國立政治大學 107 學年度 碩士班 招生考試試題

考試科目	微積分	系所別	風險管理與保險學系/精算科學組	考試時間	2 月 2 日(五) 第 1 節

1. Find $\lim_{t\to 0}\frac{sin(\cos t)}{\sec t}$ (10%)

2. Find the volume of the solid obtained by rotating the region bounded by the following curves about the x-axis: (10%)

$$y = |x+2|, y = 0, x = -3, x = 0$$

3. Evaluate $\int_1^4 ln\sqrt{x}dx$ (10%)

4. Determine whether the following series is convergent. If it is, find its sum. (10%)

$$\sum_{t=1}^{\infty} 2\left(\frac{3}{4}\right)^{t-1}$$

5. Find the area under $y = x^2 + 1, \quad 0 < x < 3$ (10%)

6. Find the point on the plane $x + 2y + 3z = 4$ that is closest to the origin. (10%)

7. Find the area of the region inside the circle $r = 3\cos\theta$ and outside the cardioid $r = 1 + \cos\theta$ (10%)

8. Solve the following differential equation: (10%)

$$y' - 2xy = 2xe^{x^2}, y(0) = 3$$

9. Find $\lim_{t\to -\infty}\sqrt[3]{t}$ (10%)

10. Find $\int_1^2\int_1^2 x^2y\,dydx$ (10%)

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。