

uff Universidade Federal Fluminense
EGM - Instituto de Matemática
GMA - Departamento de Matemática Aplicada

LISTA 5 - 2015-2

Integração: miscelânea

Nos exercícios 1 a 24, resolva a integral indicada. Em alguns casos será preciso aplicar mais de uma técnica de integração.

1. $\int \frac{\arcsen \sqrt{x}}{\sqrt{x}} dx$

9. $\int \frac{dx}{1 + \sqrt{1+x}}$

17. $\int \frac{x}{1 + \sen x} dx$

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

10. $\int \frac{dx}{1+e^x}$

18. $\int \sqrt{1+e^x} dx$

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

11. $\int \frac{dx}{\sqrt{x} + \sqrt[3]{x}}$

19. $\int \frac{7}{x^2 - 6x + 18} dx$

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

12. $\int e^{\sqrt{x}} dx$

20. $\int \frac{3x+2}{x^2+8x+25} dx$

5. $\int \frac{dx}{x^2-2x-3}$

13. $\int \frac{x \arctan x}{(x^2+1)^3} dx$

21. $\int \tan^3 x \sec^4 x dx$

6. $\int (\sec^2 x) \ln(\tan x) dx$

14. $\int x \ln \sqrt{1+x^2} dx$

22. $\int x\sqrt{1+x} dx$

7. $\int \frac{dx}{\sqrt{x-1} + \sqrt{x+1}}$

15. $\int \arcsen \sqrt{x} dx$

23. $\int \frac{dx}{x(1-x^2)^{\frac{3}{2}}}$

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

16. $\int e^x 2^{e^x} 3^{e^x} dx$

24. $\int \sen 3x \sen 2x dx$

Nos exercícios 25 a 30, calcule a integral definida dada.

25. $\int_0^{\frac{\pi}{4}} \frac{dx}{\sqrt{1+3\sec^2 x}}$

27. $\int_3^4 \frac{x^3}{\sqrt{x^2+3}} dx$

29. $\int_0^4 \frac{x-2}{2x^2+7x+3} dx$

26. $\int_0^{\frac{\pi}{4}} e^{3x} \sen(4x) dx$

28. $\int_0^1 \frac{x^2}{\sqrt{4-x^2}} dx$

30. $\int_0^{\frac{\pi}{2}} \cos^3 x \sen^2 x dx$

RESPOSTAS DA LISTA 5

1. $2\sqrt{x} \arcsen \sqrt{x} + 2\sqrt{1-x} + C$
2. $\ln \left| x + 2 + \sqrt{x^2 + 4x} \right| + C$
3. $\frac{\tan x}{4\sqrt{4 - \tan^2 x}} + C$
4. $x - \sqrt{1-x^2} \arcsen x + C$
5. $\frac{1}{4} \ln \left| \frac{x-3}{x+1} \right| + C$
6. $(\tan x)(\ln(\tan x)) - \tan x + C$
7. $\frac{1}{3} \left((x+1)^{\frac{3}{2}} - (x-1)^{\frac{3}{2}} \right) + C$
8. $-\frac{1}{6} (6e^{-x} + 3e^{-2x} + 2e^{-3x}) + C$
9. $2\sqrt{1+x} - 2 \ln(1 + \sqrt{1+x}) + C$
10. $x - \ln(e^x + 1) + C$
11. $2\sqrt{x} - 3\sqrt[3]{x} + 6\sqrt[6]{x} - 6 \ln(1 + \sqrt[6]{x}) + C$
12. $2\sqrt{x} e^{\sqrt{x}} - 2e^{\sqrt{x}} + C$
13. $-\frac{\arctan x}{4(x^2+1)^2} + \frac{3 \arctan x}{32} + \frac{x}{8(x^2+1)} + \frac{x(1-x^2)}{32(x^2+1)^2} + C$
14. $\frac{1}{4} (1+x^2) \ln(1+x^2) - \frac{1}{4} x^2 + C$
15. $x \arcsen(\sqrt{x}) + \frac{1}{2} \sqrt{x} \sqrt{1-x} - \frac{1}{2} \arcsen \sqrt{x} + C$
16. $\frac{2e^x - 3e^x}{\ln 2 + \ln 3} + C$
17. $x \tan x - x \sec x + \ln|1 + \sen x| + C$
18. $2\sqrt{1+e^x} + \ln|\sqrt{1+e^x} - 1| - \ln|\sqrt{1+e^x} + 1| + C$
19. $\frac{7}{3} \arctan \frac{x-3}{3} + C$
20. $\frac{3}{2} \ln|x^2 + 8x + 25| - \frac{10}{3} \arctan \frac{x+4}{3} + C$
21. $\frac{1}{6} \tan^6 x + \frac{1}{4} \tan^4 x + C$
ou $\frac{1}{6} \sec^6 x - \frac{1}{4} \sec^4 x + C$
22. $\frac{2}{5} (1+x)^{\frac{5}{2}} - \frac{2}{3} (1+x)^{\frac{3}{2}} + C$
23. $\frac{1}{\sqrt{1-x^2}} + \frac{1}{2} \ln|\sqrt{1-x^2} - 1| - \frac{1}{2} \ln|\sqrt{1-x^2} + 1| + C$
24. $\frac{1}{2} \sen x - \frac{1}{10} \sen(5x) + C$
25. $\arctan \frac{\sqrt{7}}{7} = \arcsen \frac{\sqrt{2}}{4}$
26. $\frac{4}{25} \left(1 + \sqrt[4]{e^{3\pi}} \right)$
27. $\frac{10}{3} \sqrt{19} - 2\sqrt{3}$
28. $\frac{\pi}{3} - \frac{\sqrt{3}}{2}$
29. $\ln 7 - 2 \ln 3$
30. $\frac{2}{15}$