Lista 7 de Cálculo I
Data da entrega: 28/11/2019

Exercício 1 (Regra da cadeia) Calcule:

1. $\int \sqrt{1-4y}\,dy$
3. $\int \sqrt[3]{6-2x}\,dx$
5. $\int x\sqrt{x^2-9}\,dx$
7. $\int x^2(x^3-1)^{10}\,dx$
9. $\int 5x\sqrt[3]{(9-4x^2)^2}\,dx$
11. $\int \dfrac{y^3\,dy}{(1-2y^4)^5}$
13. $\int (x^2-4x+4)^{4/3}\,dx$
15. $\int x\sqrt{x+2}\,dx$
17. $\int \dfrac{2r\,dr}{(1-r)^7}$
21. $\int \cos 4\theta\,d\theta$
23. $\int 6x^2 \operatorname{sen} x^3\,dx$
25. $\int \sec^2 5x\,dx$
29. $\int \cos x(2+\operatorname{sen} x)^5\,dx$
31. $\int \sqrt{1+\dfrac{1}{3x}}\,\dfrac{dx}{x^2}$
33. $\int 2\operatorname{sen} x\sqrt[4]{1+\cos x}\,dx$
35. $\int \cos^2 t \operatorname{sen} t\,dt$

Respostas:

1. $-\frac{1}{6}(1-4y)^{3/2}+C$ 3. $-\frac{3}{8}(6-2x)^{4/3}+C$ 5. $\frac{1}{3}(x^2-9)^{3/2}+C$ 7. $\frac{1}{33}(x^3-1)^{11}+C$ 9. $-\frac{3}{8}(9-4x^2)^{5/3}+C$
11. $\dfrac{1}{32(1-2y^4)^4}+C$ 13. $\frac{3}{11}(x-2)^{11/3}+C$ 15. $\frac{2}{5}(x+2)^{5/2}-\frac{4}{3}(x+2)^{3/2}+C$ 17. $-\frac{2}{5}(1-r)^{-5}+\frac{1}{3}(1-r)^{-6}+C$
19. $-\frac{3}{4}(3-2x)^{3/2}+\frac{3}{10}(3-2x)^{5/2}-\frac{1}{28}(3-2x)^{7/2}+C$ 21. $\frac{1}{4}\operatorname{sen} 4\theta+C$ 23. $-2\cos x^3+C$ 25. $\frac{1}{5}\operatorname{tg} 5x+C$
27. $-\frac{1}{6}\operatorname{cosec} 3y^2+C$ 29. $\frac{1}{6}(2+\operatorname{sen} x)^6+C$ 31. $-2\left(1+\dfrac{1}{3x}\right)^{3/2}+C$ 33. $-\frac{3}{2}(1+\cos x)^{4/3}+C$ 35. $-\frac{1}{3}\cos^3 t+C$

Exercício 2 (Integração por partes) Calcule:

a) $\int x\,e^x\,dx$
b) $\int x \operatorname{sen} x\,dx$
c) $\int x^2 e^x\,dx$
c) $\int x \ln x\,dx$
e) $\int \ln x\,dx$
f) $\int x^2 \ln x\,dx$
j) $\int x\,e^{2x}\,dx$
m) $\int e^{-2x} \operatorname{sen} x\,dx$

Respostas:

a) $(x-1)e^x+k$ b) $-x\cos x+\operatorname{sen} x+k$ c) $e^x(x^2-2x+2)+k$
d) $\dfrac{x^2}{2}\left(\ln x-\dfrac{1}{2}\right)+k$ e) $x(\ln x-1)+k$ f) $\dfrac{1}{3}x^3\left(\ln x-\dfrac{1}{3}\right)+k$
j) $\dfrac{1}{2}e^{2x}\left(x-\dfrac{1}{2}\right)+k$
m) $-\dfrac{1}{5}e^{-2x}(\cos x+2\operatorname{sen} x)+k$

Exercício 3 (Potência e produto de seno e cosseno) Calcule:

1. $\int \operatorname{sen}^4 x \cos x \, dx$
3. $\int \cos^3 4x \operatorname{sen} 4x \, dx$
5. $\int \operatorname{sen}^3 x \, dx$
7. $\int \operatorname{sen}^4 z \, dz$
9. $\int \cos^2 \frac{1}{2}x \, dx$
11. $\int \operatorname{sen}^2 x \cos^3 x \, dx$

Respostas:

1. $\frac{1}{5}\operatorname{sen}^5 x + C$ **3.** $-\frac{1}{16}\cos^4 4x + C$ **5.** $\frac{1}{3}\cos^3 x - \cos x + C$ **7.** $\frac{3}{8}z - \frac{1}{4}\operatorname{sen} 2z + \frac{1}{32}\operatorname{sen} 4z + C$

9. $\frac{1}{2}x + \frac{1}{2}\operatorname{sen} x + C$ **11.** $\frac{1}{3}\operatorname{sen}^3 x - \frac{1}{5}\operatorname{sen}^5 x + C$ **13.** $-\frac{1}{3}\cos^3 x + \frac{2}{5}\cos^5 x - \frac{1}{7}\cos^7 x + C$ **15.** $\frac{1}{8}t - \frac{1}{96}\operatorname{sen} 12t + C$