

考試科目	微積分 41832	所別	風險管理與保險學系/ 精算科學組	考試時間	2 月 27 日(六) 第 1 節
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Please show all your work.

- (10%) Suppose the point X is (2, 0). Find the points on $-x^2 + y^2 = 4$ that are closest to the point X.
- (10%) Find the line that is tangent to the curve $y = (x^2 + 1)^{-1}$ at the point $(-1, \frac{1}{2})$.
- (10%) Evaluate $\int_0^t \frac{y \sin y}{1 + \cos^2 y} dy$
- (10%) Find the solution to $\frac{dy}{dx} = \frac{\sin x}{\sin y}$ that satisfies $y(0) = \frac{\pi}{2}$
- (10%) Suppose point A is (6, 5, -2). What is the equation of the plane passing through point A and in the meanwhile parallel to the plane $x + y - z = -1$?
- (10%) Find $\lim_{(x,y) \rightarrow (\pi,\pi)} x \sin\left(\frac{x+y}{4}\right)$
- (10%) Evaluate $\int_0^\pi \int_0^2 \int_0^{\sqrt{4-t^2}} t \sin y dx dt dy$
- (10%) Find the gradient vector field of $f(x, y) = x^5 - 4x^2y^3$
- (10%) Solve the differential equation $y' - 2xy = x$
- (10%) Find the area of the region bounded by the following curves: $y = 2x$, $y = x^2 - 4x$

備註 一、作答於試題上者，不予計分。
二、試題請隨卷繳交。