系級..... 組別: A / B 學號 ..... 姓名.....

微積分 (I) Quiz #8 (45 minutes) 2023/12/4

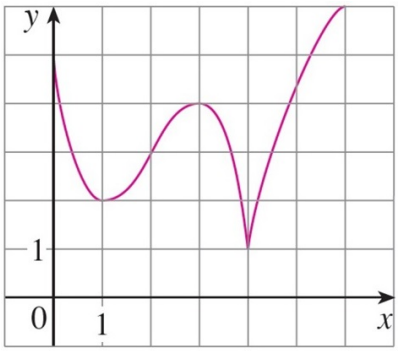
除了選擇,填充和簡答題之外，你的答案必須提供完整說明，如果只有答案沒有任何說明得零分!

1. (6+10+6=22 points) 求以下定積分: (a) $\int_0^{\pi/6} \frac{\sin x}{\cos^2 x}\, dx$

(b) $\int_0^{\pi} (\sin^2 x - \sin^3 x)\, dx$

(c) $\int_0^{\pi/2} \cos x \cdot \sin(\sin x)\, dx$

2. (10 points) 填充題. 依照以下$y = f(x)$在區間$[0,6]$的圖形回答下列問題:



(a) The open intervals on which f is increasing.

(b) The open intervals on which f is decreasing.

(c) The open intervals on which f is concave upward.

(d) The open intervals on which f is concave downward.

(e) The coordinates of the points of inflection.

(f) 產生絕對極大值與絕對極小值的 x 座標

3. (7+7=14 points) 計算以下積分: (a) $\int_0^{\pi/2} \sin^2(x)\cos^2(x)\ dx$

(b) $\int \tan^2(x)\cos^3(x)\ dx$

4. (6+3+5=14 points) Let $f(x) = e^{2x} + e^{-x}$.

(a) Find the intervals on which f is increasing or decreasing.

(b) Find the local maximum and minimum values of f.

(c) Find the intervals of concavity and the inflection points.