1. Calcule:

   a) $\int_0^1 xe^x \, dx$

   b) $\int_1^2 \ln x \, dx$

2. Calcule:

   a) $\int \frac{1}{\sqrt{4 - x^2}} \, dx$

   b) $\int \frac{1}{4 + x^2} \, dx$

   c) $\int \frac{x}{\sqrt{1 - x^2}} \, dx$

   d) $\int \sqrt{3 - 4x^2} \, dx$

3. Calcule:

   a) $\int \frac{2}{(1 + \sqrt{x})^3} \, dx$

   b) $\int x^2 \, (x + 1)^{10} \, dx$

   c) $\int \frac{x + 2}{(x + 1)^5} \, dx$

   d) $\int \frac{x - 1}{\sqrt{2x + 1}} \, dx$

4. Calcule:

   a) $\int \frac{2x - 1}{9 + 4x^2} \, dx$

   b) $\frac{3x - 2}{x^2 + x + 1} \, dx$

5. Elimine a raíz do integrando:

   a) $\int \sqrt{9 - x^2} \, dx$

   b) $\int \sqrt{x^2 - 9} \, dx$

   c) $\int \sqrt{x^2 + 9} \, dx$

   d) $\int x^2 \, \sqrt{1 - x^2} \, dx$

   e) $\int \frac{x}{\sqrt{2 - 3x^2}} \, dx$

   f) $\int \frac{x^2}{\sqrt{2 - 3x^2}} \, dx$

6. Calcule:

a) $\int \dfrac{dx}{x^2 - 4}$

b) $\int \dfrac{x}{x^2 - 5x + 6} \, dx$

c) $\int \dfrac{x}{x^2 - 4} \, dx$

d) $\int \dfrac{2x + 1}{x^2 - 1} \, dx$

e) $\int \dfrac{x^3 + x + 1}{x^2 - 2x + 1} \, dx$

f) $\int \dfrac{x^3 + x + 1}{x^2 - 4x + 3} \, dx$

7. Calcule:

a) $\int \dfrac{2x - 3}{(x - 1)^3} \, dx$

b) $\int \dfrac{2}{(x + 2)(x - 1)^2} \, dx$

9. Calcule:

a) $\int \dfrac{x + 1}{(x - 1)^4} \, dx$

b) $\int \dfrac{2}{x^3 \, (x + 2)} \, dx$

c) $\int \dfrac{x - 1}{x^2 \, (x + 1)^2} \, dx$

d) $\int \dfrac{3}{(x^2 - 1)(x^2 - 4)} \, dx$

10. Calcule:

a) $\int \dfrac{x + 2}{x^3 + 2x^2 + 5x} \, dx$

b) $\int \dfrac{4x + 1}{x^2 + 6x + 12} \, dx$

c) $\int \dfrac{4x + 1}{x^2 + 6x + 8} \, dx$

d) $\int \dfrac{2x^2 + 4}{x^3 - 8} \, dx$

e) $\int \dfrac{x^3 + 4x^2 + 6x + 1}{x^3 + x^2 + x - 3} \, dx$

11. Calcule:

a) $\int \operatorname{sen}7x \, \cos2x \, dx$

b) $\int \operatorname{sen}3x \, \operatorname{sen}5x \, dx$

c) $\int \operatorname{sen}x \, \operatorname{sen}2x \, \operatorname{sen}3x \, dx$

d) $\int \cos x \, \cos2x \, \cos3x \, dx$

12. Calcule:

a) $\int \cos^2 5x \ dx$

b) $\int \text{sen} x \ \cos^2 x \ dx$

c) $\int \cos x \ \text{sen}^4 x \ dx$

d) $\int \text{sen} 2x \ \cos^2 2x \ dx$

13. Verifique:

a) $\int \text{tg}^n x \ dx = \dfrac{\text{tg}^{n-1} x}{n-1} - \int \text{tg}^{n-2} x \ dx$

b) $\int \sec^n x \ dx = \dfrac{\sec^{n-2} x \ \text{tg} x}{n-1} + \dfrac{n-2}{n-1} \int \sec^{n-2} x \ dx$

14. Calcule:

a) $\int \text{tg}^5 x \ \sec^2 x \ dx$

b) $\int \text{tg}^3 \ \sec^4 x \ dx$

c) $\int \text{tg}^3 2x \ \sec 2x \ dx$

d) $\int \text{tg}^3 3x \ dx$

e) $\int \sec^4 x \ dx$

f) $\int \sec^5 3x \ \text{tg} 3x \ dx$

15. $\left(\text{A mudança } u = \text{tg} \ \dfrac{x}{2} \right)$ Calcule:

a) $\int \dfrac{\cos x}{4 - \text{sen}^2 x} \ dx$

b) $\int \dfrac{1}{\text{sen} x + \cos x} \ dx$

c) $\int \dfrac{\text{sen} 2x}{1 + \cos x} \ dx$

d) $\int \dfrac{2 \ \text{tg} x}{2 + 3 \ \cos x} \ dx$

16. Determine o centro de massa da região dada.

a) $\{(x, y) : 0 \leq x \leq 1, 0 \leq y \leq x^3\}$

b) $\{(x, y) : x^2 + 4y^2 \leq 1, x \geq 0, y \geq 0\}$

c) $\{(x, y) : x^2 + 4y^2 \leq 1, y \geq 0\}$

d) $\{(x, y) : x^2 \leq y \leq x\}$

17. Determine o centro de massa do gráfico da função dada.

a) $f(x) = \sqrt{4 - x^2}, \ -2 \leq x \leq 2$

b) $f(x) = x^2, \ -\dfrac{1}{2} \leq x \leq \dfrac{1}{2}$