

科目：微積分 適用：財金系二

編號：242

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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In the process of solving the following questions, one must clearly describe your calculation processes (10 % per question).

1. Find the derivative of $f(x) = \frac{7}{x^3}$

2. Differentiate : $y = \frac{2x}{1-3x^2}$

3. Find the horizontal asymptote for $f(x) = \frac{2x^2 + x - 7}{x^2 - 1}$

4. Find $\frac{dy}{dx}$ using implicit differentiation : $y^3 + \frac{1}{e^y} = \ln \sqrt{x} + 4x$

5. A company produces a product for which the marginal cost of producing x units is

$$\frac{dC}{dx} = 0.12x + 8$$

and fixed costs are \$ 1500. Find the average cost of producing 50 units.

6. Integrate : $\int 3x\sqrt{5-x} dx$

7. Find $f_y(x, y)$ for $f(x, y) = 2x^2y + xy^2 - y^3$

8. Find the limit : $\lim_{x \rightarrow \infty} \frac{\ln(x-4)}{x^2}$

9. Find the third-degree Taylor polynomial centered at 0 for $f(x) = e^x$

10. Evaluate $\int_0^1 \int_1^2 ye^{x^2} dx dy$ reversing the order of integration.