LISTA 1 - CÁLCULO II

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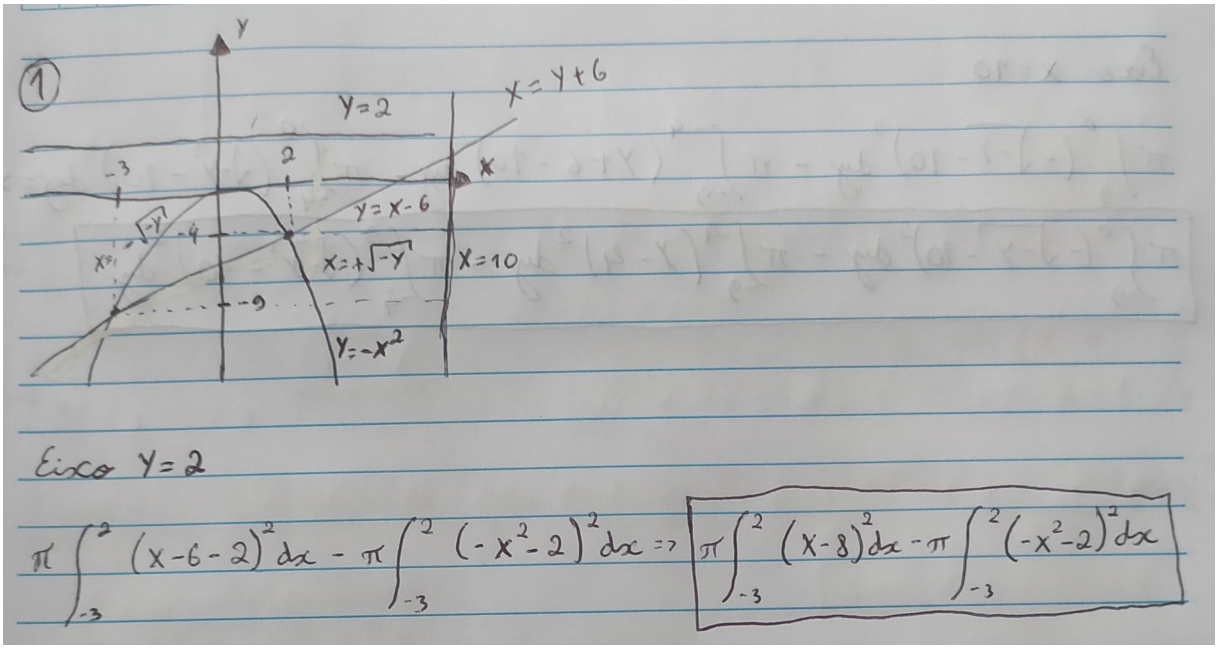
1)



