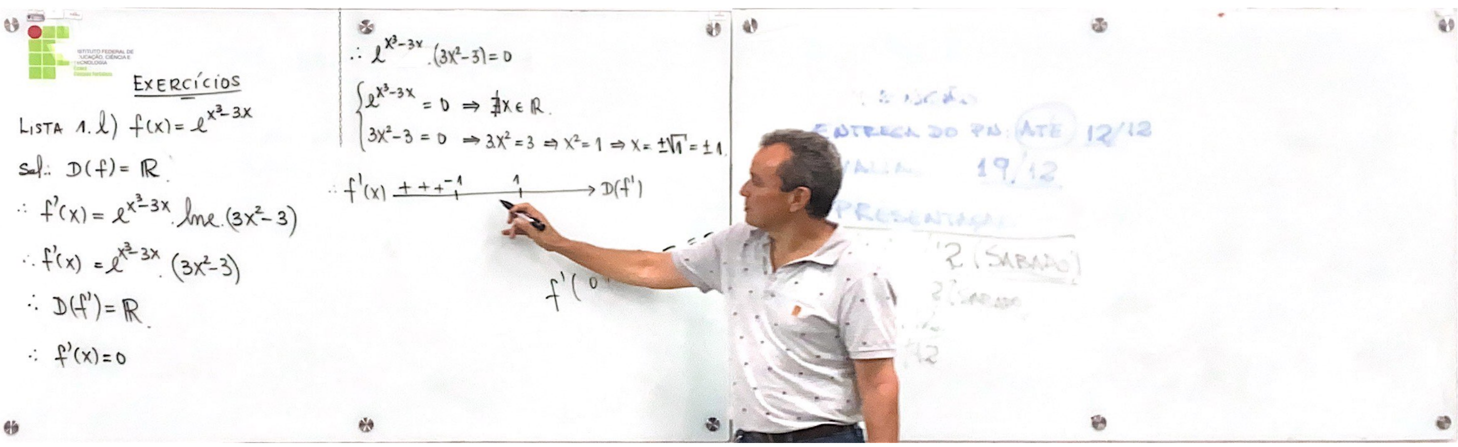
EXERCÍCIOS
LISTA 1. l) $f(x) = e^{x^3-3x}$
Sol.: $D(f) = \mathbb{R}$.
$\therefore f'(x) = e^{x^3-3x} \cdot \ln e \cdot (3x^2-3)$
$\therefore f'(x) = e^{x^3-3x} \cdot (3x^2-3)$
$\therefore D(f') = \mathbb{R}$.
$\therefore f'(x) = 0$
$\therefore e^{x^3-3x} \cdot (3x^2-3) = 0$
$e^{x^3-3x} = 0 \Rightarrow \nexists x \in \mathbb{R}$.
$3x^2-3 = 0 \Rightarrow 3x^2 = 3 \Rightarrow x^2 = 1 \Rightarrow x = \pm\sqrt{1} = \pm 1$.
$\therefore f'(x)$ + + + −1 1 $D(f')$
ENTREGA DO PN: ATÉ 12/12
19/12

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EXERCÍCIOS

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$\therefore D(f') = \mathbb{R}$.

