

# Capítulo 10

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## 1 Exercícios 10.2

1.

$$\begin{aligned} & \int x \, dx \\ &= \frac{x^2}{2} + k \end{aligned}$$

2.

$$\begin{aligned} & \int 3 \, dx \\ &= 3x + k \end{aligned}$$

3.

$$\begin{aligned} & \int 3x + 1 \, dx \\ &= \int 3x \, dx + \int 1 \, dx + k \\ &= \frac{3x^2}{2} + k + x + k' \\ &= \frac{3x^2}{2} + x + k \end{aligned}$$

4.

$$\begin{aligned} & \int (x^2 + x + 1) \, dx \\ &= \int x^2 \, dx + \int x \, dx + \int 1 \, dx \\ &= \frac{x^3}{3} + \frac{x^2}{2} + x + k \end{aligned}$$

5.

$$\begin{aligned} & \int x^3 \, dx \\ &= \frac{x^4}{4} + k \end{aligned}$$

6.

$$\begin{aligned}
 & \int (x^3 + 2x + 3) dx \\
 &= \int x^3 dx + \int 2x dx + \int 3 dx \\
 &= \frac{x^4}{4} + 2 \int x dx + 3x + k \\
 &= \frac{x^4}{4} + 2 * \frac{x^2}{2} + 3x + k \\
 &= \frac{x^4}{4} + x^2 + 3x + k
 \end{aligned}$$

7.

$$\begin{aligned}
 & \int \frac{1}{x^2} dx \\
 &= x^{-1} / -1 + k \\
 &= \frac{1}{x} * \frac{1}{-1} + k \\
 &= \frac{-1}{x} + k
 \end{aligned}$$

8.

$$\begin{aligned}
 & \int (x + \frac{1}{x^3}) dx \\
 &= \int x dx + \int \frac{1}{x^3} dx \\
 &= \frac{x^2}{2} + \frac{x^{-2}}{-2} + k \\
 &= \frac{x^2}{2} + \frac{1}{x^2} * \frac{1}{-2} + k \\
 &= \frac{x^2}{2} - \frac{1}{2x^2} + k
 \end{aligned}$$

9.

$$\begin{aligned}
 & \int \sqrt{x} dx \\
 &= \int x^{\frac{1}{2}} dx \\
 &= \frac{\sqrt{x^3}}{\frac{3}{2}} \\
 &= \sqrt{x^3} * \frac{2}{3} \\
 &= \frac{2\sqrt{x^3}}{3} + k
 \end{aligned}$$

10.

$$\begin{aligned}
 & \int \sqrt[3]{x} \, dx \\
 &= \int x^{\frac{1}{3}} \, dx \\
 &= \frac{x^{\frac{4}{3}}}{\frac{4}{3}} + k \\
 &= \sqrt[3]{x^4} * \frac{3}{4} \\
 &= \frac{3\sqrt[3]{x^4}}{4} + k
 \end{aligned}$$

11.

$$\begin{aligned}
 & \int \left(x + \frac{1}{x}\right) \, dx \\
 &= \int x \, dx + \int \frac{1}{x} \, dx \\
 &= \frac{x^2}{2} + \ln x + k
 \end{aligned}$$

12.

$$\begin{aligned}
 & \int 2 + \sqrt[4]{x} \, dx \\
 &= \int 2 \, dx + \int \sqrt[4]{x} \, dx \\
 &= 2x + \int x^{\frac{1}{4}} \, dx \\
 &= 2x + \frac{x^{\frac{5}{4}}}{\frac{5}{4}} + k \\
 &= 2x + \frac{\sqrt[4]{x^5}}{\frac{5}{4}} + k \\
 &= 2x + \sqrt[4]{x^5} * \frac{4}{5} + k \\
 &= 2x + \frac{4\sqrt[4]{x^5}}{5} + k
 \end{aligned}$$

13.

$$\begin{aligned}
 & \int \sqrt{x} + \frac{1}{x^2} dx \\
 &= \int \sqrt{x} dx + \int \frac{1}{x^2} dx \\
 &= \frac{2\sqrt{x^3}}{3} + \left(-\frac{1}{x}\right) + k \\
 &= \frac{2\sqrt{x^3}}{3} - \frac{1}{x} + k
 \end{aligned}$$

14.

$$\begin{aligned}
 & \int \left(\frac{2}{x} + \frac{3}{x^2}\right) dx \\
 &= 2 * \int \frac{1}{x} dx + 3 * \int \frac{1}{x^2} dx \\
 &= 2 \ln(x) + 3 * \left(\frac{-1}{x}\right) + k \\
 &= 2 \ln(x) + \left(\frac{-3}{x}\right) + k \\
 &= 2 \ln(x) - \frac{3}{x} + k
 \end{aligned}$$

15.

$$\begin{aligned}
 & \int \left(2x^3 - \frac{1}{x^4}\right) dx \\
 &= 2 * \int x^3 dx - \left(\frac{-1}{3x^3}\right) + k \\
 &= \frac{x^4}{2} + \frac{1}{3x^3} + k
 \end{aligned}$$

16.

$$\begin{aligned}
 & \int \operatorname{sen} \alpha x \, dx \\
 &= \frac{1}{\alpha} \cos \alpha x + k \\
 &= \int \operatorname{sen} u \frac{du}{\alpha} \\
 &= \frac{1}{\alpha} \int \operatorname{sen} u \, du \\
 &= -\frac{1}{\alpha} * (\cos u + k) \\
 &= -\frac{1}{\alpha} \cos \alpha x + k
 \end{aligned}$$

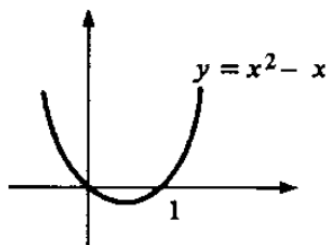
17.

$$\begin{aligned}
 & \int \cos \alpha x \, dx \\
 &= \frac{1}{\alpha} \operatorname{sen} \alpha x + k \\
 &= \int \cos u \frac{du}{\alpha} \\
 &= \frac{1}{\alpha} \int \cos u \, du \\
 &= \frac{1}{\alpha} * (\operatorname{sen} u + k) \\
 &= \frac{1}{\alpha} \operatorname{sen} \alpha x + k
 \end{aligned}$$

18.

$$\begin{aligned}
 & \int e^{2x} \, dx \\
 &= \frac{1}{2} \int e^u \, du \\
 &= \frac{1}{2} * e^u + k \\
 &= \frac{e^{2x}}{2} + k
 \end{aligned}$$

19.



20.

