

Lista de exercícios: **INTEGRAIS INDEFINIDAS**

1. Determine uma primitiva para cada função abaixo:

- | | |
|-----------------------------------|--------------------------------------|
| a. $6x$ | $R = 3x^2$ |
| b. x^7 | $R = \frac{x^8}{8}$ |
| c. $x^7 - 6x + 8$ | $R = \frac{x^8}{8} - 3x^2 + 8x$ |
| d. $-\frac{2}{x^3}$ | $R = \frac{1}{x^2}$ |
| e. $\frac{1}{2x^3}$ | $R = -\frac{1}{4x^2}$ |
| f. $x^3 - \frac{1}{x^3}$ | $R = \frac{x^4}{4} + \frac{1}{2x^2}$ |
| g. $\frac{2}{3}x^{\frac{1}{3}}$ | $R = x^{\frac{2}{3}}$ |
| h. $\frac{1}{3}x^{-\frac{2}{3}}$ | $R = x^{\frac{1}{3}}$ |
| i. $-\frac{1}{3}x^{-\frac{4}{3}}$ | $R = x^{-\frac{1}{3}}$ |

2. Calcule as seguintes integrais:

- | | |
|------------------------------------|---|
| a. $\int (3x^2 - 4x - 5)dx$ | $R = x^3 - 2x^2 - 5x + c$ |
| b. $\int (x^3 - 3x^2 + 2x - 4)dx$ | $R = \frac{x^4}{4} - x^3 + x^2 - 4x + c$ |
| c. $\int (2x^3 - 4x^2 - 5x + 6)dx$ | $R = \frac{1}{2}x^4 - \frac{4}{3}x^3 - \frac{5}{2}x^2 + 6x + c$ |
| d. $\int (2x^3 - 1)(x^2 + 5)dx$ | $R = \frac{1}{3}x^6 + \frac{5}{2}x^4 - \frac{x^3}{3} - 5x + c$ |
| e. $\int \frac{x^3 - 1}{x - 1} dx$ | $R = \frac{x^3}{3} + \frac{x^2}{2} + x + c$ |
| f. $\int (4t^2 + 3)^2 dt$ | $R = \frac{16}{5}t^5 + 8t^3 + 9t + c$ |

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g. $\int \left(t^2 + 3t + \frac{1}{t^2} \right) dt$

$$R = \frac{t^3}{3} + \frac{3}{2}t^2 - \frac{1}{t} + c$$

h. $\int \left(\frac{3}{x^2} + \frac{5}{x^4} \right) dx$

$$R = -\frac{3}{x} - \frac{5}{3x^3} + c$$

i. $\int \frac{25x^3 - 1}{\sqrt{x}} dx$

$$R = \frac{50}{7}x^{\frac{7}{2}} - 2x^{\frac{1}{2}} + c$$

j. $\int \left(\sqrt{2x} + 2x\sqrt{x} + \frac{1}{\sqrt{x}} \right) dx$

$$R = \frac{2}{3}(2x)^{\frac{3}{2}} + \frac{4}{5}x^{\frac{5}{2}} + 2x^{\frac{1}{2}} + c$$

k. $\int \frac{(\sqrt{x} - 1)^2}{\sqrt{x}} dx$

$$R = \frac{2}{3}x^{\frac{3}{2}} - 2x + 2x^{\frac{1}{2}} + c$$

l. $\int \frac{t^3 + 2t^2 - 3}{\sqrt[3]{t}} dx$

$$R = \frac{3}{11}t^{\frac{11}{3}} + \frac{6}{8}t^{\frac{8}{3}} - \frac{9}{2}t^{\frac{2}{3}} + c$$

