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淡江大學 102 學年度日間部轉學生招生考試試題

系別：產業經濟學系三年級　　　　科目：微　積　分

考試日期：7 月 24 日(星期三) 第 4 節　　　　本試題共　九大題，　1 頁

1.(10%)Compute the derivatives of.

　　(i) $f(x) = x^{x+1}$　　　(ii) $f(x) = (\dfrac{1}{\sqrt{x^2+1}} + xe^x)^5$

2.(10%)Use definition to find the derivative of $f(x) = x^2 + 4\sqrt{x}$.

3.(10%) Find the slope of the curve $y^4 + x^4 - 2x^2y^2 = 9$, at the point (2, 1).

4. (20%)Find the relative extrema of

(a) $f(x) = x^4 + 8x^3 + 18x^2 - 8$　　　(b) $f(x,y) = x^4 + y^4 - 4xy + 1$

5. (10%)Maximize and minimize $f(x,y) = 4xy$ subject to the constrain $x^2 + y^2 = 50$

6.(10%)Compute the following improper integrals

　　(a) $\displaystyle\int_e^\infty \dfrac{(\ln x)^2}{x} dx$　　　　　(b) $\displaystyle\int_0^\infty x^2 e^{-x} dx$

7. (12%) Evaluate the following double integrals

　(a) $\displaystyle\iint\limits_R ye^{xy} dA$　with　$R = \{(x,y)\,|\,-1 \le x \le 1, -2 \le y \le 2\}$

　(b) $\displaystyle\int_0^1 \int_{x^2}^1 xe^{y^2} dy\,dx$

8. (8%) Find the area between the curves $y = 12 - 3x^2$ and $y = 4x + 5$ from x=0 to x=3.

9.(10%) Compute the following integrals

　　(a) $\displaystyle\int \dfrac{1}{x^2 - 1} dx$　　　　　(b) $\displaystyle\int x^3 e^{x^2} dx$.