

(答案請寫於答案卷上)

需列計算過程，否則不予計分

填充計算題 (總計10題，每題10分)

1.  $\lim_{x \rightarrow 0} x^2 \sin \frac{1}{x} = \underline{\hspace{2cm}} ?$
2. Given  $c$  is a nonzero constant,  $\lim_{x \rightarrow 0} \frac{\sqrt[3]{1+cx} - 1}{x} = \underline{\hspace{2cm}} ?$
3. If  $f(x) = e^x g(x)$ , where  $g(0) = 2$  and  $g'(0) = 5$ , find  $f'(0)$ .
4. Find the two points on the curve  $y = x^4 - 2x^2 - x$  that have a common tangent line.
5. A piece of wire 10 m long is cut into two pieces. One piece is bent into a square and the other is bent into an equilateral triangle. How should the wire be cut so that the total area enclosed is a minimum?
6.  $\int_{-\infty}^{\infty} \frac{1}{\sqrt{2\pi}} (x-3)^6 e^{-(x-3)^2/2} dx = \underline{\hspace{2cm}} ?$
7. Let  $a_n$  and  $c_n$  be sequences of real number such that  $a_n$  converges to 0, and  $c_n a_n^2$  converges to 0. Then  $\lim_{n \rightarrow \infty} c_n \log(1+a_n) - a_n c_n = \underline{\hspace{2cm}} ?$
8.  $\int_0^{\infty} x^{103} e^{-3x} dx = \underline{\hspace{2cm}} ?$
9.  $\iiint_0^{\infty} \frac{12}{(2+x+y+z)^4} dx dy dz = \underline{\hspace{2cm}} ?$
10. Find the volume of the solid that lies under the paraboloid  $z = x^2 + y^2$ , above the  $xy$ -plane, and inside the cylinder  $x^2 + y^2 = 2x$ .

試題隨卷繳回