

中原大學 97 學年度轉學生招生入學考試

97/07/22 10:30~12:00 理工群組二、化學群組二

誠實是我們珍視的美德，
我們喜愛「拒絕作弊，堅守正直」的你！

科目：微積分 (共 1 頁第 1 頁)

可使用計算機，惟僅限不具可程式及多重記憶者 不可使用計算機

一、填充題：(每題 7 分)

請在答案紙上畫此格式，再將答案填入

①	②	③	④	⑤
⑥	⑦	⑧	⑨	⑩

1. $\lim_{x \rightarrow \infty} (\ln \sqrt{4x+2} - \ln \sqrt{x+3}) =$ ①.

2. $\sin(2\text{Cot}^{-1}4) =$ ②.

3. $\int \text{Sin}^{-1}x dx =$ ③.

4. $\int_{-1}^1 x \sqrt{\cos(x^2)} dx =$ ④.

5. $\int_{-\infty}^{\infty} \frac{dx}{1+x^2} =$ ⑤.

6. Assume that $f(x) \in C \quad \forall x \in \mathbb{R}$ and that $\int_0^x f(t) dt = \frac{2x}{4+x^2}$,
then $f(0) =$ ⑥.

7. $f(x) = ax^3 + bx^2 + cx + d$ that has a local maxima value of 3 at -2
and a local minima value of 0 at 1, then $9a+3b+c+3d =$ ⑦.

8. Suppose g is the inverse function of a differentiable
function f and let $G(x) = \frac{1}{g(x)}$. If $f(3) = 2$ and $f'(3) = \frac{1}{9}$,
then $G'(2) =$ ⑧.

9. If $f(x, y, z) = \frac{x^2}{y+4^z}$, then $\frac{\partial f}{\partial x} + \frac{\partial f}{\partial y} + \frac{\partial f}{\partial z} =$ ⑨.

10. $\int_0^1 \int_y^1 ye^{x^2} dx dy =$ ⑩.

二、計算題：(每題 10 分)

1. Find $\iint_Q 3 \cos(x^3) dA$ where Q is the region bounded by the

x -axis, the curve $y = x^2$, and the line $x = \sqrt[3]{\frac{\pi}{3}}$.

2. Find the points on the sphere $x^2 + y^2 + z^2 = 36$ that are
closest to and farthest from the point $(1, 2, 2)$.

3. Find the area of the region that lies inside the circle
 $r = 3 \sin \theta$ and outside the cardioid $r = 1 + \sin \theta$.