷上依序作答，並應註明作答之大題及其題號。**

1.  $\lim_{x \rightarrow \infty} (x - \sqrt{x^2 + 2x}) = ?$  (10%)
2. Find  $\frac{d}{dx} 2^{(x^2)} = ?$  (10%)
3. It is known that  $2x^3 + y^3 = 5xy$ . Determine the value of  $dy/dx$  when  $(x,y)=(1,2)$ . (10%)
4. Find the arc length determined by the curve  $y = \frac{1}{12}x^3 + \frac{1}{x}$  over  $1 \leq x \leq 2$ . (10%)
5.  $\int_0^{\pi} (\cos^2 x + \sec^2 x) dx = ?$  (10%)
6.  $1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \dots = ?$  (10%)
7.  $\int_0^1 \left[ \int_y^1 \sin x^2 dx \right] dy = ?$  (10%)
8. When  $2x^2 - 4xy + 5y^2 = 1$ ,  $f(x,y) = x^2 + y^2$ , determine the maximum value and minimum value of  $f(x,y)$ . (10%)
9.  $\int_0^{\infty} \exp(-2x^2) dx = ?$  (10%)
10.  $y=f(x)$  satisfies  $\frac{dy}{dx} = 2\frac{y}{x}$ . When  $x=1, y=2$ , what is  $f(x)$ ? (10%)

**試題隨卷繳回**