

科目：微積分

適用：財金系

考生注意：

1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

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編號：264

一、填充題(共 80 分，每空格 8 分，不需列出計算過程)

1. $\lim_{x \rightarrow \infty} \frac{3x^2 + 8x - 4}{2x^2 + 4x - 5} = \underline{\hspace{2cm}}$

2. If $h(x) = \left[3x + \frac{1}{g(x)}\right]^{3/2}$, where $g(1) = g'(1) = 1$. Find $h'(1) = \underline{\hspace{2cm}}$

3. $\int_0^2 \int_0^1 x e^{xy} dy dx = \underline{\hspace{2cm}}$

4. Let $z = f(x+1) + f(1-x)$, Find $\left. \frac{dz}{dx} \right|_{x=0} = \underline{\hspace{2cm}}$

5. Let $h(x) = \frac{e^{2x}(x^2+3x+1)^{10}(x+1)^2}{(x^2-3)^6(x+3)^{12}}$, then $h'(-2) = Ae^{-4}$, find

$A = \underline{\hspace{2cm}}$

6. $\int_0^{\infty} x e^{-x} dx = \underline{\hspace{2cm}}$

7. $\int_0^1 \int_0^{1-x} \sqrt{x+y} (y-x)^2 dy dx = \underline{\hspace{2cm}}$

8. $\int_{-\infty}^{\infty} \frac{1}{1+x^2} dx = \underline{\hspace{2cm}}$

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9. Find the slope of circle $x^2 + y^2 = 25$ at the point (3,-4).

Ans: _____

10. Find the area of the region bounded by the graphs of $x = y^2$ and $y = x - 2$. Ans: _____

二、計算題(共 20 分，沒有列出計算過程者不予計分)

1. (10 分) In a survey, it was determined that the demand equation for product A is given by

$$f(p_1, p_2) = 220 - 2p_1 + 1.5p_2$$

and the demand for product B is given by

$$g(p_1, p_2) = 400 + 0.8p_1 - 1.6p_2$$

where P_1 and P_2 denote the unit price, respectively, and x and y denote the number of product A and the number of product B demand each week. Determine whether these two products are substitute, complementary, or neither.

2. (10 分) Determine constants a , b , and c so that

$$\lim_{x \rightarrow 1} \frac{ax^4 + bx^3 + 1}{(x-1)\sin(\pi x)} = c$$