3

$$-\frac{3^3}{3} + 2\cdot(3)^2 \cdot 3 - \left[-\frac{1}{3} + 2\cdot 1^2 - 3\cdot 1\right]$$

$$-9 + 18 - 9 - [-1/3 \cdot 2 - 3]$$

$$-9 + 17 - 9 + \frac{1}{3} \cdot 2 + 3 = \frac{4}{3}$$

7) Calcular a área limitada pelas funções

$y = -x^2 + 4$ e $y = -5$

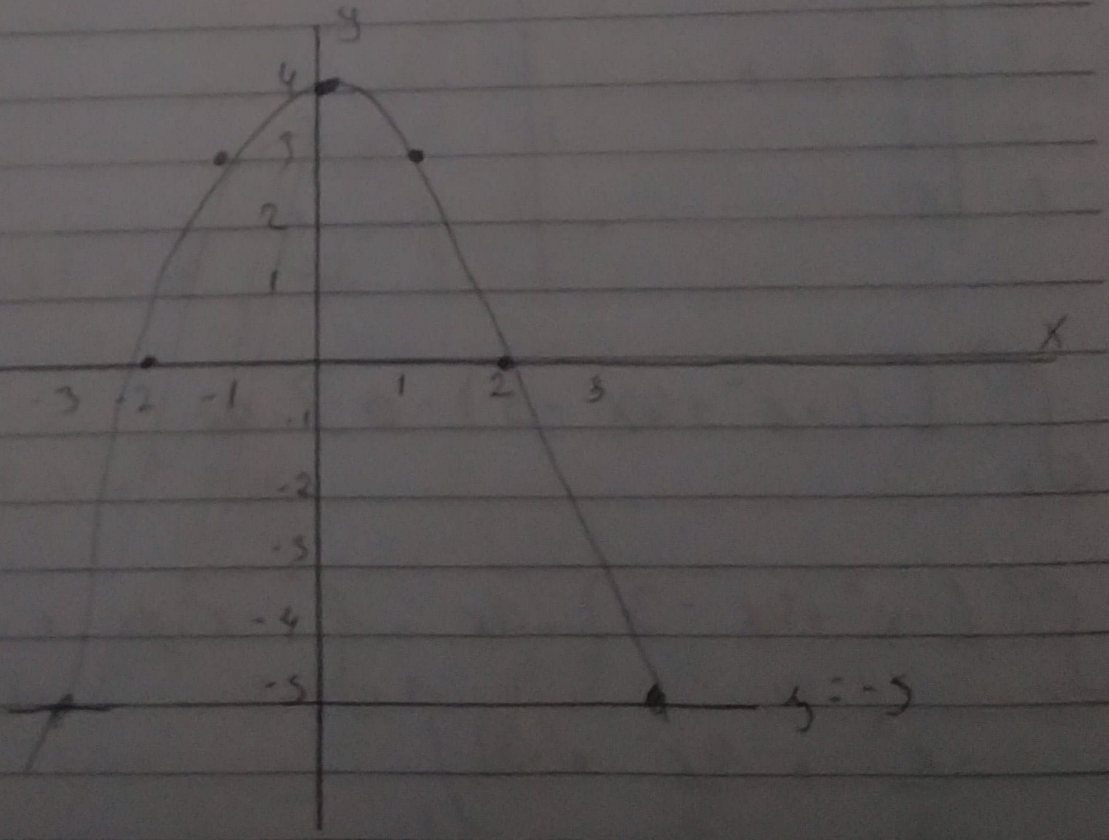
Ponto de interseção

$-x^2 + 4 = -5$

$-x^2 = -5 - 4 \Rightarrow -x^2 = -9$ $\Rightarrow x^2 = 9 \Rightarrow x = \pm\sqrt{9}$ $\Rightarrow$ 3, -3

