臺中健康暨管理學院

九十四學年度大學部轉學招生考試試題紙

學系別	考試科目	考試日期	時　　間	備　　註
電腦與通訊學系三年級	微積分	94.7.30	10:20-12:00	

可用計算機　(但不能互借)

1. Find (5% each)

   (1) $\lim_{x\to 0} x\cot 3x$

   (2) $\lim_{x\to\frac{\pi}{4}} \dfrac{\sin(x-\frac{\pi}{4})}{(x-\frac{\pi}{4})^2}$

2. Show that $\lim_{x\to\infty}(x^2+1)^{1/\ln x} = e^2$ (hint: Taking the logarithm and then applying L'Hospital's rule) (10%)

3. Differentiate (5% each)

   (1) $f(x) = (1+2x)^5$

   (2) $f(x) = [(1+2x)^5 + (3-5x)^4]^6$

   (3) $f(x) = (\cos 5x)^{\cos 5x}$

4. Calculate these indefinite integrals. (5% each)

   (1) $\int \dfrac{1}{x(\ln x)^3}\,dx$　　(2) $\int x\sqrt{2x-1}\,dx$

   (3) $\int e^{3x}\cos 2x\,dx$　　(4) $\int \sec x\,dx$

   (5) $\int \dfrac{1}{9+4x^2}\,dx$

5. What is the maximum volume for a rectangular box (square base, no top) made from 12 square feet of cardboard? (10%)

6. A ladder 13 feet long is leaning against the side of a building. If the foot of the ladder is pulled away from the building at the rate of 0.5 feet per second,

   (1) how fast will the top of the ladder be dropping at the instant when the base is 5 feet from the wall? (10%)

   (2) how fast is the angle formed by the ladder and the ground changing at the same instant ? (10%)

7. Let Ω be the region under the curve $y = \sin x$, $x \in [0, \frac{\pi}{2}]$. Find the volume of the solid generated by revolving Ω about the x-axis. (10%)

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※試題請隨卷繳回

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