

元智大學 107 學年度 轉學考 招生試題卷

系(所)別：工業工程與管理學系學士班 組別：工業工程與管理學系 2 年級 科目：微積分

用紙第 1 頁共 1 頁

● 不可使用電子計算機

1. Evaluate the double integral $\int_0^{10\sqrt{\ln 6}} \int_{y/10}^{\sqrt{\ln 6}} e^{x^2} dx dy$. (20%)
2. Given the parametric equations $x = 1 - 10\sin t$, $y = 1 + 9\cos t$, find $\frac{d^2y}{dx^2}$ in terms of t . (18%)
3. Determine whether the series is convergent or divergent. (show your work)
 - A. $\sum_{n=1}^{\infty} \frac{9^n}{n!n}$ (5%)
 - B. $\sum_{n=1}^{\infty} \frac{(-1)^n}{n+4}$ (5%)
4. Find the directional derivative of $f(x, y) = 2\sqrt{x} - y^3$ at the point $(1, 3)$ in the direction toward the point $(3, 1)$. (20%)
5. Find the points on the surface $z^2 = xy + 49$ that are closest to the origin. (17%)
6. At what point is the following function a local maximum?
 $f(x, y) = 3 - 8x + 12y - 4x^2 - 6y^2$ (15%)