$y = -x^2 + 4$

x	y
-3	-5
-2	0
-1	3
0	4
1	3
2	0
3	-5



$$\int_{-3}^{3} [(-x^2+4)-(-5)]\,dx$$

$$\int_{-3}^{3} [-x^2+4+5]\,dx$$

$$\int_{-3}^{3} [-x^2+9]\,dx$$

$$\int -x^2\,dx + \int_{-3}^{3} 9\,dx$$

$$\left[-\frac{x^3}{3}+9x\right]_{-3}^{3}$$

$$\left[-\frac{3^3}{3}+9\cdot 3\right]-\left[-\frac{(-3)^3}{3}+9(-3)\right]$$

$$-9+27-[-(-9)-27]$$

$$-9+27-[9-27]$$

$$-9+27+27 = \boxed{36\ u\ a}$$

$$-9+27=9+27\ \checkmark$$

2) Determinar a área limitada pelas funções

$y = x+2$; $y = x^2-x+2$

Ponto de Interseção

$x+2 = x^2-x+2$

$x+2-x^2+x-2=0$

$2x-x^2=0$

$$x = \frac{+2 \pm \sqrt{2^2-4\cdot(-1)\cdot 0}}{2\cdot(-1)}$$

$$x = \frac{+2 \pm \sqrt{4+0}}{-2} \quad x = \frac{+2-2}{-2} = \frac{-4}{-2} = 2$$

$$x = \frac{+2+2}{-2} \quad x = \frac{0}{2} = 0$$

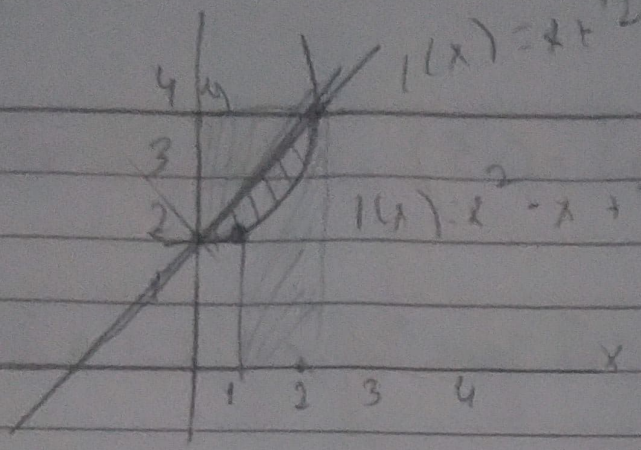
$y = x+2$

x	y
0	2
2	4

$y = x^2-x+2$

x	y
0	2
1	2
2	4

11



$$\int_0^2 [(x+2) - (x^2 - x + 2)] \cdot dx$$

$$\int_0^2 [x + 2 - x^2 + x - 2] \cdot dx$$

$$\int_0^2 [2x - x^2] \cdot dx$$

$$2\int_0^2 x \cdot dx - \int x^2 \cdot dx$$

$$\frac{2x^2}{2} - \frac{x^3}{3}\Big]_0^2 = \frac{2 \cdot 2^2}{2} - \frac{2^3}{3}\Big]_0^2 - \frac{2 \cdot 0^2}{2} - \frac{0^3}{3}\Big]_0^2$$

$$4 - \frac{8}{3}\Big] - 0\Big]_0^2 = \frac{4}{3}\ u.a \quad [1,33\ u.a]$$

9) Calcular a área limitada pelas funções

$y = 4x$, $y = x^3 + 3x^2$

Ponto de Intersecção

$4x = x^3 + 3x^2$ → $x^3 + 3x^2 - 4x = 0$

$x^3 + 3x^2 = 4x$

$x(x^2 + 3x - 4) = 0$

$x = 0$

$x^2 + 3x - 4 = 0$

$\Delta = 9 + 16$

$x = \frac{-3 \pm \sqrt{3^2 - 4 \cdot 1 \cdot (-4)}}{2 \cdot 1} = \frac{-3 \pm \sqrt{25}}{2}$

