國立臺北大學106學年度碩士班一般入學考試試題

系（所）組別：都市計劃研究所甲組

科　　目：微積分

☐可 ☑不可使用計算機

1. (20%) Evaluate the following limit.

   A. $\lim_{x\to\infty}\left(\frac{x^3}{x^2+2}-x\right)$

   B. $\lim_{x\to 4}\frac{x^2+7x-44}{x^2-6x+8}$

2. (20%) Find dy/dx.

   A. $x^2+y^2=25$

   B. $y^2+x^3-y^3+6=3y$

3. (30%) Evaluate the following integrals.

   A. $\int\frac{e^x}{1+e^{2x}}dx$

   B. $\int_4^9\frac{x+1}{x+2\sqrt{x-3}}dx$

   C. $\int x^2(3-2x)^9\,dx$

4. (10%) Find the radius of convergence and its interval of convergence for

   $(x+2)-2(x+2)^2+4(x+2)^5-8(x+2)^7+16(x+2)^9+\cdots$.

5. (10%) Find the local extrema of $f(x)=|x^2-x|$.

6. (10%) Find the volume of the solid obtained by rotating the region bounded by the given curves $y=x^{3/2}$, $y=8$ and $x=4$ about the x axis.

試題隨卷繳交