大同大學 99 學年度(寒)轉學入學考試試題

考試科目:微積分　　所別:各系所　　第全頁

註:本次考試不可以參考自己的書籍及筆記；不可以使用字典；不可以使用計算器。

1. Find the derivatives of the following functions. (12%)

(a) $f(x)=x^2e^x$　　(b) $g(x)=\dfrac{\sqrt{x}}{x^2+1}$

2. Evaluate the following limits. (18%)

(a) $\lim_{x\to 0} x^3\sin(x^2)$　　(b) $\lim_{x\to 0}\dfrac{1-\cos x}{2x^2}$　　(c) $\lim_{x\to 1}\dfrac{1-x}{\ln x}$

3. Determine whether the series is convergent or divergent. (12%)

(a) $\sum_{n=1}^{\infty}\cos(\frac{5}{n})$　　(b) $\sum_{n=1}^{\infty}\dfrac{3^n}{n!}$

4. Evaluate the following integrals. (18%)

(a) $\int x\sqrt{1+x^2}\,dx$　　(b) $\int x\cos x\,dx$　　(c) $\int\dfrac{1}{x^2+x-2}\,dx$

5. Find an equation of the tangent line to the graph of $2x^3y^2-x^2y^3+2x+5y=0$ at the point $(-1,1)$. (6%)

6. Find $\partial z/\partial x$ and $\partial z/\partial y$, given $2xz^2+x^2y^2-z^3+2yz+1=0$. (6%)

7. Find the length of the arc from $\theta=0$ to $\theta=2\pi$ for the curve $r=1-\cos\theta$. (8%)

8. Find the minimum distance from the point $(1,-1,0)$ to the surface $z=x^2+y^2$. (10%)

9. Find the volume of the solid region R bounded above by the paraboloid $z=1-x^2-y^2$ and below by the plane $z=1-x$. (10%)