

淡江大學 97 學年度碩士班招生考試試題

系別：產業經濟學系

科目：微 積 分

A

准帶項目請打「V」	
✓	簡單型計算機

本試題共 / 頁， 大題

1. Assume that the equation $F(u; x, y) = u^3x^2 + 3xy + yu + y^2 - 13 = 0$ implicitly defines a utility function $u = f(x, y)$ around the point $(u = 1, x = 1, y = 2)$. Please find the marginal utilities of x and y , and the slope of the indifference curve. Then evaluate them at that point. (15)
2. Find the partial total derivative $\partial z / \partial v$, given $z = (x + 2y)^2(2x - y)^3 + v^2$, where $x = u^2 + 2v, y = 2u - v^3$. (10)
3. Suppose that an investment \$A at the present time ($t=0$) will increase the value according to the function $V = e^{3\sqrt{t}}$. Let the discount rate (on the continuous basis) be r . Please find the optimal time for this investment project. Be sure to check the first and second order conditions. (15)
4. Find the derivatives of $y = 2xe^{1-x^2} + \ln\left(\frac{2x}{1-3x}\right)$. (10)
5. Find dy for the function $y = \frac{x_1x_2}{2x_1 - x_2^2}$. (10)
6. Find the extreme values of $z = -x_1^3 + 2x_1x_2 + 2x_3 - x_2^2 - x_3^2$, and check if they are maximum, minimum, or inflection point. (15)
7. Check whether the function $z = x_1 - \ln x_2^2$ is quasiconcave, quasiconvex, both, or neither. (10)
8. Solve the first-order linear differential equations: $\frac{dy}{dt} + t^2y = 2t^2, y(0) = 6$ and $\frac{dy}{dt} + 4t^2y = 0$. (15)