

銘傳大學九十二學年度轉學生招生考試

七月二十五日 第三節

微積分 試題

(不可使用計算機)

※僅有答案，無適的理由與計算過程者，以零分計算!

1. Please evaluate

$$\frac{d}{dx} \cos(\csc^{-1}(\ln x)) \quad (20\text{pt.})$$

2. Please evaluate

$$\int \frac{x^4 + x^2 + x + a^2 + 1}{x^2 \cdot \sqrt{a^2 + x^2}} dx \quad x \neq 0 \quad (20 \text{ pt.})$$

3. Please prove that the volume (V) and surface area (A) of a sphere with radius R are equal to (20 pt.)

$$V = \frac{4}{3}\pi R^3 \quad \text{and} \quad A = 4\pi R^2$$

4. Assume that the error function is defined as

$$\text{erf}(x) = \frac{2}{\sqrt{\pi}} \int_0^x e^{-t^2} dt$$

Please prove that

$$\text{erf}(x = \infty) = 1 \quad (20\text{pt.})$$

5. Please evaluate

$$\int \frac{x^4 + (2 - a^2)x^2 + a^2}{x^2 \cdot (x^2 - a^2)^{\frac{3}{2}}} dx \quad x \neq 0 \quad x \neq \pm a \quad (20 \text{ pt.})$$

試題完