

1. 求 $\lim_{x \rightarrow 1^+} \frac{2+x}{1-x} = ?$

2. 若 $f\left(\frac{x-1}{x+1}\right) = x$, 求 $f'(0) = ?$

3. 求 $\int \frac{-x}{(x+1)\sqrt{x+1}} dx = ?$

4. 求 $f(x) = \frac{\ln x}{x}$, $x > 0$ 之遞增遞減區間、極值

5. 求 $\int \cot^3 x \csc^3 x dx = ?$

6. 求 $\int x \sec^{-1} x dx = ?$

7. 求 $\lim_{x \rightarrow 0^+} (\sin x)^x = ?$

8. 判別 $\sum_{n=1}^{\infty} \sin^{-1} \frac{1}{n^2}$ 是否收斂

9. 令函數 $f(x, y) = \begin{cases} \frac{xy}{x^2 + y^2}, & (x, y) \neq (0, 0) \\ 0 & , (x, y) = (0, 0) \end{cases}$ 求 $f_{x,y}(0, 0) = ?$

10. 求 $\int_0^{\pi} \int_x^{\pi} \frac{(\sin y)^2}{y} dy dx = ?$

(每題 10 分)