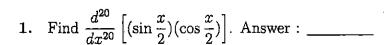
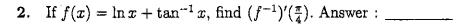
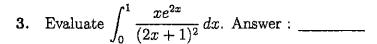
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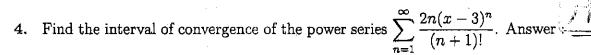
科目<u>微積分</u>類組別<u>A3 A4 A5 A7 951</u> 共<u>/</u>頁 第<u>/</u>頁 *請在答案卷內作答

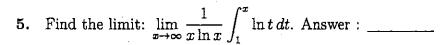
甲、填充題:共8題,每題8分,共64分。請將答案依題號順序寫在答案卷上。

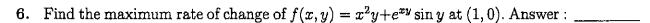












7. Find
$$\lim_{(x,y)\to(0,0)} \frac{\cos(x^2+y^2)-1}{x^2+y^2}$$
.

8. Evaluate $\int_0^1 \int_0^{1-x} \sqrt{x+y}(y-2x)^2 dy dx$ by applying the transformation u=x+y, v=y-2x and integrating over a appropriate region in the uv-plane. Answer:

乙、計算、證明題:共3題,每題 12分,共36分。須詳細寫出計算及證明過程,否則不予計分。

- 1. Sketch the region of integration, reverse the order of integration, and evaluate the integral $\int_0^3 \int_{\sqrt{x/3}}^1 e^{y^3} \, dy dx.$
- 2 Find the counterclockwise circulation for the field $\mathbf{F} = (x + e^x \sin y)\mathbf{i} + (x + e^x \cos y)\mathbf{j}$ along the curve C: The right-hand loop of the lemniscate $r^2 = \cos 2\theta$.
- 3. A manufacturer finds that it takes x units of labor and y units of capital to produce $f(x,y) = 100x^{3/4}y^{1/4}$ units of product. If a unit of labor costs \$100, a unit of capital costs \$200, and \$200,000 is budgeted for production, determine how many units should be expended on labor and how many units should be expended on capital in order to maximize production.