

1. 求  $\lim_{x \rightarrow 1} \frac{\sqrt{x+3}-2}{3-\sqrt{x+8}} = ?$  (8 分)

2. 令  $f(x) = \frac{x(x-1)(x-2)(x-3)}{(x+1)(x+2)(x+3)}$ , 求  $\frac{d}{dx} f(x) \Big|_{x=0} = ?$  (8 分)

3. 求  $f(x) = \frac{x^2+1}{x^2-9}$  之極值 = ? (8 分)

4.  $\int_0^{100} \frac{\sqrt[100]{100-x}}{\sqrt[100]{100-x} + \sqrt[100]{x}} dx = ?$  (8 分)

5.  $\lim_{x \rightarrow 0} \frac{\sin^{-1} \tan x}{\sin x} = ?$  (8 分)

6.  $\int \frac{1}{x\sqrt{9-(\ln x)^2}} dx = ?$  (8 分)

7.  $\int x \cos x dx = ?$  (8 分)

8.  $\int_0^3 \sqrt{3^2-x^2} dx = ?$  (8 分)

9.  $\lim_{x \rightarrow \infty} \left(\frac{x+2}{x+1}\right)^x = ?$  (8 分)

10.  $\int_0^{\infty} x^2 e^{-\frac{x}{2}} dx = ?$  (8 分)

11. 求極大值  $f(x, y) = 100 - x^2 - y^2$  受限於  $2x - 4y = 20$  (10 分)

12.  $\int_0^1 \int_{3y}^3 e^{x^2} dx dy = ?$  (10 分)