$\therefore f'(x) = 0$

$\therefore e^{x^3-3x} \cdot (3x^2-3) = 0$

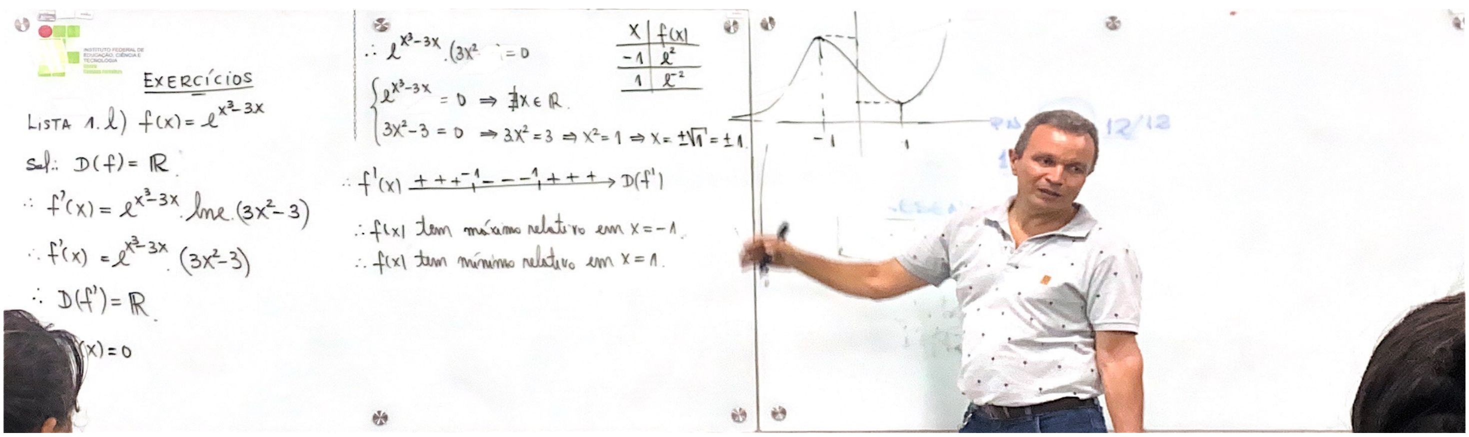
$$\begin{cases} e^{x^3-3x} = 0 \Rightarrow \nexists x \in \mathbb{R}. \\ 3x^2-3 = 0 \Rightarrow 3x^2 = 3 \Rightarrow x^2 = 1 \Rightarrow x = \pm\sqrt{1} = \pm 1. \end{cases}$$

x	$f(x)$
-1	e^2
1	e^{-2}

$\therefore f'(x)$ $+ + + \overset{-1}{|} - - - \overset{1}{|} + + + \rightarrow D(f')$

$\therefore f(x)$ tem máximo relativo em $x = -1$.

$\therefore f(x)$ tem mínimo relativo em $x = 1$.


EXERCÍCIOS
LISTA 1. l) f(x) = e^{x³-3x}
Sol.: D(f) = ℝ.
∴ f'(x) = e^{x³-3x}. lne. (3x²-3)
∴ f'(x) = e^{x³-3x}. (3x²-3)
∴ D(f') = ℝ.
(x) = 0
∴ e^{x³-3x}. (3x²) = 0
e^{x³-3x} = 0 ⇒ ∄x ∈ ℝ.
3x²-3 = 0 ⇒ 3x² = 3 ⇒ x² = 1 ⇒ x = ±√1 = ±1.
∴ f'(x) + + + -1 - - - 1 + + + D(f')
∴ f(x) tem máximo relativo em x = -1.
∴ f(x) tem mínimo relativo em x = 1.
x | f(x)
-1 | e²
1 | e⁻²
-1
1
12/12

LISTA 1.5) $f(x) = \frac{1-x^3}{x^2}$

Sol: $D(f) = \mathbb{R}^*$.

$$f'(x) = \frac{(-3x^2)\cdot x^2 - (1-x^3)\cdot 2x}{(x^2)^2}$$

$$f'(x) = \frac{-3x^4 - 2x + 2x^4}{x^4}$$

$$f'(x) = \frac{-x^4 - 2x}{x^4} = \frac{\cancel{x}\cdot(-x^3-2)}{\cancel{x^4}}$$

$$f'(x) = \frac{-x^3-2}{x^3}.$$

$\therefore D(f') = \mathbb{R}^*$.

$\therefore f'(x) = 0 \Rightarrow \frac{-x^3-2}{x^3} = 0$

$\therefore -x^3 - 2 = 0$

$\therefore x^3 = -2$

$\therefore \boxed{x = \sqrt[3]{-2} = -\sqrt[3]{2}}$

$\therefore f'(x)$ $- - - \underset{-\sqrt[3]{2}}{|} + + \underset{0}{0} - - \rightarrow D(f')$

ERCÍCIOS

$) = e^{x^3-3x}$

$\cdot \ln e \cdot (3x^2-3)$

$(3x^2-3)$

$\therefore e^{x^3-3x} \cdot (3x^2 \quad) = 0$

X	f(x)
-1	e^{2}
1	e^{-2}

$$\begin{cases} e^{x^3-3x} = 0 \Rightarrow \nexists x \in \mathbb{R}. \\ 3x^2-3 = 0 \Rightarrow 3x^2 = 3 \Rightarrow x^2 = 1 \Rightarrow x = \pm\sqrt{1} = \pm 1. \end{cases}$$

$\therefore f'(x) \quad + + + \overset{-1}{|} - - - \overset{1}{|} + + + \longrightarrow D(f')$

$\therefore$ f(x) tem máximo relativo em $x = -1$.

