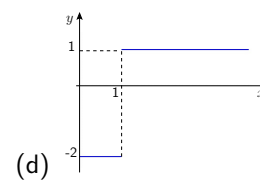
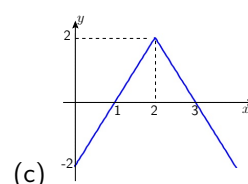
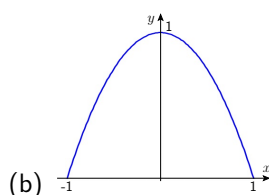
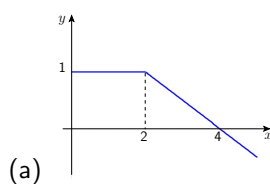


1. Considere, em cada alínea, a função $f : I \rightarrow \mathbb{R}$, I um intervalo, representada graficamente por



Esboce F , uma primitiva de f em I , sabendo que:

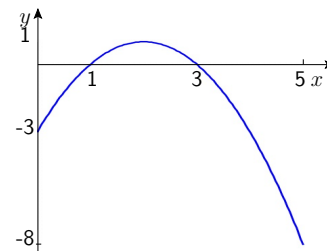
(a) $I = [0, 5]$

(c) $I = [0, 4]$ e $F(0) = -2$

(b) $I = [-1, 1]$, $f(x) = 1 - x^2$ e $F(0) = 0$

(d) $I = [0, 4]$ e $F(0) = 1$

2. Seja $f : [0, 5] \rightarrow \mathbb{R}$ representada graficamente na figura ao lado. Considere uma função primitiva de f , $F : [0, 5] \rightarrow \mathbb{R}$.



(a) Encontre os pontos críticos de F .

(b) Classifique os pontos críticos de F .

(c) Esboce graficamente F .

3. Calcule os seguintes integrais indefinidos

(a) $\int (3x^2 - 2x^5) dx$

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

(m) $\int \frac{\sqrt{1+3 \ln a}}{a} da$

(b) $\int (\sqrt{x} + 2)^2 dx$

(h) $\int \frac{t}{3-t^2} dt$

(n) $\int z \operatorname{sen} z^2 dz$

(c) $\int (2\theta + 10)^{20} d\theta$

(i) $\int \frac{1}{4-3x} dx$

(o) $\int \frac{1}{x(\ln^2 x + 1)} dx$

(d) $\int x^4(x^5 + 10)^9 dx$

(j) $\int \operatorname{th} x dx$

(p) $\int \left(\frac{2}{x} - 3\right)^2 \frac{1}{x^2} dx$

(e) $\int y^2 e^{y^3} dy$

(k) $\int \frac{1}{e^{3x}} dx$

(q) $\int \operatorname{sen}(\pi - 2x) dx$

(f) $\int \sqrt{2x+1} dx$

(l) $\int \frac{-7}{\sqrt{1-5x}} dx$

4. Sendo $f : \mathbb{R} \rightarrow \mathbb{R}$ definida por $f(x) = x^2 \operatorname{sen} x$, calcule a primitiva de f cujo gráfico passa pelo ponto $(\frac{\pi}{2}, \pi)$.

5. Encontre uma antiderivada F sabendo que $F(1) = 0$. A solução encontrada é única?

(a) $f(x) = \operatorname{sen} x \cos x$

(c) $f(x) = \operatorname{sen}^2 x$

(b) $f(x) = \operatorname{sen}(2x) \cos x$

(d) $f(x) = \frac{1}{x}, x < 0$

6. Usando primitivação por partes calcule:

(a) $\int \ln x dx$

(b) $\int x \operatorname{sen}(2x) dx$

(c) $\int \operatorname{arctg} x dx$

(d) $\int x \cos x \, dx$	(i) $\int \ln^2 x \, dx$	(n) $\int x \operatorname{arctg} x \, dx$
(e) $\int \ln(1-x) \, dx$	(j) $\int e^x \cos x \, dx$	(o) $\int x^2 \ln x \, dx$
(f) $\int x \ln x \, dx$	(k) $\int \operatorname{arcsen} x \, dx$	(p) $\int \operatorname{sen}(\ln x) \, dx$
(g) $\int x^2 \operatorname{sen} x \, dx$	(l) $\int e^{\operatorname{sen} x} \operatorname{sen} x \cos x \, dx$	(q) $\int \operatorname{ch} x \operatorname{sen}(3x) \, dx$
(h) $\int x \operatorname{sen} x \cos x \, dx$	(m) $\int \frac{\operatorname{arcsen} \sqrt{x}}{\sqrt{x}} \, dx$	(r) $\int x^3 e^{x^2} \, dx.$

