

一、填充題 (共 7 題, 每題 10 分, 不須要寫計算過程)

1. 求極限: $\lim_{x \rightarrow 2} \frac{x^2 + x - 6}{x - 2} = \underline{\hspace{2cm}}$.

2. 求極限: $\lim_{x \rightarrow 1^+} \left(\frac{x}{x-1} - \frac{1}{\ln x} \right) = \underline{\hspace{2cm}}$.

3. 設 $x^{2/3} - y^{2/3} - 2y = 2$. 在點 (1,-1) 之 $\frac{dy}{dx} = \underline{\hspace{2cm}}$.

4. 函數 $f(x) = \frac{x-1}{x^2}$. x 在 $\underline{\hspace{2cm}}$ 範圍內 $f(x)$ 之函數值會遞增.

5. $D_x \left[\int_1^{x^2} \sin t \, dt \right] = \underline{\hspace{2cm}}$.

6. $\int_1^4 \frac{1}{\sqrt{t}(\sqrt{t}+1)^3} \, dt = \underline{\hspace{2cm}}$.

7. $\int_0^{1/2} \frac{1}{\sqrt{1-x^2}} \, dx = \underline{\hspace{2cm}}$.

二、計算題 (共 3 題, 每題 10 分, 必須寫清楚每一題的計算過程)

8. $\int x \cos x \, dx = ?$

9. $\int_1^\infty \frac{2}{4x^2 - 1} \, dx = ?$

10. $\int_{1/2}^1 \frac{5^{1/x}}{x^2} \, dx = ?$