元智大學 103 學年度研究所 碩士班 招生試題卷

系(所)別：工業工程與管理學系碩士班　組別：不分組　科目：微積分　用紙第 1 頁共 1 頁

●不可使用電子計算機

1. (10% for each sub-problem) Find f_x, f_y, and f_z of the following functions: (a) $f(x,y,z)=\left(x^2+y^2+z^2\right)^{-1/2}$, and (b) $f(x,y,z)=yz\ln(xy)$, respectively.

2. (20%) Find the radius of convergence and interval of convergence of the series $\sum_{n=1}^{\infty}\frac{(x-1)^n}{n^3 3^n}$.

3. (10% for each sub-problem) Evaluate the following integrals: (a) $\int e^{-y}\cos y dy$, and (b) $\int\frac{(\ln x)^3}{x}dx$, respectively.

4. (5% for each sub-problem) Find the volumes of the solids generated by revolving the region bounded by $y=\sqrt{x}, y=2, x=0$ about the given axes (a) the x-axis, (b) the y-axis, (c) the line $x=4$, and (d) the line $y=2$, respectively.

5. (20%) Analyze and sketch the function $y=\frac{8x}{x^2+4}$. Name any intercept, asymptotes, symmetry, extrema, point of inflection, etc. if applicable.

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