

除了選擇, 填充和簡答題之外, 你的答案必須提供完整說明, 如果只有答案沒有任何說明得零分!

1. (5+5=10 points) Find the limits: (a) $\lim_{x \rightarrow 0} \frac{\sin(x^2)}{x}$ (b) $\lim_{x \rightarrow 1} \frac{\sin(x-1)}{x^2+x-2}$

2. (3+3+4=10 points) 簡答題. Find the derivatives: (a) $y = 5^{\sqrt{x}}$

(b) $f(t) = \csc(\pi t)$

(c) $y = e^{\tan x}$.

3. (5+5=10 points) 簡答題. Find the derivatives: (a) $F(t) = \left(\frac{1}{2t+1} \right)^4$

(b) $y = e^{z/(z-1)}$

4. (10 points) Find an equation of the tangent line to the curve $y = \frac{\cot 2t}{e^t}$ at the point $(\pi/4, 0)$.
5. (10 points) Find the derivative $f(t) = \tan \sqrt{1+t^2}$ and compute $f'(1)$.
6. (10 points) Find the derivative $f(x) = (1 + \cos^2 x)^3$ and compute $f'(\pi/4)$.