國立暨南國際大學 108 學年度碩士班入學考試試題

科目:微積分

編號:213

適用:經濟系(經濟分析組)

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。

共 頁 第 / 頁

1. (16%) Let f and g be functions whose first and second derivatives exist on an interval. Which of the following formulas is (are) true?

(a)
$$fg''-f''g = (fg'-f'g)'$$
 (b) $(fg)''-2f'g' = fg''+f''g$

(b)
$$(fg)''-2f'g'=fg''+f''g$$

2. (16%) The velocity of a particle moving in a straight line is given by

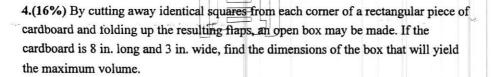
$$v = t(t^2 + 5)^4 + 4t$$
. Given that the distance $s = 0$ at $t = 0$, find an expression for s in terms of t without any unknown constants.

3.(24%) Evaluate the following questions

(a)
$$\lim_{x\to 3} \frac{x^2-x-6}{\ln(3x8)}$$

(b)
$$\int_{1}^{2} 2x^{2} \sqrt{x^{3} + 1} dx$$

(c)
$$\int_1^\infty (1-x)e^{-x}dx$$



5.(16%) Find the relative extrema, if any, of the function $g(x) = \frac{x}{1+x^2}$. Use the second derivative test, if applicable.

6.(12%) Find the derivative of the following functions.

(a)
$$\frac{3x^3 + 5x^2 + 2x - 5}{x^2}$$

$$\frac{x(1-\frac{x-2}{x+1})}{b}$$