$\frac{-3+5}{2} = \frac{2}{2} = 1$

$\frac{-3-5}{2} = \frac{-8}{2} = -4$

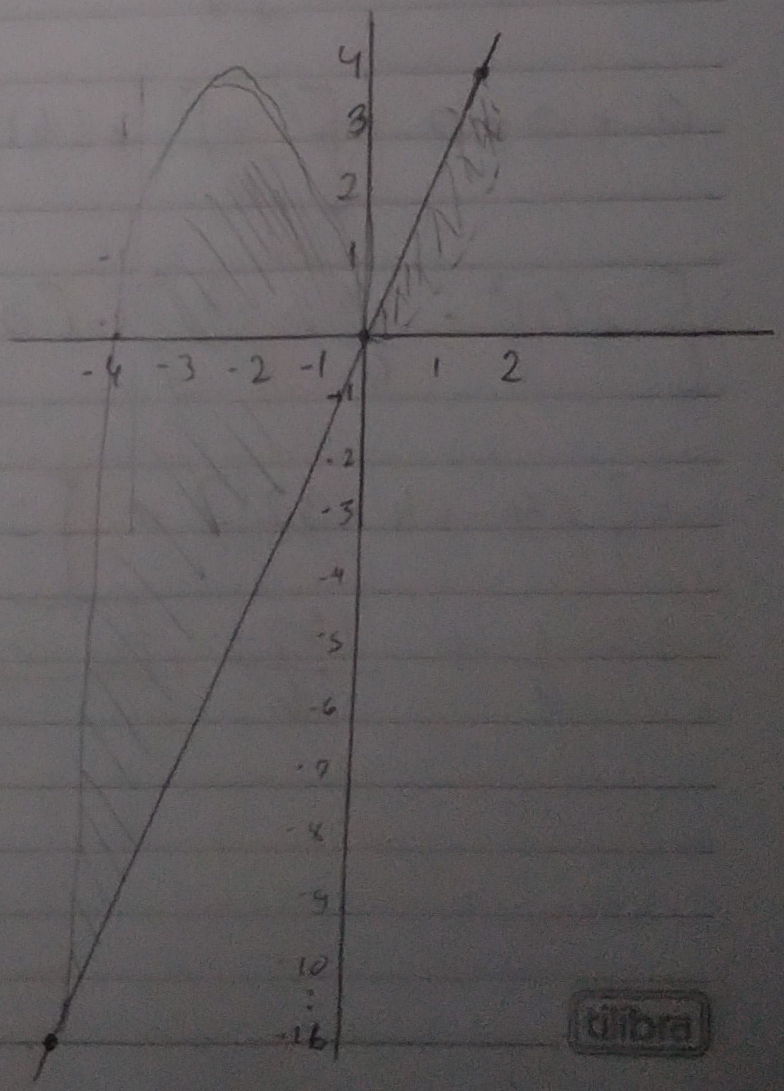
$[-4, 0, 1]$

$y = 4x$

x	y
-4	-16
0	0
1	4

$y = x^3 + 3x^2 - 4x$

x	y
-4	-16
-3	0
-2	4
-1	2
0	0
1	4



$$\int_{-4}^{0} [(x^3+3x^2)-(4x)]\,dx$$

$$\int_{0}^{1} [4x-(x^3+3x^2)]\,dx$$

$$\int_{-4}^{0} [x^3+3x^2-4x]\,dx + \int_{0}^{1} [4x-x^3-3x^2]\,dx$$

$$\left[\frac{x^4}{4}+\frac{3x^3}{3}-\frac{4x^2}{2}\right]_{-4}^{0} + \left[\frac{4x^2}{2}-\frac{x^4}{4}-\frac{3x^3}{3}\right]_{0}^{1}$$

$$\left[\frac{x^4}{4}+x^3-2x^2\right]_{-4}^{0} + \left[2x^2-\frac{x^4}{4}-x^3\right]_{0}^{1}$$

$$0+0+0-\left[\frac{(-4)^4}{4}+(-4)^3-2(-4)^2\right] + \dots$$

$$\left[2(1)^2-\frac{1^4}{4}-1^3\right]-[0]$$

$$-[64-64-32]+\left[2-\frac{1}{4}-1\right] \therefore 32+1-\frac{1}{4}$$

$$33-\frac{1}{4} = \frac{132-1}{4} = \boxed{32,25}$$