

1. Tentukan integral-integral berikut

(a) $\int_0^1 x\sqrt{1-x^2} dx$

(b) $\int \frac{e^x}{4+e^x} dx$

(c) $\int \frac{\tan z}{\cos^2 z} dz$

(d) $\int \frac{\sin \sqrt{t}}{\sqrt{t}} dt$

(e) $\int_0^{\pi/4} \frac{\cos x}{1+\sin^2 x} dx$

(f) $\int e^{\cos z} \sin z dz$

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

(h) $\int_0^{3/4} \frac{\sin \sqrt{1-x}}{\sqrt{1-x}} dx$

(i) $\int \frac{x^3+7x}{x-1} dx$

(j) $\int \frac{\sec^3 x + e^{\sin x}}{\sec x} dx$

(k) $\int \frac{1+\sin 2x}{\cos^2(2x)} dx$

2. Gunakan integral parsial untuk menyelesaikan integral berikut

(a) $\int xe^3x dx$

(b) $\int x \sin(2x) dx$

(c) $\int z^3 \ln z dz$

(d) $\int x3^x dx$

(e) $\int t \tan^{-1} t dt$

(f) $\int_{\pi/6}^{\pi/4} x \sec^2 x dx$

(g) $\int \frac{t^7}{(7-3t^4)^{3/2}} dt$

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

(i) $\int e^{3x} \cos(2x) dx$

(j) $\int \sin(\ln x) dx$

(k) $\int (\ln x)^3 dx$

3. (a) Buktikan rumus reduksi

$$\int \sin^n x dx = -\frac{1}{n} \sin^{n-1} x \cos x + \frac{n-1}{n} \int \sin^{n-2} x dx$$

(b) Gunakan bagian (a) untuk menghitung $\int \sin^2 x dx$.

(c) Gunakan bagian (a) untuk menunjukkan bahwa, untuk sinus pangkat ganjil berlaku

$$\int_0^{\pi/2} \sin^{2n+1} x dx = \frac{2 \cdot 4 \cdot 6 \cdots 2n}{3 \cdot 5 \cdot 7 \cdots (2n+1)}$$

4. (a) Buktikan rumus reduksi

$$\int \sec^n x dx = \frac{\sec^{n-2} x \tan x}{n-1} + \frac{n-2}{n-1} \int \sec^{n-2} x dx$$

(b) Gunakan rumus reduksi di atas untuk menentukan

$$\int \sec^6 x dx$$

5. Hitung integral

$$\int_0^1 \frac{x^3}{\sqrt{x^2+1}} dx$$

(a) dengan integral parsial

(b) dengan metoda substitusi

6. Tentukan integral berikut

(a) $\int \cos^2 x \sin x dx$

(b) $\int \sin^2 x \cos^2 x dx$

(c) $\int_0^{\pi/2} \cos^3 x dx$

(d) $\int \sin 4x \cos 2x dx$

(e) $\int e^{-x} \tan(e^{-x}) dx$

(f) $\int \tan t \sec^3 t dt$

(g) $\int \sqrt{\tan x} \sec^4 x dx$

(h) $\int_0^{\pi/2} \tan^5(x/2) dx$

(i) $\int \sec^3 x \, dx$

7. Misalkan m, n merupakan bilangan bulat tak negatif. Tunjukkan bahwa

(a) $\int_0^{2\pi} \sin mx \cos nx \, dx = 0$

(b) $\int_0^{2\pi} \sin mx \sin nx \, dx = 0$

(c) $\int_0^{2\pi} \cos mx \cos nx \, dx = 0$

8. Gunakan substitusi trigonometri untuk menentukan integral-integral berikut

(a) $\int \sqrt{1-4x^2} \, dx$

(b) $\int \frac{x^2}{\sqrt{7+x^2}} \, dx$

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

(d) $\int \frac{\sqrt{1+t^2}}{t} \, dt$

(e) $\int \frac{dx}{1+2x^2+x^4} \, dx$

(f) $\int \frac{\cos \theta}{\sqrt{2-\sin^2 \theta}} \, d\theta$

(g) $\int_0^{1/2} \frac{dx}{(1-x^2)^2}$

(h) $\int_0^3 \frac{x^3}{(3+x^2)^{5/2}} \, dx$

9. Tentukan

(a) $\int x\sqrt{x+3} \, dx$

(b) $\int_0^1 \frac{\sqrt{t}}{t+1} \, dt$

(c) $\int \frac{x^2+3x}{\sqrt{x+4}} \, dx$

10. Gunakan metode pecahan parsial untuk menentukan integral-integral berikut

(a) $\int \frac{x^4}{x-1} \, dx$

(b) $\int \frac{5x+1}{(2x+1)(x-1)} \, dx$

(c) $\int_0^1 \frac{2}{2x^2+3x+1} \, dx$

(d) $\int_3^4 \frac{x^3-2x^2-4}{x^3-2x^2} \, dx$

(e) $\int \frac{x^3+4}{x^2+4} \, dx$

(f) $\frac{10}{(x-1)(x^2+9)} \, dx$

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

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

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

(j) $\int_0^1 \frac{x^3+2x}{x^4+4x^2+3} \, dx$

11. Gunakan metoda yang anda pilih untuk menentukan integral-integral berikut

(a) $\int_1^2 \frac{(x+1)^2}{x} \, dx$

(b) $\int \frac{x}{(x+1)^2} \, dx$

(c) $\int_1^2 x^5 \ln x \, dx$

(d) $\int \frac{dx}{\sqrt{e^x-1}}$

(e) $\int \frac{e^{2x}}{1+e^{4x}} \, dx$

(f) $\int e^{\sqrt[3]{x}} \, dx$

(g) $\int x \sec x \tan x \, dx$

(h) $\int \tan^5 x \sec^3 x \, dx$

(i) $\int_0^{\pi/2} \cos^3 x \sin 2x \, dx$

(j) $\int \frac{1-\tan \theta}{1+\tan \theta} \, d\theta$

(k) $\int \frac{1}{x\sqrt{x^2+1}} \, dx$

(l) $\int \frac{1}{\sqrt{x+x^{3/2}}} \, dx$