

## Capítulo 10

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### 1 Exercícios 11.5

1.

$$\begin{aligned} & \int_0^1 x + 3 \, dx \\ &= \int x \, dx + 3 \int 1 \, dx \\ &= \frac{x^2}{2} + 3x + k \\ &= \frac{(x+6)}{2} + k = \frac{7}{2} \end{aligned}$$

2.

$$\begin{aligned} & \int_{-1}^1 2x + 1 \, dx \\ &= 2 \int x \, dx + \int 1 \, dx \\ &= x^2 + x + k = 2 \end{aligned}$$

3.

$$\begin{aligned} & \int_0^4 \frac{1}{2} \, dx \\ &= \frac{1}{2} \int 1 \, dx \\ &= \frac{x^2}{2} + k = 2 \end{aligned}$$

4.

$$\begin{aligned} & \int_{-2}^1 (2x + 1) \, dx \\ & \int x^2 \, dx - \int 1 \, dx \\ & = \frac{x^3}{3} - x + k = 0 \end{aligned}$$

5.

$$\begin{aligned} & \int_{-1}^2 4 \, dx \\ & 4 \int 1 \, dx \\ & 4x + k = 12 \end{aligned}$$

6.

$$\begin{aligned} & \int_1^3 \frac{1}{x^3} \, dx \\ & \frac{1}{2x^2} + k = \frac{4}{9} \end{aligned}$$

7.

$$\begin{aligned} & \int_{-1}^1 5 \, dx \\ & 6 \int 1 \, dx \\ & 5x + k = 5 \end{aligned}$$

8.

$$\begin{aligned} & \int_0^1 (x^2 + 3x - 3) \, dx \\ & \int x^2 \, dx + 3 \int x \, dx - 3 \int 1 \, dx \\ & \frac{x^3}{3} + \frac{3x^2}{2} - 3x + k = -\frac{7}{6} \end{aligned}$$

9.

$$\begin{aligned} & \int_0^1 (5x^3 - \frac{1}{2}) dx \\ & 5 \int x^3 dx - \frac{1}{2} \int 1 dx \\ & \frac{5x^4}{4} - \frac{x}{2} + k = \frac{3}{4} \end{aligned}$$

10.

$$\begin{aligned} & \int_1^1 (2x + 3) dx \\ & 2 \int x dx + 3 \int 1 dx \\ & x^2 + 3x + k = 0 \end{aligned}$$

11.

$$\begin{aligned} & \int_1^0 (2x + 3) dx \\ & 2 \int x dx + 3 \int 1 dx \\ & x^2 + 3x + k = -4 \end{aligned}$$

12.

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

13.

$$\begin{aligned} & \int_0^4 \sqrt{(x)} \, dx \\ & \int \sqrt{(x)} \, dx \\ & \int x^n \, dx \\ & \frac{2x^{\frac{3}{2}}}{3} + k = \frac{16}{3} \end{aligned}$$

14.

$$\begin{aligned} & \int_1^4 \frac{1}{\sqrt{(x)}} \, dx \\ & \int \frac{1}{\sqrt{(x)}} \, dx \\ & 2\sqrt{(x)} + k = 2 \end{aligned}$$

15.

$$\begin{aligned} & \int_0^8 \sqrt[3]{(x)} \, dx \\ & \int \sqrt[3]{(x)} \, dx \\ & \frac{3x^{\frac{4}{3}}}{4} + k = 12 \end{aligned}$$

16.

$$\begin{aligned} & \int_{-1}^0 (x^3 - 2x + 3) \, dx \\ & \int x^3 \, dx - 2 \int x \, dx + 3 \int 1 \, dx \\ & \frac{x^4}{4} - x^2 + 3x + k = \frac{15}{4} \end{aligned}$$

17.

$$\begin{aligned} & \int_0^1 \sqrt[8]{x} \, dx \\ & \int \sqrt[8]{x} \, dx \\ & \frac{8x^{\frac{9}{8}}}{9} + k = \frac{8}{9} \end{aligned}$$

18.

$$\begin{aligned} & \int_1^2 \left(x^3 + x + \frac{1}{x^3}\right) dx \\ & \int x^3 \, dx + \int x \, dx + \int \frac{1}{x^3} \, dx \\ & \frac{\frac{x^4}{4} + \frac{x^2}{2} - \frac{1}{2x^2}}{4x^2} + k = \frac{45}{8} \end{aligned}$$

