國立屏東教育大學100學年度學士班轉學招生考試

微積分 試題

（應用數學系/資訊科學系/應用物理系/電腦與智慧型機器人學士學位學程）

＊注意事項：(1) 本試題共1頁，答案請「橫式」書寫，並依規定上下翻頁，否則不予計分。
(2) 不必抄題，但請依序將題號標出，並寫在答案紙上。

1. Find the vertical asymptotes of $f(x)=\dfrac{x^2+2x-8}{x^2-4}$. (10%)

2. Find the equation of tangent line of $f(x)=x^2$ at $x=-2$. (10%)

3. Find the derivative of $f(x)=3x^2\sin^2 x$. (10%)

4. Find the derivative of $f(x)=x^2\sqrt{1-x^2}$. (10%)

5. Prove $\lim_{x\to\infty}\dfrac{\sin x}{x}=0$ (10%)

6. Find the limit: (16%)

(a) $\lim\limits_{x\to 0}\dfrac{x^2\cos\dfrac{1}{x}}{\sin x}$; (b) $\lim\limits_{x\to 0^+}\sqrt{x}^{\sqrt{x}}$.

7. Find the interval of convergence of $\sum\limits_{i=1}^{\infty}\dfrac{(x-2)^i}{3^i i^2}$. (10%)

8. Find the tangent line to the folium of Descartes given by $x^3+y^3=3xy$ at the point (3/2, 3/2). (12%)

9. Find the area of the region R bounded by the line $y=\dfrac{1}{2}x$ and the parabola $y^2=8-x$. (12%)