Cálculo 2 - Lista 15

Integração por substituição trigonométrica

Resolva as integrais

1. $\int \frac{dx}{x^2\sqrt{4-x^2}}$

2. $\int \frac{\sqrt{4-x^2}}{x^2}\,dx$

3. $\int \frac{dx}{x\sqrt{x^2+4}}$

4. $\int \frac{x^2\,dx}{\sqrt{x^2+6}}$

5. $\int \frac{dx}{x\sqrt{25-x^2}}$

6. $\int \sqrt{1-u^2}\,du$

7. $\int \frac{dx}{\sqrt{x^2-a^2}}$

8. $\int \frac{dw}{w^2\sqrt{w^2-7}}$

9. $\int \frac{x^2\,dx}{(x^2+4)^2}$

10. $\int \frac{dx}{(4+x^2)^{3/2}}$

11. $\int \frac{dx}{(4x^2-9)^{3/2}}$

12. $\int \frac{dx}{x^4\sqrt{16+x^2}}$

13. $\int \frac{2dt}{t\sqrt{t^4+25}}$

14. $\int \frac{x^3\,dx}{(25-x^2)^2}$

15. $\int \frac{dx}{\sqrt{4x+x^2}}$

16. $\int \frac{dx}{\sqrt{4x-x^2}}$

17. $\int \frac{dx}{(5-4x-x^2)^{3/2}}$

18. $\int \frac{dx}{x\sqrt{x^4-4}}$

19. $\int \frac{\sec^2 x\,dx}{(4-\tan^2 x)^{3/2}}$

20. $\int \frac{e^{-x}\,dx}{(9e^{-2x}+1)^{3/2}}$

21. $\int \frac{\ln^3 w \, dw}{w\sqrt{\ln^2 w - 4}}$

22. $\int \frac{dz}{(z^2 - 6z + 18)^{3/2}}$

23. $\int \frac{e^t dt}{(e^{2t} + 8e^t + 7)^{3/2}}$

24. $\int \frac{\sqrt{16 - e^{2x}}}{e^x} \, dx$

Respostas

1. $-\frac{\sqrt{4-x^2}}{4x} + C$

2. $-\frac{\sqrt{4-x^2}}{x} - \arcsin\frac{x}{2} + C$

3. $\frac{1}{2}\ln\left|\frac{\sqrt{x^2+4}-2}{x}\right| + C$

4. $\frac{x}{2}\sqrt{x^2 + 6} - 3\ln\left|\sqrt{x^2 + 6} + x\right| + C$

5. $\frac{1}{5}\ln\left|\frac{5-\sqrt{25-x^2}}{x}\right| + C$

6. $\frac{1}{2}\arcsin u + \frac{1}{2}u\sqrt{1 - u^2} + C$

7. $\ln\left|\frac{x+\sqrt{x^2-a^2}}{a}\right| + C$

8. $\frac{1}{7}\frac{\sqrt{w^2-7}}{w} + C$

9. $\frac{1}{4}\arctan\frac{x}{2} - \frac{x}{2(x^2+4)} + C$

10. $\frac{1}{4}\frac{x}{\sqrt{4+x^2}} + C$

11. $-\frac{1}{9}\frac{x}{\sqrt{4x^2-9}} + C$

12. $-\frac{1}{768}\frac{(16+x^2)^{3/2}}{x^3} + \frac{1}{256}\frac{\sqrt{16+x^2}}{x} + C$

13. $\frac{1}{5}\ln\left(\frac{\sqrt{t^4+25}-5}{t^2}\right) + C$

14. $\frac{x^2}{2(25-x^2)} + \ln\left(\frac{\sqrt{25-x^2}}{5}\right) + C$

15. $\ln\left|x + 2 + \sqrt{x^2 + 4x}\right| + C$

16. $\arcsin\frac{x-2}{2} + C$

17. $\frac{x+2}{9\sqrt{5-4x-x^2}} + C$

18. $\frac{1}{4}\text{arcsec}\frac{x^2}{2} + C$

19. $\frac{1}{4}\frac{\tan x}{\sqrt{4-\tan^2 x}} + C$

20. $-\frac{e^{-x}}{\sqrt{1+9e^{-2x}}} + C$

21. $\sqrt{\ln^2 w - 4}\left(\frac{8+\ln^2 w}{3}\right) + C$

22. $\frac{1}{9}\frac{z-3}{\sqrt{z^2-6z+18}} + C$

23. $-\frac{1}{9}\frac{e^t+4}{\sqrt{e^{2t}+8e^t+7}} + C$

24. $-\frac{\sqrt{16-e^{2x}}}{e^x} - \arcsin\frac{e^x}{4} + C$