m. $\int (3x^4 + 4x^2 + 11) dx$

$$R = \frac{3}{5}x^5 + \frac{4x^3}{3} + 11x + c$$

n. $\int 3t^{\frac{2}{3}} \sqrt{t} \cdot dt$

$$R = \frac{9}{7}t^{\frac{7}{3}} + c$$

o. $\int (x+1) dx$

$$R = \frac{x^2}{2} + x + c$$

p. $\int \left(\frac{1}{7} - \frac{1}{\frac{5}{y^4}} \right) dy$

$$R = \frac{1}{7}y + \frac{4}{\frac{1}{y^4}} + c$$

q. $\int \frac{t\sqrt{t} + \sqrt{t}}{t^2} dt$

$$R = 2\sqrt{t} - \frac{2}{\sqrt{t}} + c$$

r. $\int (x^2 - 2x + 5) dx$

$$R = \frac{x^3}{3} - x^2 + 5x + c$$

3. Calcule as seguintes integrais, utilizando o método da substituição:

a. $\int (4x + 3)^4 dx$

$$R = \frac{(4x + 3)^5}{20} + c$$

b. $\int t(4t^2 + 7)^9 dt$

$$R = \frac{(4t^2 + 7)^{10}}{80} + c$$

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c.	$\int x\sqrt{4x^2 + 15} dx$	$R = \frac{(4x^2 + 15)^{\frac{3}{2}}}{12} + c$
d.	$\int \frac{3x dx}{(4 - 3x^2)^8}$	$R = \frac{(4 - 3x^2)^{-7}}{14} + c$
e.	$\int \frac{s ds}{\sqrt[3]{5s^2 + 16}}$	$R = \frac{3(5s^2 + 16)^{\frac{2}{3}}}{20} + c$
f.	$\int \frac{(8t + 2) dt}{(4t^2 + 2t + 6)^{17}}$	$R = \frac{-(4t^2 + 2t + 6)^{-16}}{16} + c$
g.	$\int \left(1 - x^{\frac{3}{2}}\right)^{\frac{5}{3}} \sqrt{x} dx$	$R = \frac{-\left(1 - x^{\frac{3}{2}}\right)^{\frac{8}{3}}}{4} + c$
h.	$\int \frac{x^2}{(4x^3 + 1)^7} dx$	$R = \frac{-(4x^3 + 1)^{-6}}{72} + c$
i.	$\int (5t^2 + 1) \cdot \sqrt[4]{5t^3 + 3t - 2} dt$	$R = \frac{4}{15} (5t^3 + 3t - 2)^{\frac{5}{4}} + c$
j.	$\int \frac{2x^2 - 1}{(6x^3 - 9x + 1)^{\frac{3}{2}}} dx$	$R = \frac{-2(6x^3 - 9x + 1)^{-\frac{1}{2}}}{9} + c$
k.	$\int \frac{2x dx}{(2 - x)^{\frac{2}{3}}}$	$R = \frac{3}{2} (2 - x)^{\frac{4}{3}} - 12(2 - x)^{\frac{1}{3}} + c$
l.	$\int \frac{t^2 dt}{\sqrt{t + 4}}$	$R = \frac{2}{5} (t + 4)^{\frac{5}{2}} - \frac{16}{3} (t + 4)^{\frac{3}{2}} + 32(t + 4)^{\frac{1}{2}} + c$
m.	$\int x\sqrt{5 - x} dx$	$R = -\frac{10}{3} (5 - x)^{\frac{3}{2}} + \frac{2}{5} (5 - x)^{\frac{5}{2}} + c$
n.	$\int (7x - 2)^3 dx$	$R = \frac{(7x - 2)^4}{28} + c$
o.	$\int (3x + 5)^{-2} dx$	$R = -\frac{(3x + 5)^{-1}}{3} + c$
p.	$\int \sqrt{1 + y^2} \cdot 2y dy$	$R = \frac{2}{3} (1 + y^2)^{\frac{3}{2}} + c$

q. $\int \sqrt{4t-1} dt$

$$R = \frac{1}{6} (4t-1)^{\frac{3}{2}} + c$$

r. $\int \frac{2z dz}{\sqrt[3]{z^2+1}}$

$$R = \frac{3}{2} (z^2+1)^{\frac{2}{3}} + c$$

s. $\int 28(7x-2)^{-5} dx$

$$R = -(7x-2)^{-4} + c$$

t. $\int \frac{9r^2 dr}{\sqrt{1-r^3}}$

$$R = -6(1-r^3)^{\frac{1}{2}} + c$$

u. $\int \left(x + \frac{5}{x}\right)^{21} \left(\frac{x^2-5}{x^2}\right) dx$

$$R = \frac{\left(x + \frac{5}{x}\right)^{22}}{22} + c$$

v. $\int x^2 \sqrt{5x-1} dx$

$$R = \frac{2}{125} \left(\frac{1}{7} (5x-1)^{\frac{7}{2}} + \frac{2}{5} (5x-1)^{\frac{5}{2}} + \frac{1}{3} (5x-1)^{\frac{3}{2}} \right) + c$$

w. $\int \sqrt[3]{3x^2+5} \cdot x^3 \cdot dx$

$$R = \frac{1}{42} (3x^2+5)^{\frac{7}{3}} - \frac{5}{24} (3x^2+5)^{\frac{4}{3}} + c$$

Bons estudos!

Equipe FicouMaisFacil.

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