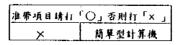
系別: 商管組三年級

科目:微積分



節次: 7 月 / 4 日第 4 節 木材 顆 止 1 頁

請詳列演算過程, 否則不予計分, 每題 10 分, 共 10 題

1. Let
$$f(x) = \begin{cases} 2x^2 - 5x + 4 & x \ge 1 \\ -7x + 8 & x < 1 \end{cases}$$
, Is f continuous at x=1? Give your reason.

2. Let
$$f(x) = \ln(x^2 + 1) + \frac{2}{\sqrt{x^3}} - 5x$$
, find $f'(x)$.

- 3. Suppose that $e^{xy} = x^2 + y^2$, find $\frac{dy}{dx}$.
- 4. Researchers interested in modeling the rate at which animals grow have used the model, $y = t + \sin(\frac{nt}{4}) + B$, where y is the height in contimeters, B is the birth height, and t is in units of months from birth. Find the maximum and minimum values of the rate of growth, $\frac{dy}{dt}$, and the times during the first year at which they occur.
- 5. Evaluate $\int x^3 \sqrt{1+x^2} dx$.
- 6. What is the fair price to pay today for a stand of timber that will yield \$1000 worth of lumber per year indefinitely, assuming the operating costs are negligible and that prevailing interest rates remain constant at $\dot{r} = 5\%$?
- 7. Determine whether the series, $\sum_{n=1}^{\infty} \frac{\cos n\pi}{\sqrt{1+n}}$, is convergent or divergent? Give your reason.
- 8. Approximate sin(0.3) accurate to the 4th decimal place. Give the maximal possible error.
- 9. Find and classify all relative extrema for the function $f(x, y) = x^4 + y^4 4xy$.
- 10. Find the volume of the solid that is bounded by the surface $z = y\sqrt{1 + x^3}$ and over the region bounded by x- axis, y=x and x=2.