Eixo $y=2$

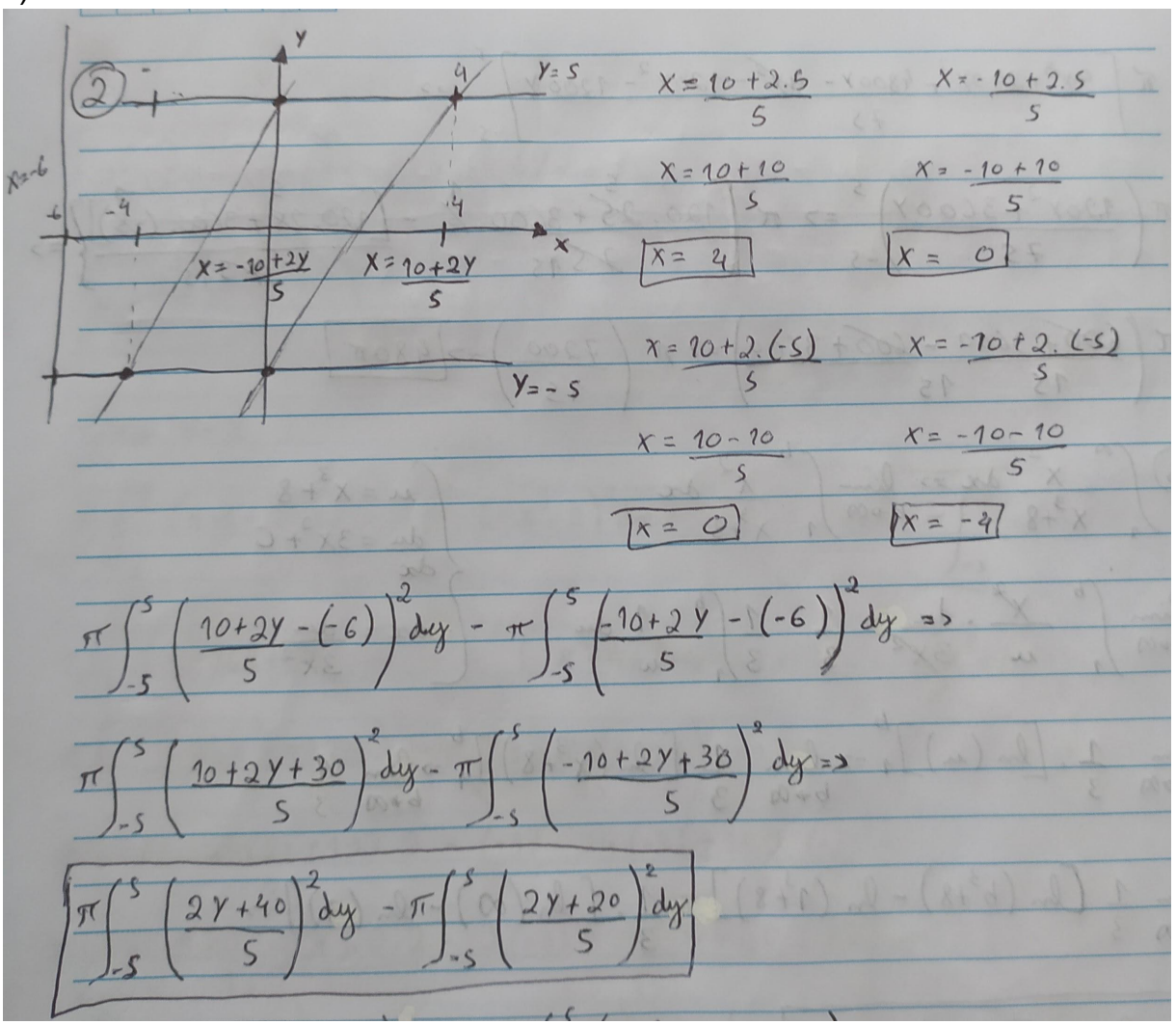
$$\pi\int_{-3}^{2}(x-6-2)^2\,dx-\pi\int_{-3}^{2}(-x^2-2)^2\,dx \Rightarrow \boxed{\pi\int_{-3}^{2}(x-8)^2\,dx-\pi\int_{-3}^{2}(-x^2-2)^2\,dx}$$

