

2019-09-15

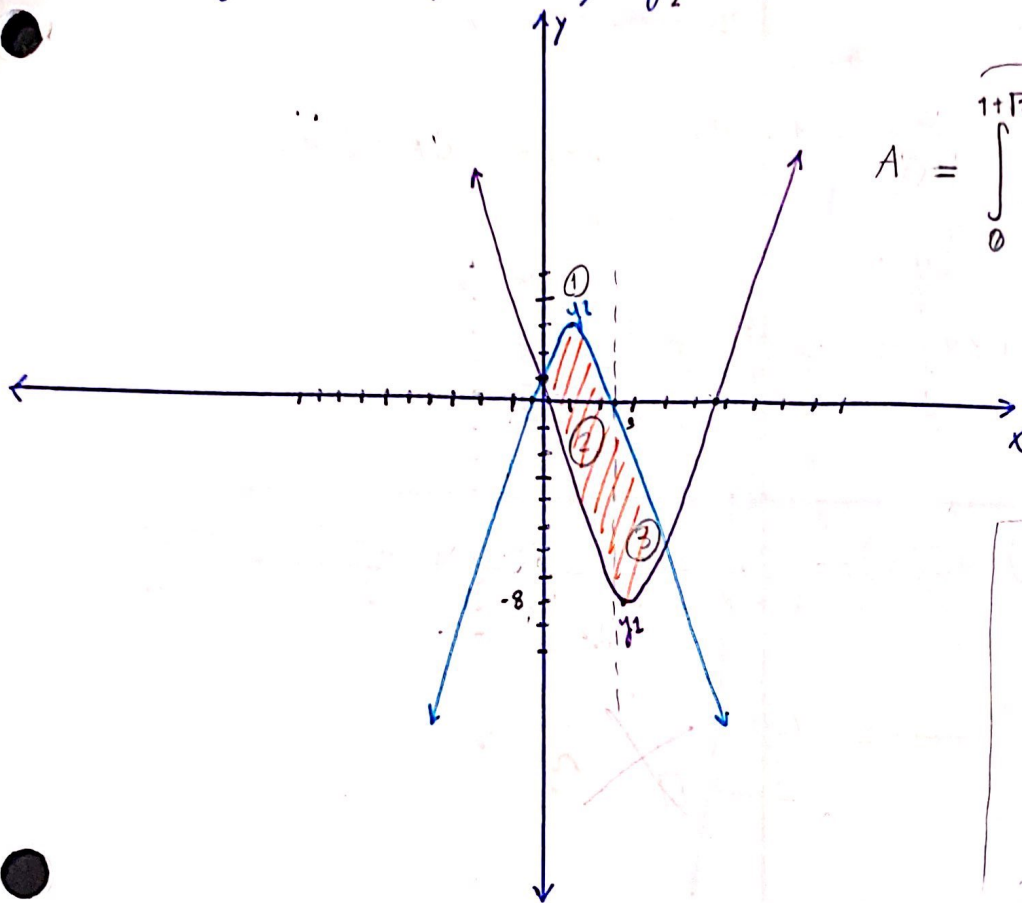
Laboratorio # 7

Nombre: ?

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20190432

(97)

① a.1) $y_1 = x^2 - 6x + 1$, $y_2 = -x^2 + 2x + 1$



$$A = \int_0^{1+\sqrt{2}} y_2 - y_1 dx + \int_{1+\sqrt{2}}^4 y_1 - y_2 dx$$

¿cuando interseca y_1 & y_2 ?

$$x^2 - 6x + 1 = -x^2 + 2x + 1$$

$$x^2 + x^2 - 6x - 2x + 1 - 1 = 0$$

$$2x^2 - 8x = 0$$

$$2x(x - 4) = 0$$

$$\underline{x=0} \quad \underline{x=4}$$

intersecan en $x=0$ & $x=4$ I-en-x de y_2

$$y = 0$$

$$0 = -x^2 + 2x + 1$$

$$a = -1 \quad b = 2 \quad c = 1$$

$$x = \frac{-2 \pm \sqrt{4 - 4(-1)(1)}}{2(-1)}$$

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

$$x = \frac{-2 \pm \sqrt{8}}{-2}$$

$$x_1 \approx -0.41$$

$$x_2 \approx 2.41$$

Vértice y_2

eval:

$$-2x + 2 = 0 \quad -(1)^2 + 2 + 1$$

$$2(-x + 1) = -1 + 3$$

$$-x = -1 \quad 2$$

$$x = 1 \quad (1, 2)$$

vértice y_1

$$2x - 6 = 0$$

$$x = \frac{6}{2} = 3$$

$$y_1(3) = 3^2 - 18 + 1$$

$$= 9 - 18 + 1$$

$$= -9 + 1 = -8$$

$$(3, -8)$$

I-en- y_1 $x=0$ de y_1

$$0^2 - 6(0) + 1 = y_1$$

$$y_1 = 1$$

$$(0, 1)$$

I-en-x $\Rightarrow y=0$ de y_1

$$0 = x^2 - 6x + 1$$

$$a = 1 \quad b = -6 \quad c = 1$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(1)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{36 - 4}}{2} = \frac{6 \pm \sqrt{32}}{2}$$

$$x_1 \approx 5.828 \quad x_2 \approx 0.172$$

$$\begin{aligned}
 a.2) \quad A &= \int_0^4 (-x^2 + 2x + 1) - (x^2 - 4x + 1) dx & y_1 &= x^2 - 4x + 1 \\
 & & y_2 &= -x^2 + 2x + 1 \\
 &= \int_0^4 -x^2 + 2x + 1 - x^2 + 4x - 1 dx = \int_0^4 -2x^2 + 8x dx \\
 &= \left[-\frac{2}{3}x^3 + \frac{8}{2}x^2 + 3x \right]_0^4 = \left[-\frac{2}{3}x^3 + 4x^2 + 3x \right]_0^4 =
 \end{aligned}$$

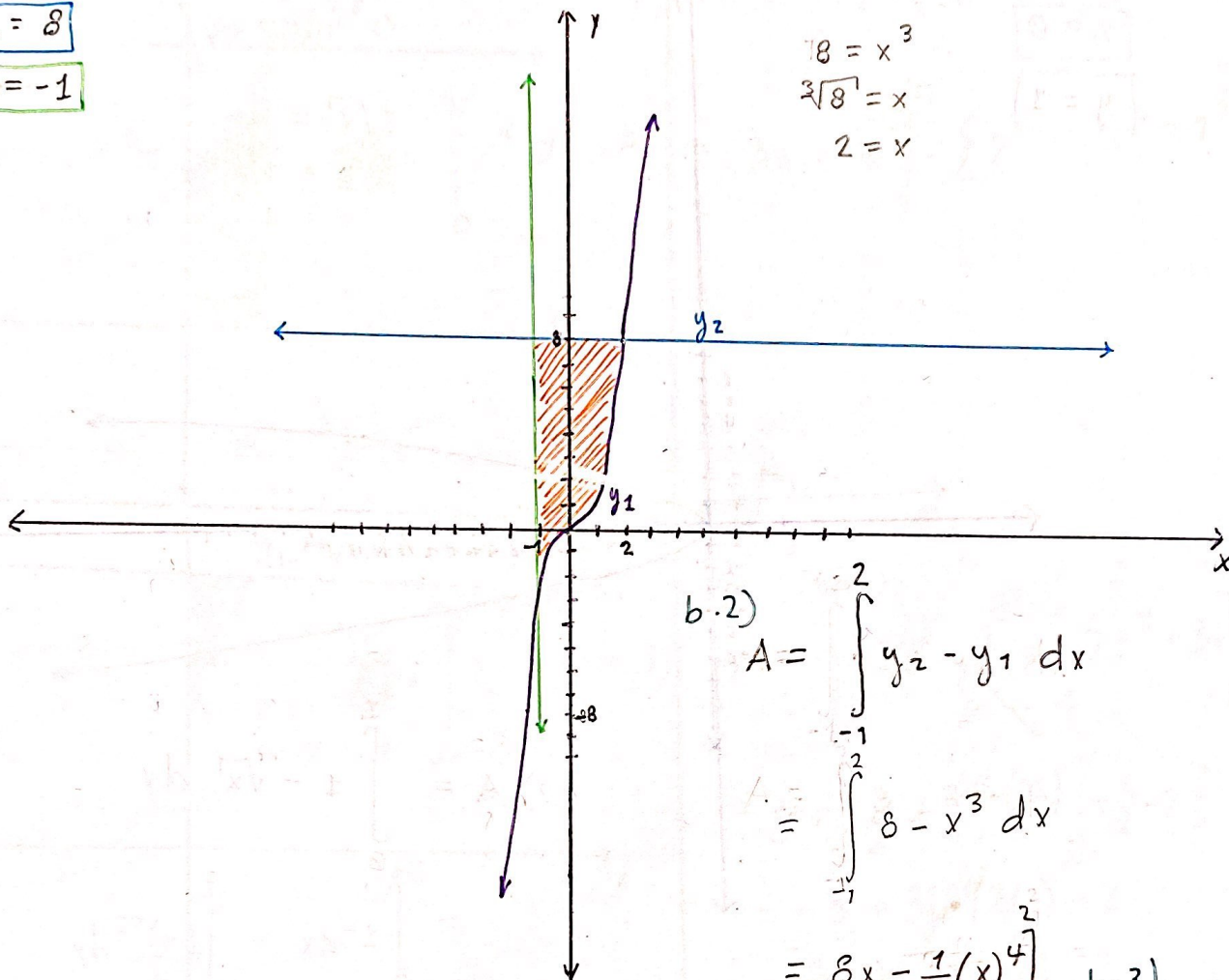
$$\begin{aligned}
 a.3) &= \left\{ -\frac{2}{3}(4)^3 + 4(4)^2 + 3(4) \right\} - \{0\} = \left\{ -\frac{64 \cdot 2}{3} + \frac{64 \cdot 3}{3} + \frac{12 \cdot 3}{3} \right\} \\
 &= \frac{-128 + 192 + 36}{3} = \frac{100}{3} \quad \text{[Crossed out with a red X and a 3]}
 \end{aligned}$$

