中原大學 107 學年度 □上學期 ■下學期 考試命題紙 ■第一次會考

科目名稱: 微積分 (下)(3學分)
考試時間: 3 月 13 日第二節
∗ ⟨每題 7 分, 滿分 105 分⟩

1. Calculate $\int \tan x \; dx$.

2. Use the logarithmic differentiation to find the derivative of the function $y = \sqrt{\dfrac{x-1}{x^4+1}}$.

3. Calculate $\displaystyle\int_e^6 \frac{1}{x \ln x} \; dx$.

4. Differentiate the function $y = \ln|2 - x - 5x^2|$.

5. Find y' if $y = e^{-4x} \sin 5x$.

6. Evaluate the integral $\displaystyle\int_1^2 \frac{e^{\frac{1}{x}}}{x^2} \; dx$.

7. Calculate $\displaystyle\int_0^1 (x^e + e^x) \; dx$.

8. Find y' if $e^{\frac{x}{y}} = x - y$ and y is differentiable function of x.

9. Differentiate $y = x^{\sqrt{x}}$.

10. Calculate $\displaystyle\int \frac{\log_{10} x}{x} \; dx$.

11. Calculate $\displaystyle\int 3^{\sin x} \cos x \; dx$.

12. Find $\displaystyle\lim_{x \to 0} \frac{\tan x - x}{x^3}$.

13. Compute $\displaystyle\lim_{x \to 0^+} \sin x \ln x$.

14. Compute $\displaystyle\lim_{x \to 0^+} x^{\sqrt{x}}$.

15. Compute $\displaystyle\lim_{x \to \frac{\pi}{2}^-} (\sec x - \tan x)$.

107 學年度第二學期理工電資學院微積分 (3學分) 第一次會考答案 2019.3.13

題號	答案	來源
1	$\ln\lvert\sec x\rvert + C$	6.2^* – 例題 13
2	$y' = \sqrt{\dfrac{x-1}{x^4+1}}\left(\dfrac{1}{2(x-1)} - \dfrac{4x^3}{2(x^4+1)}\right)$	6.2^* – 習題 63
3	$\ln(\ln 6)$	6.2^* – 習題 70
4	$\dfrac{-1-10x}{2-x-5x^2}$	6.2^* – 習題 33
5	$y' = -4e^{-4x}\sin 5x + 5e^{-4x}\cos 5x$	6.3^* – 例題 5
6	$e - e^{\frac{1}{2}}$	6.3^* – 習題 93
7	$\dfrac{1}{e+1} + e - 1$	6.3^* – 習題 83
8	$y' = \dfrac{y^2 - ye^{\frac{x}{y}}}{y^2 - xe^{\frac{x}{y}}}$	6.3^* – 習題 55
9	$x^{\sqrt{x}}\left(\dfrac{1}{2\sqrt{x}}\ln x + \dfrac{1}{\sqrt{x}}\right)$	6.4^* – 例題 4
10	$\dfrac{1}{\ln 10}\dfrac{(\ln x)^2}{2} + C$	6.4^* – 習題 47
11	$\dfrac{3^{\sin x}}{\ln 3} + C$	6.4^* – 習題 49
12	$\dfrac{1}{3}$	6.8 – 例題 4
13	0	6.8 – 習題 44
14	1	6.8 – 習題 57
15	0	6.8 – 例題 8

* 爲非勾選習題、類似題.
證明題、圖形題略過.