



(每大題 10 分)

- 1、Find all relative extreme, determine the intervals on which the graph is concave up or concave down, and sketch the graph.

$$f(x) = x^3 - 3x^2 + 6$$

- 2、Find the area of the region bounded by the graphs of the given equation.

$$y = x^2 - 4x + 2, \quad x + y = 6$$

- 3、For the function  $f(x) = \sqrt[3]{x+5}$ , find the derivative  $(f^{-1})'(2)$

- 4、Find  $\frac{dy}{dx}$ .  $y = x^{\sqrt{x}}$ .

- 5、Evaluate the improper integral  $\int_1^{\infty} e^{-x} x dx$

- 6、試求曲線  $r = \theta^2$  自  $\theta = 0$  至  $\theta = \sqrt{5}$  之曲線長

- 7、試用辛普森法(設  $n=2$ )及梯形法(設  $n=4$ )求  $\int_0^2 \sqrt{4+x^3} dx$  的近似值

- 8、 $z = \tan^{-1} \frac{y}{x}$ ,  $x = \sin 2t$ ,  $y = \cos 2t$ , 求  $\frac{dz}{dt}$

- 9、利用冪級數求積分  $\int_0^1 e^{-x^2} dx$  (列出前四個非零項)

- 10、試求下列積分值

$$(1) \int \cos^3 x dx \quad (2) \int \tan^5 x \sec^4 x dx \quad (3) \int_0^1 \int_0^{x^2} e^{-\frac{y}{x}} dy dx$$