$\therefore$ f(x) tem mínimo relativo em $x = 1$.

LISTA 1.5) $f(x) = \dfrac{1-x^3}{x^2}$

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$\therefore -x^3 - 2 = 0$

$\therefore x^3 = -2$

$\therefore \boxed{x = \sqrt[3]{-2} = -\sqrt[3]{2}}$

$\therefore f'(x) \quad - - - \overset{-\sqrt[3]{2}}{|} + + \overset{0}{\circ} - - \longrightarrow D(f')$

$\therefore$ f(x) tem mínimo relativo em $x = -\sqrt[3]{2}$

LISTA 1.5) $f(x)=\dfrac{1-x^3}{x^2}$

Sol: $D(f)=\mathbb{R}^*$.

$$f'(x)=\frac{(-3x^2)\cdot x^2-(1-x^3)\cdot 2x}{(x^2)^2}$$

$$f'(x)=\frac{-3x^4-2x+2x^4}{x^4}$$

$$f'(x)=\frac{-x^4-2x}{x^4}=\frac{\cancel{x}\cdot(-x^3-2)}{\cancel{x^4}}$$

$$f'(x)=\frac{-x^3-2}{x^3}.$$

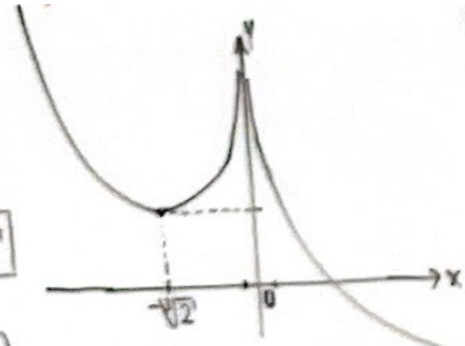
$\therefore D(f')=\mathbb{R}^*$.

$\therefore f'(x)=0 \Rightarrow \dfrac{-x^3-2}{x^3}=0$

$\therefore -x^3-2=0$

$\therefore x^3=-2$

$\therefore \boxed{x=\sqrt[3]{-2}=-\sqrt[3]{2}}$



$\therefore f'(x)$ $- - - \overset{-\sqrt[3]{2}}{|} + + \overset{0}{|} - -$ $\rightarrow D(f')$

$\therefore f(x)$ tem mínimo relativo em $x=-\sqrt[3]{2}$.

EXERCÍCIOS

LISTA 1. l) $f(x) = e^{x^3-3x}$

Sol.: $D(f) = \mathbb{R}$.

$\therefore f'(x) = e^{x^3-3x} \cdot \ln e \cdot (3x^2-3)$

$\therefore f'(x) = e^{x^3-3x} \cdot (3x^2-3)$

$\therefore D(f') = \mathbb{R}$.

$(x) = 0$

$\therefore e^{x^3-3x} \cdot (3x^2-3) = 0$

x	f(x)
-1	e^{2}
1	e^{-2}

$$\begin{cases} e^{x^3-3x} = 0 \Rightarrow \nexists x \in \mathbb{R}. \\ 3x^2-3 = 0 \Rightarrow 3x^2 = 3 \Rightarrow x^2 = 1 \Rightarrow x = \pm\sqrt{1} = \pm 1. \end{cases}$$

$\therefore f'(x)$ $+ + + \overset{-1}{|} - - - \overset{1}{|} + + + \rightarrow D(f')$

$\therefore f(x)$ tem máximo relativo em $x = -1$.

$\therefore f(x)$ tem mínimo relativo em $x = 1$.

LISTA 1. s) $f(x) = \dfrac{1-x^3}{x^2}$

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$$f'(x) = \frac{-x^4 - 2x}{x^4} = \frac{\cancel{x} \cdot (-x^3-2)}{\cancel{x^4}}$$

$$f'(x) = \frac{-x^3-2}{x^3}.$$

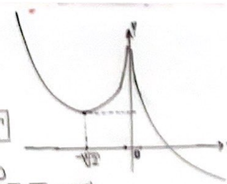
$\therefore D(f') = \mathbb{R}^*$.

