

國立中央大學八十七學年度碩士班研究生入學試題卷

所別: 財務管理研究所 乙組 科目:

微積分

共一頁 第一頁

每題 10 分

1. Evaluate $\lim_{h \rightarrow 0} \frac{\sqrt[3]{x+h+5} - \sqrt[3]{x+5}}{h}$
2. Evaluate $\lim_{n \rightarrow \infty} \frac{\sqrt{1} + \sqrt{2} + \sqrt{3} + \dots + \sqrt{n}}{n \sqrt{n}}$
3. Find $g'(x)$, where $g(x) = \frac{\frac{1}{x} + \ln(2x^2+1)}{x-1}$
4. Find $\frac{d^2y}{dx^2}$, where $\sqrt{x} + \sqrt{y} = 1$
5. Evaluate (a) $\int_0^1 \sqrt{x^4+x^7} dx$ (b) $\int_1^3 5^{-x} dx$
6. Test for convergence of $\sum_{n=1}^{\infty} \frac{1}{1+2+3+\dots+n}$. If the series converges, find its sum.
7. Find the interval of convergence of $\sum_{n=1}^{\infty} \frac{2^n (x-1)^n}{n}$.
8. Find the relative extrema of $f(x,y) = x^2 - 2xy + \frac{1}{3}y^3 - 3y$.
9. Show that the shortest distance from the point (x_0, y_0, z_0) to the plane $ax+by+cz = E$ is
$$d = \frac{|E - ax_0 - by_0 - cz_0|}{\sqrt{a^2 + b^2 + c^2}}$$
10. Use differentials to approximate $\sqrt[3]{(2.06)^2 + (1.97)^2}$