淡江大學八十七學年度碩士班入學考試試題

系別： 產業經濟學系　　科目： 微積分

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一、20% Find (i) $\int \frac{x^2+2x+4}{(x+1)^3}dx$　　(ii) $f'(x)=\lim_{h\to 0}\frac{\ln(x+h)-\ln(x)}{h}$

[Hint: using the fact $e=\lim_{n\to\infty}(1+\frac{1}{n})^n$]

二、20% Where is $f(x)=\frac{x}{1+x^2}$ concave up and where is it concave down? Sketch the graph of f.

三、20% The Betty Moore Company require that its corned beef hash containner has a capacity of 54 cubic inches, have the shape of right-circular cylinder, and be made of tin. Determine the radius and height of the containner that require the least amount of Metal.

四、20% The owner of a local cinema is considering two alternative plans for renovating and improving the theater. Plan A calls for an immediate cash outley of $250000, where plan B calls for an immediate cash outley of $180000. It has been estimated that adopting plan A would result in a net income stream generated at the rate of $f(t)=630000$ dollars/year, where plan B is $g(t)=580000$ dollars/year for the next three years. If the prevailing interest rate for the next three years were 10% per year, which plan would generate a higher net income by the end of three years?

五、20% Show that "the level of elasticity of demand determine the increase or decrease of total revenue".

(Hint: start at $R=xp$, then find $\frac{dR}{dp}$)