b.1)

$$y_1 = x^3$$

$$y_2 = 8$$

$$x = -1$$



$$8 = x^3$$

$$\sqrt[3]{8} = x$$

$$2 = x$$

b.2)

$$A = \int_{-1}^2 y_2 - y_1 dx$$

$$= \int_{-1}^2 8 - x^3 dx$$

$$= 8x - \frac{1}{4}(x)^4 \Big|_{-1}^2$$

b.3)

b.3)

$$= \left\{ 8(2) - \frac{1}{4}(2)^4 \right\} - \left\{ -8 - \frac{1}{4} \right\}$$

$$= \{ 12 \} - \left\{ -\frac{33}{4} \right\}$$

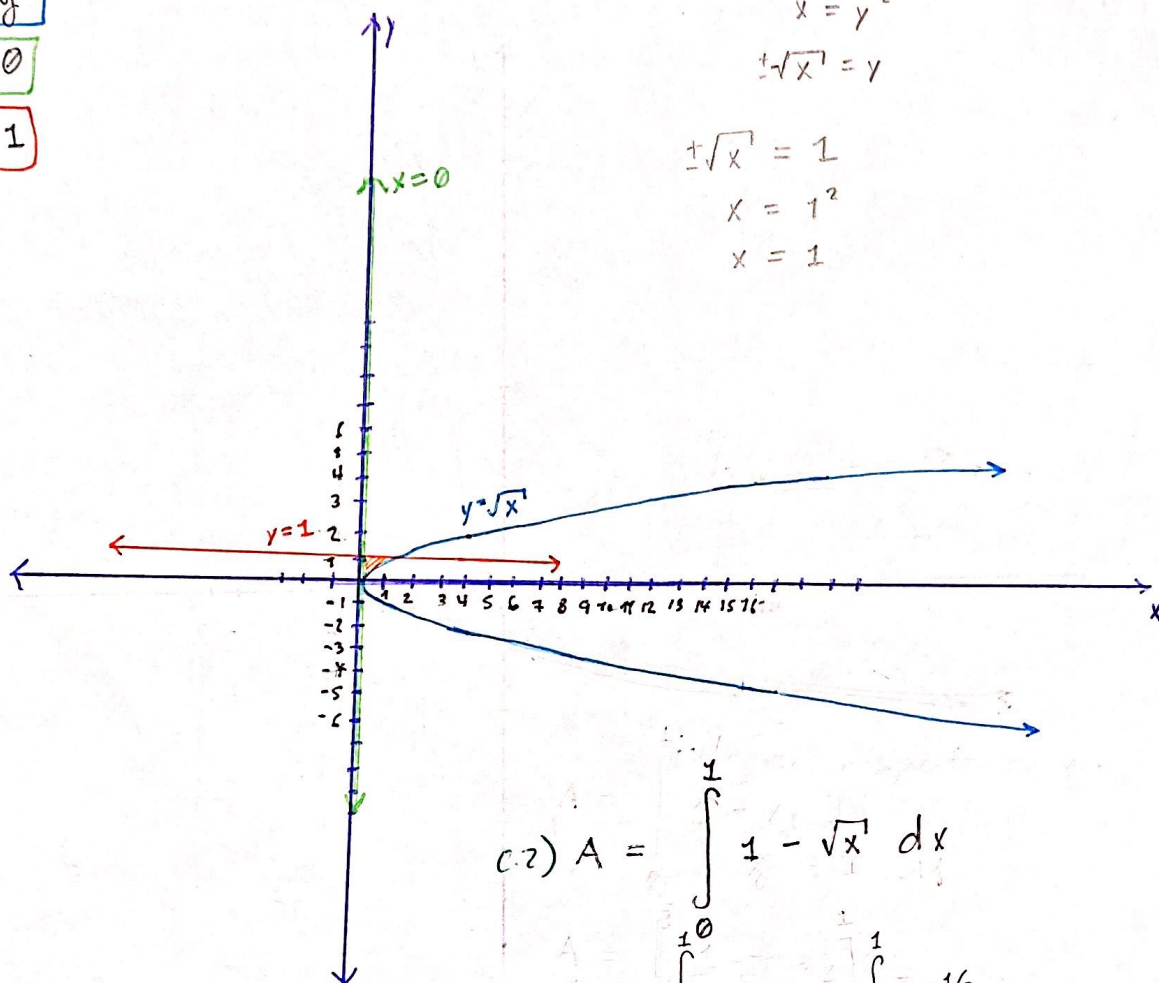