7. Calcule os seguintes integrais indefinidos.

(a) $\int \frac{3x^2 - 4x - 1}{(x^2 - 1)(x - 2)} \, dx$	(c) $\int \frac{4x^2 + x + 1}{x^3 - x} \, dx$	(e) $\int \frac{x^4 - 8}{x^3 - 2x^2} \, dx$
(b) $\int \frac{2x^2 + x + 1}{(x - 1)(x + 1)^2} \, dx$	(d) $\int \frac{27}{x^4 - 3x^3} \, dx$	(f) $\int \frac{x + 3}{(x - 2)(x^2 - 2x + 5)} \, dx$

8. Calcule as seguintes primitivas usando a substituição indicada.

(a) $\int x\sqrt{x-1} \, dx, \quad x = t^2 + 1$	(c) $\int \frac{e^{2x}}{1 + e^x} \, dx, \quad x = \ln t$
(b) $\int \sqrt{1-x^2} \, dx, \quad x = \operatorname{sen} t$	(d) $\int \sqrt{1+x^2} \, dx, \quad x = \operatorname{sh} t$

9. Calcule os seguintes integrais indefinidos

(a) $\int \frac{x}{x^2 - 1} \, dx$	(i) $\int \frac{1}{x} (1 + \ln^2 x) \, dx$	(p) $\int \frac{x e^{\sqrt{1-x^2}}}{\sqrt{1-x^2}} \, dx$
(b) $\int \frac{x}{\sqrt{x^2 - 1}} \, dx$	(j) $\int \frac{2 + \sqrt{\operatorname{arctg}(2x)}}{1 + 4x^2} \, dx$	(q) $\int \frac{1}{\cos^2 x \operatorname{sen}^2 x} \, dx$
(c) $\int \frac{1}{x} \operatorname{sen}(\ln x) \, dx$	(k) $\int \frac{e^{\operatorname{arctg} x}}{1 + x^2} \, dx$	(r) $\int \cos^2 x \operatorname{sen}^2 x \, dx$
(d) $\int \frac{-3}{x (\ln x)^3} \, dx$	(l) $\int \frac{\operatorname{sen} x}{\sqrt{1 + \cos x}} \, dx$	(s) $\int \frac{1}{1 + e^x} \, dx$
(e) $\int \frac{e^x}{1 + e^{2x}} \, dx$	(m) $\int \frac{1}{(2 + \sqrt{x})^7 \sqrt{x}} \, dx$	(t) $\int \frac{1}{x\sqrt{x^2 - 1}} \, dx$
(f) $\int \frac{e^x}{1 - 2e^x} \, dx$	(n) $\int \operatorname{tg}^2 x \, dx$	(u) $\int \frac{1}{x^2 \sqrt{4 - x^2}} \, dx.$
(g) $\int \frac{1}{\cos^2(7x)} \, dx$	(o) $\int \frac{x + [\operatorname{arcsen}(3x)]^4}{\sqrt{1 - 9x^2}} \, dx$	
(h) $\int (\sqrt{2x-1} - \sqrt{1+3x}) \, dx$		

10. Em cada alínea, determine a única função $f : \mathbb{R} \rightarrow \mathbb{R}$, duas vezes derivável, tal que:

(a) $f''(x) = 4x - 1, \quad x \in \mathbb{R}, \quad f(1) = 3 \quad \text{e} \quad f'(2) = -2$
(b) $f''(x) = \operatorname{sen} x \cos x, \quad x \in \mathbb{R}, \quad f(0) = 0 \quad \text{e} \quad f'(0) = 1.$