

淡江大學九十三年學年度轉學生招生考試試題 60-1 60

系別：商管組三年級

科目：微 積 分

准帶項目請打「○」否則打「×」	
×	簡單型計算機

節次： 7 月 14 日第 4 節
本試題共 1 頁

請詳列演算過程，否則不予計分，每題 10 分，共 10 題

1. Let $f(x) = \begin{cases} 2x^2 - 5x + 4 & x \geq 1 \\ -7x + 8 & x < 1 \end{cases}$, 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, $y = t + \sin\left(\frac{\pi t}{4}\right) + B$, where y is the height in centimeters, 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 $r = 5\%$?
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 $z = y\sqrt{1+x^2}$ and over the region bounded by x -axis, $y=x$ and $x=2$.