1. Determine a função $f$ tal que $\int f(x)dx = x^2 + \dfrac{1}{2}\cos 2x + c$.

2. Determine a função $f$ tal que $f'(x) = 3e^{1-3x}$ e $f(0) = 1$.

3. Calcule as seguintes integrais pelo método da substituição:

   (a) $\displaystyle\int \frac{dx}{4+3x}$

   (b) $\displaystyle\int \frac{2}{5-x}dx$

   (c) $\displaystyle\int \frac{dx}{x\ln x}$

   (d) $\displaystyle\int e^{2x}dx$

   (e) $\displaystyle\int e^{2x+3}dx$

   (f) $\displaystyle\int e^{\sin x}\cos\ x dx$

   (g) $\displaystyle\int \sin x \cos x dx$

   (h) $\displaystyle\int x^2(3x^3+2)^5 dx$

   (i) $\displaystyle\int (x^2+3)^4\ 2x dx$

   (j) $\displaystyle\int (3x^2+1)^3\ x dx$

   (k) $\displaystyle\int 3x^6\ \sin x^7\ dx$

   (l) $\displaystyle\int \frac{4x}{2x^2+3}\ dx$

   (m) $\displaystyle\int \frac{\sqrt{1+\ln x}}{x}\ dx$

   (n) $\displaystyle\int 5xe^{10-x^2}dx$

4. Calcule as seguintes integrais:

(a) $\int (x+2)^5 dx$

(b) $\int \sqrt{5x+1}\,dx$

(c) $\int \frac{2x}{3x^2+4}\,dx$

(d) $\int x\sqrt{x+1}\,dx$

(e) $\int \sin^4 x \cos x\,dx$

(f) $\int 3\cos(3x+1)\,dx$

(g) $\int \tan x\,dx$

(h) $\int 2x(1+3x)^6\,dx$

(i) $\int e^x \sin(1-e^x)\,dx$

(j) $\int \frac{x}{\sqrt[5]{x^2-1}}\,dx$

(k) $\int 5x\sqrt{4-3x^2}\,dx$

(l) $\int \frac{e^t}{e^t+4}\,dt$

## Respostas

1) $f(x) = 2x - \sin 2x$ \quad 2) $f(x) = -e^{1-3x} + e + 1$ \quad 3) a) $\frac{1}{3}\ln|4+3x| + c$ \quad b) $-2\ln|5-x| + c$
c) $\ln|\ln x| + c$ \quad d) $\frac{1}{2}e^{2x} + c$ \quad e) $\frac{1}{2}e^{2x+3} + c$ \quad f) $e^{\sin x} + c$ \quad g) $\frac{\sin^2 x}{2} + c$ \quad h) $\frac{(3x^3+2)^6}{54} + c$
i) $\frac{(x^2+3)^5}{5} + c$ \quad j) $\frac{1}{24}(3x^2+1)^4 + c$ \quad k) $-\frac{3}{7}\cos x^7 + c$ \quad l) $\ln(2x^2+3) + c$
m) $\frac{2}{3}(1+\ln x)^{\frac{3}{2}} + c$ \quad n) $-\frac{5}{2}e^{10-x^2} + c$ \quad 4) a) $\frac{(x+2)^6}{6} + c$ \quad b) $\frac{2}{15}(5x+1)^{\frac{3}{2}} + c$ \quad c) $\frac{1}{3}\ln(3x^2+4) + c$
d) $\frac{2}{5}(x+1)^{\frac{5}{2}} - \frac{2}{3}(x+1)^{\frac{3}{2}} + c$ \quad e) $\frac{1}{5}\sin^5 x + c$ \quad f) $\sin(3x+1) + c$ \quad g) $-\ln|\cos x| + c$
h) $\frac{1}{36}(1+3x)^8 - \frac{2}{63}(1+3x)^7 + c$ \quad i) $\cos(1-e^x) + c$ \quad j) $\frac{5}{8}(x^2-1)^{\frac{4}{5}} + c$ \quad k) $-\frac{5}{9}(4-3x^2)^{\frac{3}{2}} + c$
l) $\ln(e^t+4) + c$