EXERCÍCIOS PROPOSTOS

GRUPO 1 – Integrais do tipo $\int x^{\alpha}\,dx$

Calcular:

1. $\int x^{\frac{1}{5}}\,dx$
2. $\int 10\sqrt{x}\,dx$
3. $\int \frac{\sqrt[3]{x}}{4}\,dx$
4. $\int x^{\frac{2}{3}}\,dx$
5. $\int x^{0,4}\,dx$
6. $\int (x^{0,2} + x^{0,3})\,dx$
7. $\int x^{-3}\,dx$
8. $\int (x^4 - x^{-3})\,dx$
9. $\int x^{-\frac{1}{2}}\,dx$
10. $\int x^{\frac{4}{5}}\,dx$

GRUPO 2 – Integrais do tipo $\int a^{x}\,dx$

Calcular:

1. $\int 5^{x}\,dx$
2. $\int (0,4)^{x}\,dx$
3. $\int \left(\frac{4}{7}\right)^{x}\,dx$
4. $\int 3\left(\frac{1}{3}\right)^{x}\,dx$
5. $\int \left(\sqrt{2}\right)^{x}\,dx$
6. $\int 4 \cdot (10)^{x}\,dx$
7. $\int -\frac{2}{3} \cdot (6)^{x}\,dx$
8. $\int \frac{\left(\frac{1}{2}\right)^{x}}{5}\,dx$

GRUPO 3 – Integrais do tipo $\int e^{u(x)}\, u'(x)\, dx$

Calcular:

1. $\int e^{10x}\, dx$
2. $\int e^{-3x}\, dx$
3. $\int e^{-5x}$
4. $\int x e^{-2x^2}\, dx$
5. $\int e^{-9x}\, dx$
6. $\int (x+1)\, e^{(x+1)^2}\, dx$
7. $\int (x-5)\, e^{(x-5)^2}\, dx$
8. $\int x^3\, e^{-x^4}\, dx$
9. $\int \frac{1}{x^2}\, e^{\frac{1}{x}}\, dx$
10. $\int \frac{1}{\sqrt{x}}\, e^{\sqrt{x}}\, dx$

GRUPO 4 – Integrais do tipo $\int (u(x))^{\alpha}\, u'(x)\, dx$

Calcular:

1. $\int x^3\, (x^4+1)^5\, dx$
2. $\int (1-x^2)^3\, x\, dx$
3. $\int \frac{1}{4}\, (x^3-1)^4\, x^2\, dx$
4. $\int x\, \sqrt{x^2+1}\, dx$
5. $\int x\, \sqrt[3]{1-x^2}\, dx$
6. $\int \frac{1}{2}\, x^2\, (4-x^3)^4\, dx$
7. $\int (4x^2-4x+1)^5\, (4x-2)\, dx$
8. $\int \frac{(\ell n\, x)^2}{x}\, dx$
9. $\int (e^x+1)^2\, e^x\, dx$
10. $\int 10\, (e^{-x}+5)^4\, e^{-x}\, dx$

GRUPO 5 – Integrais do tipo $\int \frac{u'(x)}{u(x)}\, dx$

Calcular:

1. $\int \frac{2}{x+4}\, dx$
2. $\int \frac{5}{8-x}\, dx$
3. $\int \frac{3x}{1-2x^2}\, dx$
4. $\int \frac{1}{10-0,4x}\, dx$

5. $\int \frac{1}{x \, ln \, x} \, dx$

6. $\int \frac{7x}{4x^2 - 16} \, dx$

7. $\int \frac{e^x}{1 - e^x} \, dx$

8. $\int \frac{e^x + e^{-x}}{e^x - e^{-x}} \, dx$

9. $\int \frac{3x - 1}{3 - 9x^2 + 6x} \, dx$

10. $\int \frac{x + 1}{1 + 2x + x^2} \, dx$

GRUPO 6 – Integrais da forma $\int a^{u(x)} \, u'(x) \, dx$

Calcular:

1. $\int 3^{2x} \, dx$

2. $\int x \, (0,8)^{x^2} \, dx$

3. $\int x^2 \left(\frac{1}{10}\right)^{x^3} \, dx$

4. $\int x \, 10^{3x^2} \, dx$

5. $\int \left(\frac{1}{2}\right)^{\frac{3 - 5x}{4}} \, dx$

6. $\int 5^{x^2 - 2x + 1} \, (x - 1) \, dx$

RESPOSTAS

GRUPO 1

1. $\frac{5}{6} x^{\frac{6}{5}} + c$

2. $\frac{20}{3} x \sqrt{x} + c$

3. $\frac{3}{16} x \sqrt[3]{x} + c$

4. $\frac{3}{5} x^{\frac{5}{3}} + c$

5. $\frac{5}{7} x^{1,4} + c$

6. $\frac{5}{6} x^{1,2} + \frac{10}{13} x^{1,3} + c$

7. $-\frac{1}{2} x^{-2} + c$

8. $\frac{x^5}{5} + \frac{1}{2} x^{-2} + c$

9. $2x^{\frac{1}{2}} + c$

10. $\frac{5}{9} x^{\frac{9}{5}} + c$

GRUPO 2

1. $\frac{5^x}{\ell n^5} + c$
2. $\frac{(0,4)^x}{\ell n\,(0,4)} + c$
3. $\frac{\left(\frac{4}{7}\right)^x}{\ell n\left(\frac{4}{7}\right)} + c$
4. $\frac{3 \cdot \left(\frac{1}{3}\right)^x}{\ell n\left(\frac{1}{3}\right)} + c$
5. $\frac{(\sqrt{2})^x}{\ell n\,(\sqrt{2})} + c$
6. $\frac{4 \cdot 10^x}{\ell n\,10} + c$
7. $-\frac{2}{3} \cdot \frac{6^x}{\ell n\,6} + c$
8. $\frac{\left(\frac{1}{2}\right)^x}{5\,\ell n\left(\frac{1}{2}\right)} + c$

