

Cálculo B - Lista 3

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

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

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

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

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

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

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

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

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