



* انتگرال‌های زیر را محاسبه کنید.

(الف) روش تغییر متغیر

$$\int_{\frac{1}{e}}^1 \frac{e^{\frac{1}{x}}}{x^2} dx \quad (2)$$

$$\int x e^{x^2} dx \quad (1)$$

$$\int_0^1 \frac{e^x}{1+e^{2x}} dx \quad (4)$$

$$\int_0^2 \frac{x}{x^2-9} dx \quad (3)$$

$$\int_0^{\frac{\pi}{4}} \frac{\cos \sqrt{x+1}}{\sqrt{x+1}} dx \quad (6)$$

$$\int \frac{1}{\sqrt{x}(1+\sqrt{x})} dx \quad (5)$$

$$\int \cos x \cos(\sin x) dx \quad (8)$$

$$\int \frac{1+\cos x}{x+\sin x} dx \quad (7)$$

$$\int \frac{x}{\sqrt{1-4x^2}} dx \quad (10)$$

$$\int_1^e \frac{\sqrt{1+\ln x}}{x} dx \quad (9)$$

$$\int \frac{x+1}{\sqrt{x^2+2x+3}} dx \quad (12)$$

$$\int \frac{x^2}{\sqrt{2+x^2}} dx \quad (11)$$

$$\int_1^2 \frac{1}{(2x+1)^2} dx \quad (14)$$

$$\int x \cot x^2 dx \quad (13)$$

$$\int \frac{\csc \sqrt{x}}{\sqrt{x}} dx \quad (16)$$

$$\int \frac{x+3}{(x^2+6x)^2} dx \quad (15)$$

$$\int \tan x \ln(\cos x) dx \quad (18)$$

$$\int \frac{x^2}{2+x^6} dx \quad (17)$$

$$\int \frac{1}{\sqrt{e^{2x}-1}} dx \quad (20)$$

$$\int \frac{\cos x}{4+\sin^2 x} dx \quad (19)$$

(ب) روش جزء به جزء

$$\int x^2 e^x dx \quad (2)$$

$$\int x^2 \sin x dx \quad (1)$$

$$\int_0^{\frac{1}{e}} \arccos x dx \quad (4)$$

$$\int x^2 \ln x dx \quad (3)$$

$$\int_1^e \ln \sqrt{x} dx \quad (6)$$

$$\int_1^e \sqrt{x} \ln x dx \quad (5)$$

$$\int \cos(\ln x) dx \quad (8)$$

$$\int_0^{\pi^2} \sin \sqrt{x} dx \quad (7)$$

$$\int_1^e e^{\sqrt{x}} dx \quad (10)$$

$$\int_1^e \sin(\ln x) dx \quad (9)$$

$$\int_0^{\frac{\sqrt{\pi}}{2}} x^2 \cos x^2 dx \quad (12)$$

$$\int x e^{\sqrt{x}} dx \quad (11)$$

$$\int \cos x \ln(\sin x) dx \quad (14)$$

$$\int (\ln x)^2 dx \quad (13)$$

$$\int e^{2x} e^{e^x} dx \quad (16)$$

$$\int_0^{\ln 2} e^x \ln(e^x + 1) dx \quad (15)$$

$$\int x^2 (\ln x)^2 dx \quad (18)$$

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} x \csc^2 x dx \quad (17)$$

$$\int x \arctan x dx \quad (20)$$

$$\int x^m (\ln x)^n dx \quad (m, n > 0) \quad (19)$$

(ج) روش جانمایی های وارون

$$\int_2^4 \sqrt{x^2 - 4} dx \quad (2)$$

$$\int_{-1}^2 \sqrt{4 - x^2} dx \quad (1)$$

$$\int \frac{dx}{x^2 \sqrt{x^2 - 4}} \quad (4)$$

$$\int \frac{dx}{x^2 \sqrt{4 - x^2}} \quad (3)$$

$$\int \frac{dx}{x \sqrt{1 + x^2}} \quad (6)$$

$$\int \frac{dx}{x \sqrt{x^2 - 2}} \quad (5)$$

$$\int_2^4 \frac{\sqrt{x^2 - 4}}{x} dx \quad (8)$$

$$\int \frac{\sqrt{4 - x^2}}{x^2} dx \quad (7)$$

$$\int_0^{\frac{2}{3}} \frac{dx}{\sqrt{9 - x^2}} \quad (10)$$

$$\int \frac{dx}{x^2 \sqrt{1 + x^2}} \quad (9)$$

$$\int \frac{dx}{x \sqrt{2 - x^2}} \quad (12)$$

$$\int \frac{\sqrt{x^2 - 4}}{x^2} dx \quad (11)$$

$$\int \frac{x^2}{\sqrt{x^2 - 9}} dx \quad (14)$$

$$\int \frac{\sqrt{4 - x^2}}{x} dx \quad (13)$$

$$\int \frac{\sqrt{9+x^2}}{x^2} dx \quad (16)$$

$$\int x^2 \sqrt{9-x^2} dx \quad (15)$$

$$\int_{\frac{1}{2}}^1 \frac{dx}{\sqrt{2x-x^2}} \quad (18)$$

$$\int \frac{x^2}{\sqrt{1-x^2}} dx \quad (17)$$

$$\int \frac{dx}{(x^2+2x+2)^2} \quad (20)$$

$$\int \frac{x dx}{(3-2x-x^2)^{\frac{5}{2}}} \quad (19)$$

(د) روش کسرهای جزئی

$$\int \frac{x^2-3x^2+5x}{x^2-4x+4} dx \quad (2)$$

$$\int \frac{x^2+x-1}{x^2+2x^2-x-2} dx \quad (1)$$

$$\int \frac{x^2+2}{4x^5+4x^2+x} dx \quad (4)$$

$$\int \frac{x^2-2x^2+4x+1}{x^2-x^2-x+1} dx \quad (3)$$

$$\int \frac{3x^4-9x^2+14x^2-9x+2}{(x-1)(x^2-2x+2)^2} dx \quad (6)$$

$$\int \frac{x^2+x^2}{x(x-1)(x^2+x+1)(x^2+1)^2} dx \quad (5)$$

$$\int \frac{5x^2+2x+2}{x^2-1} dx \quad (8)$$

$$\int \frac{dx}{x^2(x^2-4)} \quad (7)$$

$$\int \frac{1+\sqrt{x}}{1+\sqrt[3]{x}} dx \quad (10)$$

$$\int \frac{dx}{\sqrt{x}-\sqrt[3]{x}} \quad (9)$$

$$\int \frac{x\sqrt{2-x^2}}{\sqrt{x^2+1}} dx \quad (12)$$

$$\int \frac{dx}{\sqrt[3]{x}+\sqrt{x}} \quad (11)$$

$$\int e^{\sqrt{x}} dx \quad (14)$$

$$\int \frac{dx}{\sqrt{1+e^x}} \quad (13)$$

$$\int \frac{d\theta}{3\sin\theta-4\cos\theta} \quad (16)$$

$$\int_0^{\frac{\pi}{2}} \frac{d\theta}{1+\cos\theta+\sin\theta} \quad (15)$$

$$\int \frac{1+\sin\theta}{1+\cos\theta} d\theta \quad (18)$$

$$\int \frac{d\theta}{2+\sin\theta} \quad (17)$$

$$\int_0^{\frac{\pi}{2}} \frac{\cos\theta d\theta}{\sin\theta+\cos\theta} \quad (20)$$

$$\int_{\frac{\pi}{2}}^{\frac{\pi}{4}} \frac{d\theta}{1-\cos\theta} \quad (19)$$