GRUPO 3

1. $\frac{1}{10} e^{10x} + c$
2. $-\frac{1}{3} e^{-3x} + c$
3. $-\frac{1}{5} e^{-5x} + c$
4. $-\frac{1}{4} e^{-2x^2} + c$
5. $-\frac{1}{9} e^{-9x} + c$
6. $\frac{1}{2} \cdot e^{(1+x)^2} + c$
7. $\frac{1}{2} e^{(x-5)^2} + c$
8. $-\frac{1}{4} e^{-x^4} + c$
9. $-e^{\frac{1}{x}} + c$
10. $2e^{\sqrt{x}} + c$

GRUPO 4

1. $\frac{1}{24}(x^4 + 1)^6 + c$
2. $-\frac{1}{8}(1 - x^2)^4 + c$
3. $\frac{1}{60}(x^3 - 1)^5 + c$
4. $\frac{1}{3}(x^2 + 1) \times \sqrt{x^2 + 1} + c$
5. $-\frac{3}{8}(1 - x^2)\ \sqrt[3]{1 - x^2} + c$
6. $-\frac{1}{30}(4 - x^3)^5 + c$
7. $\frac{1}{12} \times (4x^2 - 4x + 1)^6 + c$
8. $\frac{1}{3}(\ell n\, x)^3 + c$
9. $\frac{(e^x + 1)^3}{3} + c$
10. $-2\,(e^{-x} + 5)^5 + c$

GRUPO 5

1. $2\ \ell n\ |x+4| + c$
2. $-5\ \ell n\ |8-x| + c$
3. $-\frac{3}{4}\ \ell n\ |1-2x^2| + c$
4. $-2{,}5\ \ell n\ |10-0{,}4x| + c$
5. $\ell n\ |\ \ell n\, x| + c$
6. $\frac{7}{8}\ \ell n\ |4x^2-16| + c$
7. $-\ \ell n\ |1-e^x| + c$
8. $\ell n\ |e^x - e^{-x}| + c$
9. $-\frac{1}{6}\ \ell n\ |3-9x^2+6x| + c$
10. $\frac{1}{2}\ \ell n\ |1+2x+x^2| + c$

GRUPO 6

1. $\dfrac{3^{2x}}{2\ \ell n\ 3} + c$
2. $\dfrac{(0{,}8)^{x^2}}{2\ \ell n\ (0{,}8)} + c$
3. $\dfrac{\left(\frac{1}{10}\right)^{x^3}}{3\ \ell n\left(\frac{1}{10}\right)} + c$
4. $\dfrac{10^{3x^2}}{6\ \ell n\ 10} + c$
5. $\dfrac{-\frac{4}{5}\left(\frac{1}{2}\right)^{\frac{3-5x}{4}}}{\ell n\left(\frac{1}{2}\right)} + c$
6. $\dfrac{5^{x^2}\ -\ 2x+1}{2\ \ell n\ 5} + c$

EXERCÍCIOS PROPOSTOS

Usando as propriedades (1) e (2) como no quadro anterior, calcular as integrais indefinidas seguintes:

1. $\int \left(x^4 + \frac{1}{4} x^2 + 1 \right) dx$
2. $\int \left(-x^3 + \frac{1}{5} x^5 \right) dx$
3. $\int \left(x^2 - \frac{1}{7} x + 4 \right) dx$
4. $\int \left(x^3 + x^2 + x + 1 \right) dx$
5. $\int \left(\frac{1}{8} x^3 - \frac{1}{5} x^2 + 10 \right) dx$
6. $\int \left(x^5 - \frac{3}{4} x^3 + 2 \right) dx$
7. $\int \left(\frac{1}{2} x^7 - \frac{2}{3} x \right) dx$
8. $\int \left(-4 + x^3 + x^4 \right) dx$
9. $\int \left(\frac{x^3 - 2x^2 + 4}{5} \right) dx$
10. $\int \left(\frac{1}{7} x^7 - \frac{3}{4} \right) dx$

RESPOSTAS

1. $\frac{x^5}{5} + \frac{1}{12} x^3 + x + c$
2. $-\frac{x^4}{4} + \frac{1}{30} x^6 + c$
3. $\frac{x^3}{3} - \frac{1}{14} x^2 + 4x + c$
4. $\frac{x^4}{4} + \frac{x^3}{3} + \frac{x^2}{2} + x + c$
5. $\frac{1}{32} x^4 - \frac{1}{15} x^3 + 10x + c$
6. $\frac{x^6}{6} - \frac{3}{16} x^4 + 2x + c$
7. $\frac{1}{16} x^8 - \frac{1}{3} x^2 + c$
8. $-4x + \frac{x^4}{4} + \frac{x^5}{5} + c$
9. $\frac{1}{20} x^4 - \frac{2}{15} x^3 + \frac{4}{5} x + c$
10. $\frac{1}{56} x^8 - \frac{3}{4} x + c$