世新大學105學年度二年級轉學生招生考試試題卷

系所組別	考 試 科 目
經濟學系二年級	微積分

※本考題 ☑可使用 ☐禁止使用 簡易型電子計算機

※考生請於答案卷內作答

I. Calculation (60%)

1. (10%) Find f(x) by solving initial value problem

$$f'(x) = \frac{x+1}{x};\ f(1) = 1$$

2. (20%) Find the area of the region under the graph of the function from the interval [a, b].

(1) $f(x)=x^2 - 4$; a = -2, b = 2

(2) Find the area R which is the region bounded by the curve $y = x^2 - 2x$ and $y = -x^2 + 4$.

3. (20%) Approximate the given integral using (a) the trapezoidal rule and (b) Simpson's rule with the specified number of subintervals. $\int_1^2 x^2\,dx$, $n = 4$.

4. (10%) The demand and supply function, $D(q) = 131 - \frac{1}{3}q^2$ and $S(q) = 50 + \frac{2}{3}q^2$, for a particular commodity are given. Specifically, q units of the commodity will be demanded (sold) at a price of $p = D(q)$ dollars per unit, while q units will be supplied by producers when the price is $p = S(q)$ dollars per unit.

(a) Find the equilibrium price.

(b) Find the consumers' surplus and the producers' surplus at equilibrium.

轉後頁

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II. Selection (40%)

Evaluate the definite integral.

(1) $\int_{-1}^{1} 2x^2\,dx$　① 4/3　② 1/3　③ 8/3　④56/3

(2) $\int_{1}^{e} \ln x\,dx$　① 56/3　② 1　③ 8/3　④10

(3) $\int_{0}^{1} x^2 e^{-x}\,dx$　① - 1+2 ln 2　② 1-2 ln 2　③ 8/3

④ $5e^{-1}$-2　⑤2-$5e^{-1}$

(4) Find the relative maxima and relative minima, if any, of $g(t) = -t^2 + 4t + 4$.

① Relative maximum $g(2) = 8$; no relative minimum

② Relative maximum $g(4) = 4$; no relative minimum

③ Relative minimum $g(2) = 8$; no relative maximum

④ Relative minimum $g(4) = 4$; no relative maximum

(5) Determine where is concave upward and where it is concave downward.

① Concave upward: $(2,\infty)$; concave downward: $(-\infty,2)$

② Concave upward: $(1, \infty)$; concave downward: $(-\infty,1)$.

③ Concave upward: $(4,\infty)$; concave downward: $(-\infty,4)$.

④ Concave downward: $(-\infty,-1)$; concave upward $(-1,\infty)$

$\int_{1}^{4} \sqrt{x} - \frac{1}{\sqrt{x}}\,dx$　① 56/3　② 1　③ 8/3　④10

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(6) Find the inflection points, if any, of $h(t) = \sqrt[5]{t}$.

① $(0,0)$ ② $(0,1)$ ③ $(1,0)$ ④ None

(7) Find the horizontal and vertical asymptotes of the graph of $h(x) = \dfrac{4}{x^2}$

① Horizontal: $y = 0$; vertical: $x = 2$

② Horizontal: $y = 0$; vertical: $x = 0$

③ Horizontal: $y = 0$; vertical: $x = -2$

④ Horizontal: $y = 0$; vertical: $x = 1$

Find the average value of the following function over an indicated interval.

(8) $f(x) = 2x^2 - 3$ over $[1, 3]$, ① 3/2 ② 1/3 ③ 17/3 ④ 21/3 ⑤ 41/3

(9) $f(x) = \sqrt{x}$ over $[0,4]$, ① 3/2 ② 1/3 ③ 1 ④ 2/3 ⑤ 4/3

(10) Find the *Gini index* for the given *Lorenz* curve.

$$L(x) = 0.55x^2 + 0.45x$$

① 0.18 ② 3 ③ 1 ④ 0.51 ⑤ 0.4