19.

$$\begin{aligned} & \int_0^1 (x + \sqrt[4]{x}) \, dx \\ & \int x \, dx + \int \sqrt[4]{x} \, dx \\ & \frac{x^2}{2} + \frac{4x^{\frac{5}{4}}}{5} + k = \frac{13}{10} \end{aligned}$$

20.

$$\begin{aligned} & \int_1^3 \left(5 + \frac{1}{x^2}\right) dx \\ & 5 \int 1 \, dx + \int \frac{1}{x^2} \, dx \\ & 5x - \frac{1}{x} + k = \frac{32}{3} \end{aligned}$$

21.

$$\begin{aligned} & \int_{-3}^3 x^3 dx \\ & \int x^3 dx \\ & \frac{x^4}{4} + k = 0 \end{aligned}$$

22.

$$\begin{aligned} & \int_{-1}^1 (x^7 + x^3 + x) dx \\ & \int x^7 dx + \int x^3 dx + \int x dx \\ & \frac{x^8}{8} + \frac{x^4}{4} + \frac{x^2}{2} + k = 0 \end{aligned}$$

23.

$$\begin{aligned} & \int_{\frac{1}{2}}^1 (x + 3) dx \\ & \int x dx + 3 \int 1 dx \\ & \frac{x^2}{2} + 3x + 4 = \frac{15}{8} \end{aligned}$$

24.

$$\begin{aligned} & \int_1^4 (5x + \sqrt{x}) dx \\ & 5 \int x dx + \int \sqrt{x} dx \\ & \frac{5x^2}{2} + \frac{2x^{\frac{3}{2}}}{3} + k \\ & \frac{15x^2 + 4x^{\frac{3}{2}}}{6} + k = \frac{253}{6} \end{aligned}$$

25.

$$\begin{aligned}
 & \int_1^0 (x^7 - x + 3) dx \\
 & \int x^7 dx + \int x dx + 3 \int 1 dx \\
 & \frac{x^8}{8} + \frac{x^2}{2} + 3x + k \\
 & \frac{x(x^7 - 4x + 24)}{8} + k = \frac{-21}{8}
 \end{aligned}$$

26.

$$\begin{aligned}
 & \int_1^2 \frac{1+x}{x^3} dx \\
 & \int \left( \frac{1}{x^2} + \frac{1}{x^3} \right) dx \\
 & \int \frac{1}{x^2} dx + \int \frac{1}{x^3} dx \\
 & -\frac{1}{x} - \frac{1}{2x^2} + k \\
 & \frac{2x+1}{2x^2} + k = \frac{7}{8}
 \end{aligned}$$

27.

$$\begin{aligned}
 & \int_0^1 (x+1)^2 dx \\
 & \mathbf{u = (x+1)} \\
 & \int u^2 du \\
 & \frac{u^3}{3} \\
 & \frac{(x+1)^3}{3} + k = \frac{7}{3}
 \end{aligned}$$

28.

$$\begin{aligned} & \int_1^4 \frac{1+x}{\sqrt{x}} dx \\ & \int (\sqrt{x} + \frac{1}{\sqrt{x}}) dx \\ & \int (\sqrt{x}) dx + \int \frac{1}{\sqrt{x}} dx \\ & \frac{2x^{\frac{3}{2}}}{3} + 2\sqrt{x} + k \\ & \frac{2\sqrt{x}(x+3)}{3} + k = \frac{20}{3} \end{aligned}$$

29.

$$\begin{aligned} & \int_0^1 (x-3)^2 dx \\ & \int (x-3)^2 dx \\ & \mathbf{u = x-3} \\ & \frac{u^3}{3} \\ & \frac{(x-3)^3}{3} + k = \frac{19}{3} \end{aligned}$$

30.

$$\begin{aligned} & \int_0^2 (t^2 + 3t - 1) dt \\ & \int t^2 dt + 3 \int t dt - \int 1 dt \\ & \frac{t^3}{3} + \frac{3t^2}{2} - t + k \\ & \frac{t(2t^2 + 9t - 6)}{6} + k \\ & \frac{20}{3} \end{aligned}$$