Eixo $x=10$

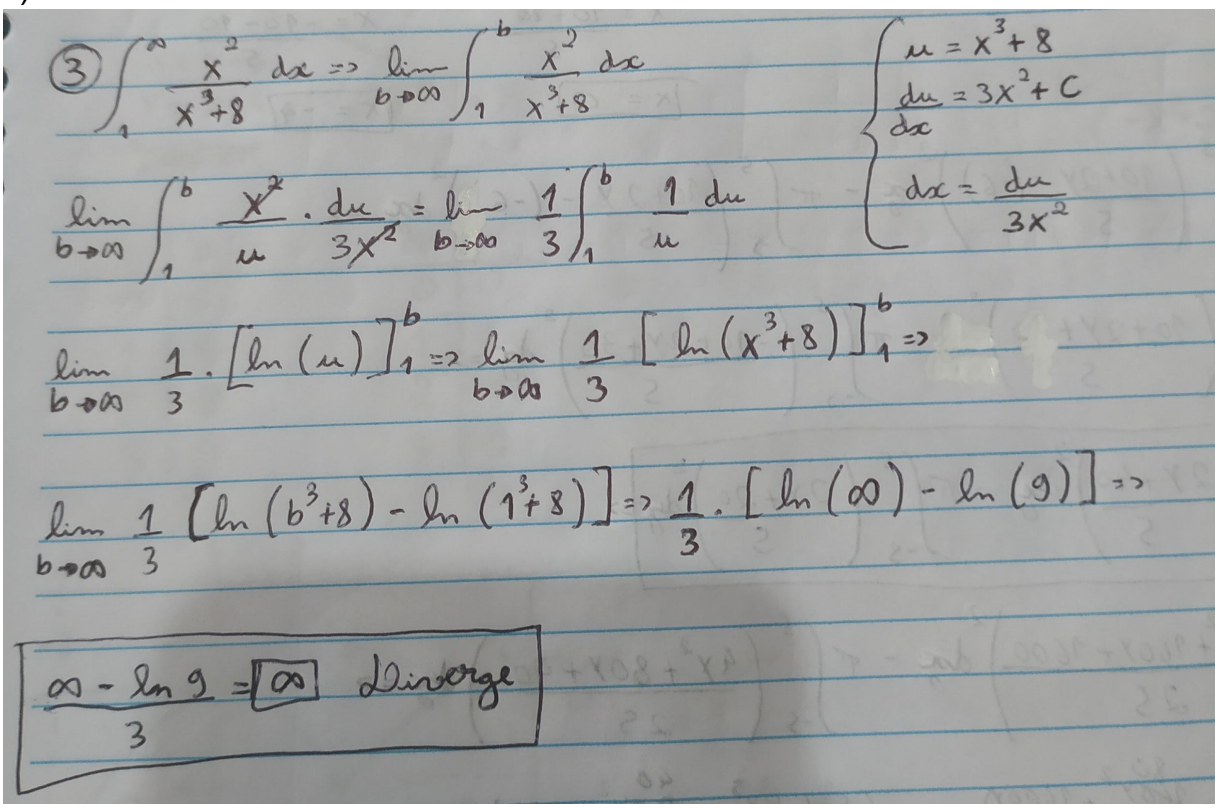
$$\pi\int_{-9}^{0}(-\sqrt{-y}-10)^2\,dy-\pi\int_{-9}^{-4}(y+6-10)^2\,dy-\pi\int_{-4}^{0}(\sqrt{-y}-10)^2\,dy \Rightarrow$$

$$\boxed{\pi\int_{-9}^{0}(-\sqrt{-y}-10)^2\,dy-\pi\int_{-9}^{-4}(y-4)^2\,dy-\pi\int_{-4}^{0}(\sqrt{-y}-10)^2\,dy}$$

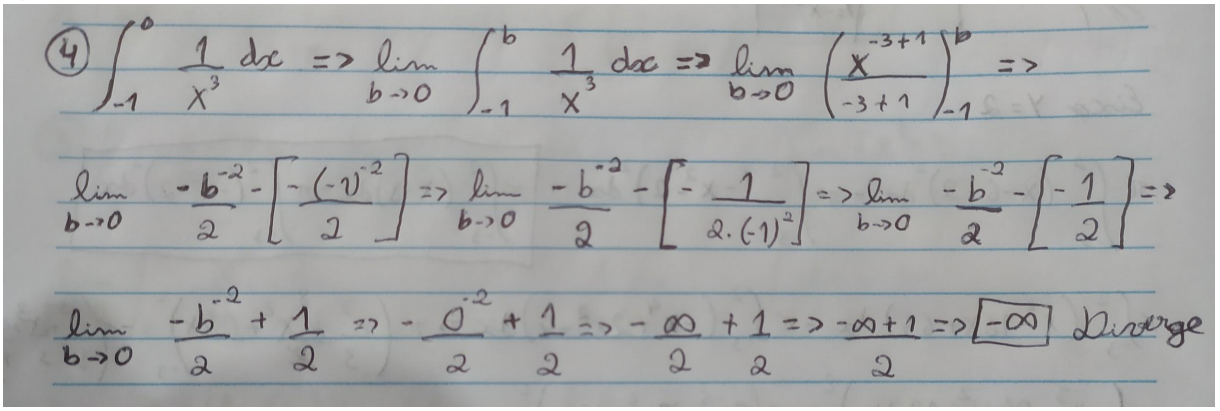
2)