$$= 12 + \frac{33}{4} = \frac{81}{4} = 20.25$$

c.1)

$$x_1 = y^2$$

$$x_2 = 0$$

$$y = 1$$



$$x = y^2$$

$$\pm\sqrt{x} = y$$

$$\pm\sqrt{x} = 1$$

$$x = 1^2$$

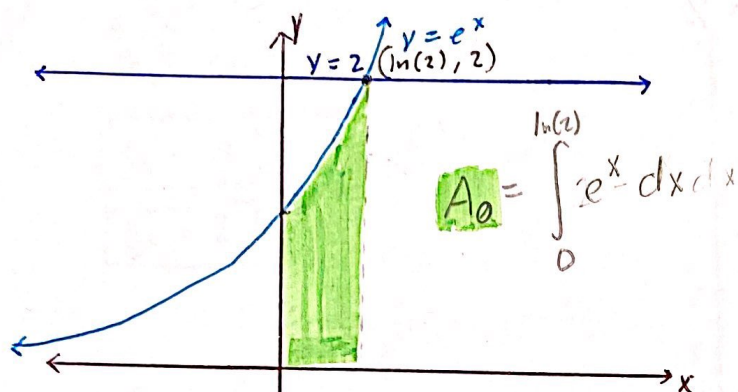
$$x = 1$$

$$\begin{aligned} c.2) A &= \int_0^1 1 - \sqrt{x} \, dx \\ &= \int_0^1 1 \, dx - \int_0^1 (x)^{1/2} \, dx \\ &= \left[x - \frac{2}{3} x^{3/2} \right]_0^1 \end{aligned}$$

