

亞洲大學

96 學年度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(A)	96.07.23	08:20-10:00	共 1 頁

Keep important details of calculation in your answer sheet.

#1. Evaluate the indefinite integral $\int \frac{x^2+2x+3}{x^3+x} dx$. (15 points)

#2. Find the derivative $f'(x)$ if following functions $f(x)$

(a) $f(x) = x^{\ln x}$ (b) $f(x) = \int_1^{x^2} \sqrt{1+t^2} e^t dt$. (15 points)

#3. If $z = f(x, y)$, where $x = r \cos \theta$ and $y = r \sin \theta$. Show $\frac{\partial^2 z}{\partial r^2} + \frac{\partial^2 z}{\partial \theta^2} = \frac{\partial^2 z}{\partial r^2} + \frac{1}{r^2} \frac{\partial^2 z}{\partial \theta^2} + \frac{1}{r} \frac{\partial z}{\partial r}$. (20 points)

#4. Use series to estimate the definite integrals $\int_0^1 e^{-x^2} dx$ correct to within an error 0.001. (15 points)

#5. Find the volume of the smaller wedge cut from a sphere of radius a by two planes that intersect along a diameter at an angle of $\frac{\pi}{6}$. (20 points)

#6. Evaluate the line integral $\int_C (2xz + y^2) dx + (2xy + y) dy + (x^2 + 3z^2) dz$. where C is the trace of the helix $\gamma(t) = (\cos t, \sin t, t)$, $0 \leq t \leq \frac{\pi}{4}$. (15 points)