

本試題是否可以使用計算機: 可使用, 不可使用 (請命題老師勾選)

Calculus (2007)

1. (20 pts) Find $\frac{d}{dx} \int_1^{x^4} \sec t \, dt$.
2. (20 pts) Find $\lim_{t \rightarrow 0} \frac{2^t - 1}{t}$.
3. (20 pts) Give a numerical example that demonstrates the following property of vector products: $\vec{a} \times \vec{b} = -\vec{b} \times \vec{a}$.
4. (20 pts) Solve the following initial-value problem:
$$y'' + y' - 6y = 0, \text{ where } y(0) = 1 \text{ and } y'(0) = 0.$$
5. (20 pts) Find the area of the region bounded by the line $y = x - 1$ and the parabola $y^2 = 2x + 6$.