

考試科目	微積分 41832	系所別	風險管理與保險學系/ 精算科學組	考試時間	2月18日(六)第1節
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Please show all your work.

1. A plane is flying horizontally at a speed of 500 km per hour and an altitude of 1 km. It passes directly over a school. Find the rate at which the distance from the plane to the school is increasing when it is 2 km away from the school. (10%)
2. Find the area under the curve  $y = \sin x$  on the interval  $[0, \pi]$ . (10%)
3. Evaluate  $\int_{-2}^2 \frac{1}{y^2-1} dy$  (10%)
4. Find the values of  $y$  for which the series  $\sum_{n=0}^{\infty} (y-3)^n$  converges. (10%)
5.  $z = x \sin y$ , find  $\frac{\partial^3 z}{\partial y^2 \partial x}$ . (10%)
6. Evaluate  $\int_C x^2 dx + y^2 dy$ , where  $C$  is the curve  $x^6 + y^6 = 1$ . (10%)
7. Evaluate  $\int_0^3 \int_{y^2}^9 y \cos(x^2) dx dy$  (10%)
8. Find the center of the sphere  $x^2 + y^2 + z^2 = x$  (10%)
9. Find  $\lim_{y \rightarrow -\infty} (\sqrt{y^2 + y + 1} + y)$  (10%)
10.  $\int_0^{\frac{\pi}{2}} x \cos 2x dx$  (10%)

備

註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。