

國立宜蘭大學 104 學年度第 2 學期 期末 考試試題紙			第 頁
考試科目	班 級	學 號	姓 名
微積分二			

Multiple choices (60 points)

- () Find the radius of convergence of the power series $\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!}$. (a) ∞ (b) 1 (c) 2 (d) 3
- () Find the interval of convergence of the power series $\sum_{n=1}^{\infty} (-1)^{n+1} (n+1)x^n$. (a) $(-1,1)$ (b) $(-1,1]$
(c) $[-1,1)$ (d) $[-1,1]$
- () Consider the function given by $f(x) = \sum_{n=1}^{\infty} \frac{x^n}{n}$. Find the intervals of convergence for $\int f(x)dx$. (a)
 $(-1,1)$ (b) $(-1,1]$ (c) $[-1,1)$ (d) $[-1,1]$
- () Find a power series for $f(x) = \frac{4}{x+2}$, centered at 0. (a) $\sum_{n=0}^{\infty} 4(-\frac{x}{2})^n$ (b) $\sum_{n=0}^{\infty} (-\frac{x}{2})^n$ (c)
 $\sum_{n=0}^{\infty} 2(-\frac{x}{2})^n$ (d) $\sum_{n=0}^{\infty} (-x)^n$
- () Find f_x and f_y and each at $(1, \ln 2)$ for $f(x, y) = xe^{x^2y}$. (a) $f_x = 4 \ln 2, f_y = 2$ (b)
 $f_x = 4 \ln 2 + 2, f_y = 2$ (c) $f_x = 4 \ln 2 + 1, f_y = 2$ (d) $f_x = \ln 2 + 2, f_y = 2$
- () Find $\frac{\partial w}{\partial s}$ for $w = 2xy$ where $x = s^2 + t^2$ and $y = \frac{s}{t}$. (a) $\frac{6s+2t}{t}$ (b) $\frac{6s+2t}{t^2}$ (c)
 $\frac{6s^2+2t^2}{t^2}$ (d) $\frac{6s^2+2t^2}{t}$
- () Find $\frac{\partial w}{\partial t}$ when $s = 1$ and $t = 2\pi$ for $w = xy + yz + xz$ where $x = s \cos t, y = s \sin t,$
and $z = t$. (a) 1 (b) 2 (c) $2 + 2\pi$ (d) 2π
- () Find $\frac{\partial w}{\partial r}$ and $\frac{\partial w}{\partial \theta}$ for $w = \arctan \frac{y}{x}$ where $x = r \cos \theta$ and $y = r \sin \theta$. (a) $\frac{\partial w}{\partial r} = 0, \frac{\partial w}{\partial \theta} = 1$
(b) $\frac{\partial w}{\partial r} = 1, \frac{\partial w}{\partial \theta} = 0$ (c) $\frac{\partial w}{\partial r} = 0, \frac{\partial w}{\partial \theta} = 0$ (d) $\frac{\partial w}{\partial r} = 1, \frac{\partial w}{\partial \theta} = 1$
- () Find $\frac{d^2 w}{dt^2}$ when $t = 0$ for $w = \arctan(2xy)$ where $x = \cos t, y = \sin t$. (a) 1 (b) 2 (c)
 $\frac{1}{\sqrt{2}}$ (d) 0
- () Find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ when $xz + yz + xy = 0$ (a) $\frac{\partial z}{\partial x} = -\frac{x+z}{x+y}, \frac{\partial z}{\partial y} = -\frac{y+z}{x+y}$ (b)

$$\frac{\partial z}{\partial x} = -\frac{y+z}{x+y}, \frac{\partial z}{\partial y} = -\frac{x+z}{x+y} \quad (c) \quad \frac{\partial z}{\partial x} = -\frac{x}{z}, \frac{\partial z}{\partial y} = -\frac{y}{z} \quad (d) \quad \frac{\partial z}{\partial x} = -\frac{y}{z}, \frac{\partial z}{\partial y} = -\frac{x}{z}$$

Calculation

1. Evaluate the iterated integrals (a) $\int_0^2 \int_{y^2}^4 dx dy$, (b) $\int_0^{\pi/2} \int_0^1 y \cos xy dx$, and (c) $\int_0^{\ln 4} \int_0^{\ln 3} e^{x+y} dy dx$. (24 points)

2. Find the volume of the solid region bounded by the paraboloid $z = 4 - x^2 - 2y^2$ and the xy -plane. (16 points)

