Universidade de São Paulo
Escola Superior de Agricultura "Luiz de Queiroz" – ESALQ
Disciplina: LCE0220 Cáluclo II
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SOLUÇÕES – 1ª LISTA DE EXERCÍCIOS

1.

$$\int \left(3-\sqrt{x}+x\right) dx = \frac{1}{6}\, x\left(3\,x-4\sqrt{x}+18\right) + \text{constant}$$

2.

$$\int e^{-10\,x}\, dx = -\frac{1}{10}\, e^{-10\,x} + \text{constant}$$

3.

$$\int \left(\frac{2}{x}-x+4\right) dx = 2\log(x) - \frac{1}{2}\,(x-8)\,x + \text{constant}$$

4.

$$\int e^{-(x-8)^3}\,(x-8)^2\, dx = -\frac{1}{3}\, e^{-(x-8)^3} + \text{constant}$$

5.

$$\int 3^{2\,x+1}\, dx = \frac{3^{2\,x+1}}{\log(9)} + \text{constant}$$

6.

$$\int \sin(3\,x+1)\, dx = -\frac{1}{3}\cos(3\,x+1) + \text{constant}$$

7.

$$\int x\cos\left(2\,x^2-7\right) dx = -\frac{1}{4}\sin\left(7-2\,x^2\right) + \text{constant}$$

8.

$$\int x\sqrt{1-3\,x^2}\, dx = -\frac{1}{9}\left(1-3\,x^2\right)^{3/2} + \text{constant}$$

9.

$$\int \left(x^{10}-x^5+4\right)^3\left(2\,x^9-x^4\right) dx =$$

$$\frac{x^{40}}{20}-\frac{x^{35}}{5}+\frac{11\,x^{30}}{10}-\frac{13\,x^{25}}{5}+\frac{29\,x^{20}}{4}-\frac{52\,x^{15}}{5}+\frac{88\,x^{10}}{5}-\frac{64\,x^5}{5} + \text{constant}$$

10.

$$\int \frac{\tan^{-1}(x)}{x^2+1}\, dx = \frac{1}{2}\tan^{-1}(x)^2 + \text{constant}$$

11.

$$\int \left(x^{-3/2}+\tan(x)-\frac{4}{x^3}+2\right) dx = \frac{2}{x^2}+2\,x-\frac{2}{\sqrt{x}}-\log(\cos(x)) + \text{constant}$$

12.

$$\int \frac{e^{-\sqrt{x}}}{\sqrt{x}}\, dx = -2\,e^{-\sqrt{x}} + \text{constant}$$

13.

$$\int \frac{1}{\sqrt{x^2+x+1}}\, dx = \sinh^{-1}\left(\frac{2\,x+1}{\sqrt{3}}\right) + \text{constant}$$

14.

$$\int x\log(x)\, dx = \frac{1}{4}\,x^2\,(2\log(x)-1) + \text{constant}$$

15.

$$\int \frac{3}{x^2-8\,x+25}\, dx = \tan^{-1}\left(\frac{x-4}{3}\right) + \text{constant}$$

16.

$$\int \frac{1}{x^3+8}\,dx = \frac{1}{24}\left(-\log\left(x^2-2x+4\right)+2\log(x+2)+2\sqrt{3}\,\tan^{-1}\left(\frac{x-1}{\sqrt{3}}\right)\right) + \text{constant}$$

17.

$$\int x\,e^{-2x}\,dx = -\frac{1}{4}\,e^{-2x}\,(2x+1) + \text{constant}$$

18.

$$\int x\,e^{-2x^2}\,dx = -\frac{1}{4}\,e^{-2x^2} + \text{constant}$$

19.

$$\int \frac{\sin(x)}{(3-\cos(x))^2}\,dx = \frac{1}{\cos(x)-3} + \text{constant}$$

20.

$$\int \frac{1}{x^2+2x}\,dx = \frac{1}{2}\,(\log(x)-\log(x+2)) + \text{constant}$$

21.

$$\int \cos^3(x)\,dx = \frac{1}{12}\,(9\sin(x)+\sin(3x)) + \text{constant}$$

22.

$$\int x\sqrt{x+1}\,dx = \frac{2}{15}\,(x+1)^{3/2}\,(3x-2) + \text{constant}$$

23.

$$\int \frac{1}{\sqrt{9-16x^2}}\,dx = \frac{1}{4}\,\sin^{-1}\left(\frac{4x}{3}\right) + \text{constant}$$

24.

$$\int \frac{x-3}{(x+1)^2\,(x-2)}\,dx = \frac{1}{9}\left(-\frac{12}{x+1}-\log(2-x)+\log(x+1)\right) + \text{constant}$$

25.

$$\int \frac{1}{4x+5}\,dx = \frac{1}{4}\log(4x+5) + \text{constant}$$

26.

$$\int \frac{3x^2+1}{x^3+x-1}\,dx = \log\left(x^3+x-1\right) + \text{constant}$$

27.

$$\int \frac{2x+3}{x^3+x^2-2x}\,dx = \frac{1}{6}\,(10\log(1-x)-9\log(x)-\log(x+2)) + \text{constant}$$

28.

$$\int \frac{\sqrt{\sin^{-1}(x)}}{1-x^2}\,dx$$

29.

$$\int \frac{x\sin^{-1}(x)}{\sqrt{1-x^2}}\,dx = x-\sqrt{1-x^2}\,\sin^{-1}(x) + \text{constant}$$

30.

$$\int e^x\sin(x)\,dx = \frac{1}{2}\,e^x\,(\sin(x)-\cos(x)) + \text{constant}$$

31.

$$\int \frac{x^3-3x+4}{(x+1)\,(x-1)^3}\,dx = \frac{1}{4}\left(\frac{2\,(x-2)}{(x-1)^2}+7\log(1-x)-3\log(x+1)\right) + \text{constant}$$

32.

$$\int \frac{x^3-x^2+2x+3}{x^2+3x+2}\,dx = \frac{1}{2}\,(x-8)\,x-\log(x+1)+13\log(x+2) + \text{constant}$$

33.

$$\int \frac{1}{\sqrt{4-9x^2}}\,dx = \frac{1}{3}\sin^{-1}\left(\frac{3x}{2}\right) + \text{constant}$$

34.

$$\int \frac{3+\log(x)}{x}\,dx = \frac{1}{2}\log(x)\,(\log(x)+6) + \text{constant}$$

35.

$$\int \frac{\log(x+1)}{\sqrt{x+1}}\,dx = 2\sqrt{x+1}\;(\log(x+1)-2) + \text{constant}$$

36.

$$\int \frac{e^{2x}}{e^{2x}+1}\,dx = \frac{1}{2}\log\left(e^{2x}+1\right) + \text{constant}$$

2.

$$\frac{d}{dx}\left(3x^2+e^x+\cos(3x)\right) = 6x+e^x-3\sin(3x)$$