

UNIVERSIDADE FEDERAL DE OURO PRETO
INSTITUTO DE CIÊNCIAS EXATAS E BIOLÓGICAS
DEPARTAMENTO DE MATEMÁTICA

Décima Primeira Lista de Exercícios de Cálculo Diferencial e Integral I - MTM122

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(1) Calcule.

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|---|--|---|---|
| (1) $\int 9x^2 - 4x + 3dx$ | (2) $\int 3\sqrt{x} + \frac{1}{\sqrt{x}}dx$ | (3) $\int \frac{6}{\sqrt[3]{x}} - \frac{\sqrt[3]{x}}{6} + 7dx$ | (4) $\int (3x - 1)^2 dx$ |
| (5) $\int \frac{(8x - 5)}{\sqrt[3]{x}}dx$ | (6) $\int \sqrt[5]{32x^4}dx$ | (7) $\int \frac{x^3 - 1}{x - 1}dx$ | (8) $\int_7^{12} dx$ |
| (9) $\int_1^2 \frac{5}{8x^6}dx$ | (10) $\int_{-1}^0 (2w + 3)^2 dw$ | (11) $\int_3^2 \frac{x^2 - 1}{x - 1}dx$ | (12) $\int_1^3 \frac{2x^3 - 4x^2 + 5}{x^2}dx$ |
| (13) $\int_{-\pi/6}^{\pi/6} x^2 dx$ (Obs.: x^2 é par) | (14) $\int_{-\pi/6}^{\pi/6} \cos x dx$ | (15) $\int_{-\pi/6}^{\pi/6} \sec(x)\operatorname{tg}(x)dx$ | (16) $\int_{-\pi/6}^{\pi/6} (x + \sin 5x)dx$ |
| (17) $\int (3x + 1)^4 dx$ | (18) $\int \sqrt{t^3 - 1}t^2 dt$ | (19) $\int \frac{s}{\sqrt[3]{1 - 2s^2}} ds$ | (20) $\int \frac{(\sqrt{u} + 3)^4}{\sqrt{u}} du$ |
| (21) $\int_1^4 \sqrt{5 - x} dx$ | (22) $\int \cos(4x - 3)dx$ | (23) $\int x(\sin(x^2))dx$ | (24) $\int \cos(3x)\sqrt[3]{\sin(3x)}dx$ |
| (25) $\int_{-1}^1 (t^2 - 1)^3 t dt$ | (26) $\int_0^1 \frac{1}{(3 - 2v)^2} dv$ | (27) $\int 5\sqrt{8x + 5}dx$ | (28) $\int_1^4 \frac{1}{\sqrt{x}(\sqrt{x+1})^3} dx$ |
| (29) $\int \sin x(1 + \sqrt{\cos(x)})^2 dx$ | (30) $\int \frac{\sin x}{\cos^2 x} dx$ | (31) $\int (2 + 5\cos(x))^3 \sin x dx$ | (32) $\int \frac{x}{x^2 + 1} dx$ |
| (33) $\int \frac{1}{7 - 5x} dx$ | (34) $\int \frac{x - 2}{x^2 - 4x + 9} dx$ | (35) $\int \frac{x^2}{x^3 + 1} dx$ | (36) $\int_{-2}^1 \frac{1}{2x + 7} dx$ |
| (37) $\int (x + e^{5x})dx$ | (38) $\int \frac{\ln x}{x} dx$ | (39) $\int_1^3 e^{-4x} dx$ | (40) $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$ |
| (41) $\int (1 + e^{\sin x})\cos x dx$ | (42) $\int \operatorname{cotg} x dx = \int \frac{\cos x}{\sin x} dx$ | (43) $\int e^x \cos(e^x) dx$ | (44) $\int \frac{(e^x + 1)^2}{e^x} dx$ |
| (45) $\int \frac{e^x - x^{-x}}{e^x + e^{-x}} dx$ | (46) $\int \frac{1}{x^2 + 2x + 1} dx$ | (47) $\int \frac{(1 + e^x)^2}{e^{2x}} dx$ | (48) $\int \frac{\cos 2x}{1 - 2\sin 2x} dx$ |
| (49) $\int \frac{x^2}{3x + 2} dx$ | (50) $\int_0^1 x(4^{x^2})dx$ | (51) $\int 5^x e^x dx$ | (52) $\int x^e dx$ |
| (53) $\int \operatorname{cosec} 4x dx$ | (54) $\int \operatorname{tg} 3x \operatorname{sec} 3x dx$ | (55) $\int (\operatorname{tg} 3x + \operatorname{sec} 3x) dx$ | (56) $\int \frac{1}{\cos 2x} dx$ |
| (57) $\int x(\operatorname{cosec}^2(x^2 + 1))dx$ | (58) $\int \operatorname{cotg} 6x \sin 6x dx$ | (59) $\int_0^{\pi/4} \operatorname{tg} x \operatorname{sec}^2 x dx$ | (60) $\int \frac{\operatorname{tg}^2 2x}{\operatorname{sec} 2x} dx$ |

(2) Calcule.

$$(1) \int \frac{5x - 12}{x(x - 4)} dx$$

$$(2) \int \frac{x + 34}{(x - 6)(x + 2)} dx$$

$$(3) \int \frac{37 - 11x}{(x + 1)(x - 2)(x - 3)} dx$$

$$(4) \int \frac{x + 16}{x^2 + 2x - 8} dx$$

$$(5) \int \frac{5x^2 - 10x - 8}{x^3 - 4x} dx$$

$$(6) \int \frac{2x^2 - 25x - 33}{(x + 1)^2(x - 5)} dx$$

$$(7) \int \frac{9x^4 + 17x^3 + 3x^2 - 8x + 3}{5x^2 + 3x^4} dx$$

$$(8) \int \frac{x^3 + 3x^2 + 3x + 63}{(x^2 - 9)^2} dx$$

$$(9) \int \frac{5x^2 + 11x + 17}{x^3 + 5x^2 + 4x + 20} dx$$

$$(10) \int \frac{x^2 + 3x + 1}{x^4 + 5x^2 + 4} dx$$

$$(11) \int \frac{2x^3 + 10x}{(x^2 + 1)^2} dx$$

$$(12) \int \frac{x^3 + 3x - 2}{x^2 - x} dx$$

$$(13) \int \frac{x^6 - 3x + 1}{x^4 + 9x^2} dx$$

$$(14) \int \frac{2x^3 - 5x^2 + 46x + 98}{(x^2 + x - 12)^2} dx$$

(3) Desenhe e hachure a área limitada pelos gráficos das expressões dadas abaixo e calcule sua área através de uma integral.

$$(1) y = \frac{1}{x^2}, y = -x^2, x = 1, x = 2$$

$$(2) y^2 = -x, x - y = 4, y = -1, y = 2$$

$$(3) y = x^2 + 1, y = 5$$

$$(4) y = x^2, y = 4x$$

$$(5) y = 1 - x^2, y = x - 1$$

$$(6) y^2 = 4 + x, y^2 + x = 2$$

$$(7) y = x, y = 3x, x + y = 4$$

$$(8) y = x^3 - x, y = 0$$

$$(9) x = 4y - y^3, x = 0$$

$$(10) y = x\sqrt{4 - x^2}, y = 0$$