②
y
x
y=5
y=-5
x=-6
-4
4
x = -10+2y / 5
x = 10+2y / 5
x = 10+2.5 / 5
x = -10+2.5 / 5
x = 10+10 / 5
x = -10+10 / 5
x = 4
x = 0
x = 10+2.(-5) / 5
x = -10+2.(-5) / 5
x = 10-10 / 5
x = -10-10 / 5
x = 0
x = -4
π ∫ from -5 to 5 ((10+2y)/5 - (-6))² dy - π ∫ from -5 to 5 ((-10+2y)/5 - (-6))² dy =>
π ∫ from -5 to 5 ((10+2y+30)/5)² dy - π ∫ from -5 to 5 ((-10+2y+30)/5)² dy =>
π ∫ from -5 to 5 ((2y+40)/5)² dy - π ∫ from -5 to 5 ((2y+20)/5)² dy

3)


③ $\int_1^{\infty} \frac{x^2}{x^3+8}\,dx \Rightarrow \lim_{b\to\infty} \int_1^{b} \frac{x^2}{x^3+8}\,dx$
$\begin{cases} u = x^3+8 \\ \frac{du}{dx} = 3x^2 + C \\ dx = \frac{du}{3x^2} \end{cases}$
$\lim_{b\to\infty} \int_1^{b} \frac{x^2}{u} \cdot \frac{du}{3x^2} = \lim_{b\to\infty} \frac{1}{3} \int_1^{b} \frac{1}{u}\,du$
$\lim_{b\to\infty} \frac{1}{3} \cdot [\ln(u)]_1^b \Rightarrow \lim_{b\to\infty} \frac{1}{3} [\ln(x^3+8)]_1^b \Rightarrow$
$\lim_{b\to\infty} \frac{1}{3} [\ln(b^3+8) - \ln(1^3+8)] \Rightarrow \frac{1}{3} \cdot [\ln(\infty) - \ln(9)] \Rightarrow$
$\frac{\infty - \ln 9}{3} = \boxed{\infty}$ Diverge

4)


④ $\int_{-1}^{0} \frac{1}{x^3}\,dx \Rightarrow \lim_{b\to 0} \int_{-1}^{b} \frac{1}{x^3}\,dx \Rightarrow \lim_{b\to 0} \left(\frac{x^{-3+1}}{-3+1}\right)_{-1}^{b} \Rightarrow$
$\lim_{b\to 0} \frac{-b^{-2}}{2} - \left[\frac{-(-1)^{-2}}{2}\right] \Rightarrow \lim_{b\to 0} \frac{-b^{-2}}{2} - \left[\frac{-1}{2\cdot(-1)^2}\right] \Rightarrow \lim_{b\to 0} \frac{-b^{-2}}{2} - \left[\frac{-1}{2}\right] \Rightarrow$
$\lim_{b\to 0} \frac{-b^{-2}}{2} + \frac{1}{2} \Rightarrow \frac{-0^{-2}}{2} + \frac{1}{2} \Rightarrow \frac{-\infty}{2} + \frac{1}{2} \Rightarrow \frac{-\infty+1}{2} \Rightarrow \boxed{-\infty}$ Diverge