$\therefore f'(x) = 0 \Rightarrow \dfrac{-x^3-2}{x^3} = 0$

$\therefore -x^3 - 2 = 0$

$\therefore x^3 = -2$

$\therefore \boxed{x = \sqrt[3]{-2} = -\sqrt[3]{2}}$

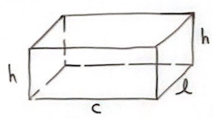


$\therefore f'(x)$ $- - - \overset{-\sqrt[3]{2}}{|} + + \overset{0}{\underset{0}{}} - - \rightarrow D(f')$

$\therefore f(x)$ tem mínimo relativo em $x = -\sqrt[3]{2}$.

EXERCÍCIOS

LISTA 10)



$c = 3.\ell$

$V = 36\ cm^3$

$V(c,\ell,h) = c.\ell.h = 36$

$\therefore 3.\ell^2.h = 36$

$\therefore \ell^2.h = 12$

$\therefore h = \frac{12}{\ell^2}$

$\therefore A_s(c,\ell,h) = 2.c.\ell + 2.c.h + 2.\ell.h$

$\therefore A_s(\ell,h) = 6.\ell^2 + 6\ell h + 2\ell.h$

$A_s(\ell,h) = 6\ell^2 + 8.\ell.h$

$A_s(\ell) = 6\ell^2 + 8.\cancel{\ell}.\frac{12}{\cancel{\ell^2}}$

$A_s(\ell) = 6\ell^2 + \frac{96}{\ell}$

$A_s(\ell) = \frac{6\ell^3 + 96}{\ell}$

$D(A_s) = (0, +\infty)$

$\therefore A_s'(\ell) = \frac{18\ell^2.\ell - (6\ell^3 + 96).1}{\ell^2}$

$A_s'(\ell) = \frac{18\ell^3 - 6\ell^3 - 96}{\ell^2}$

$A_s'(\ell) = \frac{12\ell^3 - 96}{\ell^2}$

$\therefore D(A_s') = (0, +\infty)$

$\therefore A_s'(\ell) = 0 \Rightarrow 12\ell^3 - 96 = 0$

$\therefore 12\ell^3 = 96 \Rightarrow \ell^3 = 8 \Rightarrow \boxed{\ell = 2\ cm}$

$\therefore A_s'(\ell)\ \overset{0}{\circ} - - \overset{2}{|} + + + \rightarrow D(A_s')$

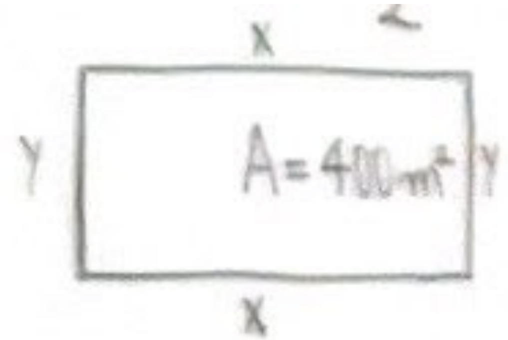
(MÍN. REL)

$\therefore c = 6\ cm.$

$\therefore h = \frac{12}{2^2} = 3\ cm.$

$A_{s_{\text{MÍNIMA}}} = A_s(2) = \frac{6.2^3 + 96}{2} = \frac{48 + 96}{2} = \frac{144}{2} = 72\ cm^2.$

Ex:



$$A(x,y) = x \cdot y = 400$$

$$\therefore\ y = \frac{400}{x}$$

Sol: $C(x,y) = 2 \cdot x + 2 \cdot y$

$$C(x) = 2 \cdot x + 2 \cdot \frac{400}{x} = \frac{2x^2 + 800}{x}$$

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$$\therefore c'(x) = \frac{4x \cdot x - (2x^2 + 800) \cdot 1}{x^2}$$

