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EGM - Instituto de Matemática  
GMA - Departamento de Matemática Aplicada

**LISTA 5 - 2012-1**

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.  $2\sqrt{1+e^x} + \ln \left| \sqrt{1+e^x} - 1 \right| - \ln \left| \sqrt{1+e^x} + 1 \right| + C$
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.  $\frac{1}{\sqrt{1-x^2}} + \frac{1}{2} \ln \left| \sqrt{1-x^2} - 1 \right| - \frac{1}{2} \ln \left| \sqrt{1-x^2} + 1 \right| + C$
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.  $\frac{2}{15}$