科目：微積分　　適用：財金系

編號：264

一、填空題(共 80 分，每空格 8 分，不需列出計算過程)

1. $\lim\limits_{x\to\infty}\dfrac{3x^2+8x-4}{2x^2+4x-5}=$ _____

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

3. $\int_0^2\int_0^1 xe^{xy}\,dy\,dx=$ _____

4. Let $z=f(x+1)+f(1-x)$, Find $\left.\dfrac{dz}{dx}\right|_{x=0}=$ _____

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

   A=_____

6. $\int_0^\infty xe^{-x}\,dx=$ _____

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

8. $\int_{-\infty}^\infty \dfrac{1}{1+x^2}\,dx=$ _____
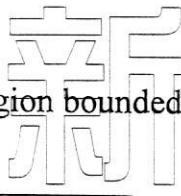
國立暨南國際大學 107 學年度碩士班入學考試試題　第 3 節

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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。

本 試 題
共 乙 頁
第 乙 頁

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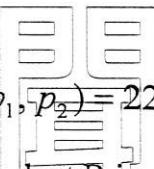
   Ans:_____

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

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