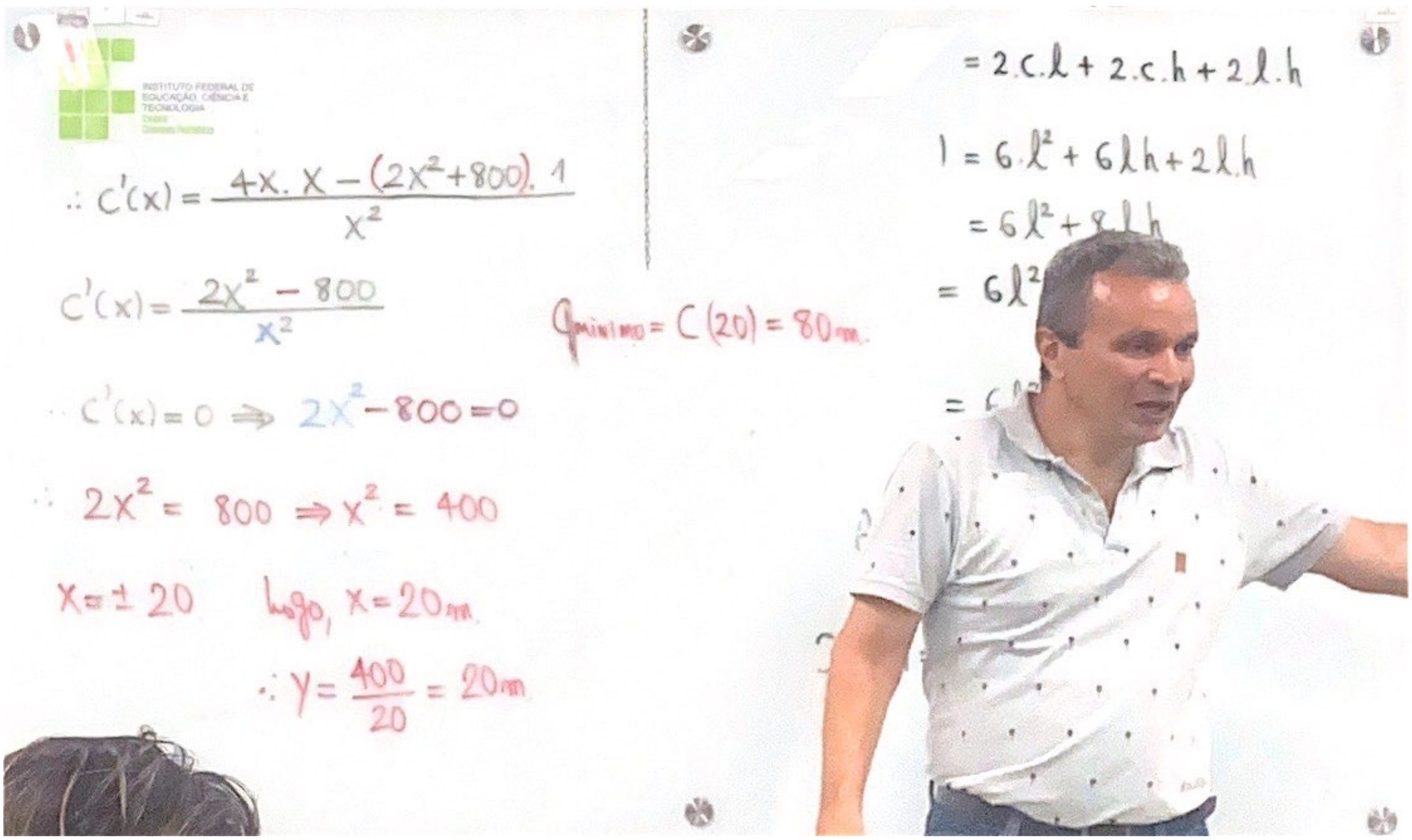
$$c'(x) = \frac{2x^2 - 800}{x^2}$$

$$\therefore c'(x) = 0 \Rightarrow 2x^2 - 800 = 0$$

$$\therefore 2x^2 = 800 \Rightarrow x^2 = 400$$

$x = \pm 20$ logo, $x = 20\,m$

$$\therefore y = \frac{400}{20} = 20\,m$$



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$\therefore C'(x) = \frac{4x.x - (2x^2+800).1}{x^2}$
$C'(x) = \frac{2x^2 - 800}{x^2}$
$\therefore C'(x) = 0 \Rightarrow 2x^2 - 800 = 0$
$\therefore 2x^2 = 800 \Rightarrow x^2 = 400$
$x = \pm 20$
Logo, $x = 20m$
$\therefore y = \frac{400}{20} = 20m$
$C_{mínimo} = C(20) = 80m.$
$= 2.c.l + 2.c.h + 2.l.h$
$1 = 6.l^2 + 6lh + 2l.h$
$= 6l^2 + 8lh$