

編號: G 388 系所: 企業管理學系丁組

科目: 微積分

本試題是否可以計算機:  可使用,  不可使用 (請命題老師勾選)

## 壹、選擇題:(每題 6 分, 共 60 分)

1. If  $ab \neq 0$ , then  $\lim_{x \rightarrow 0} \frac{\cos(ax)}{\cos(bx)}$  equals  
(A)  $a$  (B)  $b$  (C)  $\frac{a}{b}$  (D)  $\frac{b}{a}$  (E) none of these
2. If  $x = \sin(xy)$ , then  $y'$  equals  
(A)  $\frac{1+y \cos(xy)}{x \cos(xy)}$  (B)  $\frac{1-y \cos(xy)}{x \cos(xy)}$  (C)  $\frac{x \cos(xy)}{1-y \cos(xy)}$   
(D)  $\frac{1}{\cos(xy)}$  (E) none of these
3. The set of all numbers  $c$  in  $(0, 4)$  satisfying the conclusion of Rolle's theorem for the function  $f(x) = 3x^2 - 12x + 11$  on the interval  $[0, 4]$  equals  
(A)  $\{2\}$  (B)  $\{1\}$  (C)  $\{3\}$  (D)  $\{1, 2\}$  (E) none of these
4. The area bounded by  $y = x\sqrt{x^2 - 9}$ ,  $y = 0$ , and  $x = 5$  equals  
(A) 21 (B)  $\frac{64}{3}$  (C)  $\frac{65}{3}$  (D) 22 (E) none of these
5. If  $f(x) = e^{e^x}$ , then  $f'(\ln(2))$  equals  
(A)  $2e^2$  (B)  $(\ln 2)e^2$  (C)  $\frac{1}{2}e^2$  (D)  $2e^{-2}$  (E) none of these
6.  $\int_0^1 \frac{2^x}{2^x + 1} dx$  equals  
(A)  $\ln \frac{3}{2}$  (B)  $\ln \frac{2}{3}$  (C)  $(\ln 2)(\ln 3)$  (D)  $\frac{\ln 3}{\ln 2}$  (E) none of these

(背面仍有題目, 請繼續作答)

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(A) converges by the integral test

(B) diverges by comparison to  $a_n = \frac{1}{n}$ (C) converges by comparison to  $a_n = \frac{1}{n}$ 

(D) diverges by the integral test

(E) none of these

8. The interval of convergence of  $S = 1 - \frac{x}{2 \cdot 4} + \frac{x}{3 \cdot 4^2} - \dots$  is(A)  $(-4, 4)$  (B)  $[-4, 4)$  (C)  $(-4, 4]$  (D)  $[-4, 4]$  (E) none of these9. The area of the region bounded by  $r = 1 - \cos \theta$  is(A)  $3\pi$  (B)  $\frac{3\pi}{4}$  (C)  $\frac{3\pi}{2}$  (D)  $\frac{\pi}{2}$  (E) none of these10. The volume of the solid bounded by  $x^2 + y^2 = 4$  and  $x^2 + z^2 = 1$  is(A)  $\frac{8}{3}$  (B)  $\frac{16}{3}$  (C)  $\frac{32}{3}$  (D)  $\frac{64}{3}$  (E) none of these

貳、證明與計算題：(每題 10 分，共 40 分)

1. Using the Definition of a Limit, show that  $\lim_{x \rightarrow -3} (2x + 1) = -5$ .2. Show that  $f(x) = \sqrt{2x+1} + 2x$  is continuous at 3.3. Evaluate  $\int_3^4 |-3x + 6| dx$ 4. Find the area of the region bounded by the graphs of  $y^2 = -3x$ , $x - y = 4$ ,  $y = -2$ ,  $y = 2$ , by means of a double integral.