$$= \left\{ 1 - \frac{2}{3} (1)^{3/2} \right\} - \{ 0 \}$$

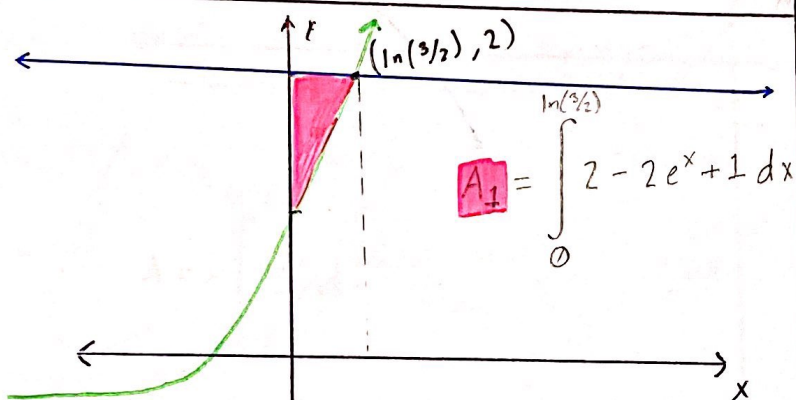
$$c.3) = \frac{1}{3} x \quad \square$$

2



$$A_0 = \int_0^{\ln(2)} e^x dx$$

$$A_0 = \left[e^x \right]_0^{\ln(2)} = \{2\} - \{1\} = 2 - 1 = 1$$



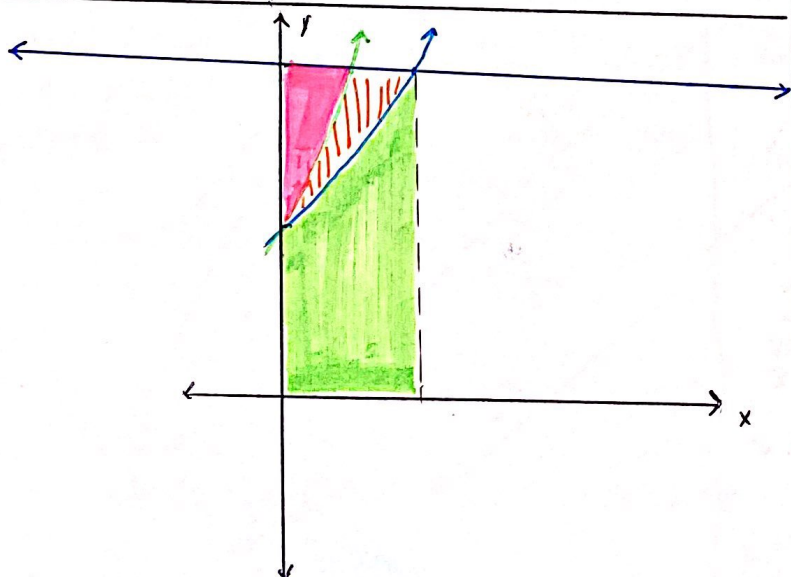
$$A_1 = \int_0^{\ln(3/2)} 2 - 2e^x + 1 dx$$

$$A_1 = \int_0^{\ln(3/2)} -2e^x + 3 dx = \left[-2e^x + 3x \right]_0^{\ln(3/2)}$$

$$= \left\{ -2 \cdot \frac{3}{2} + 3 \ln(3/2) \right\} - \{-2\}$$

$$= -3 + 3 \ln(3/2) + 2$$

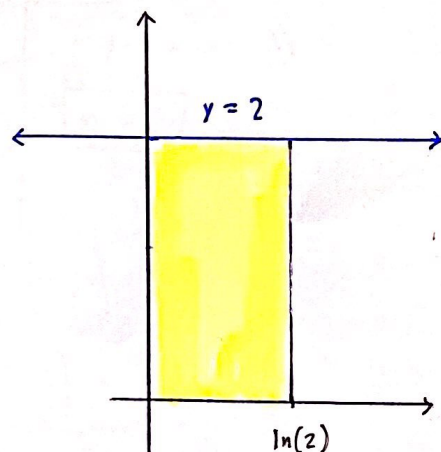
$$= 3 \ln(3/2) - 1$$



$$A_T - A_0 - A_1 = A$$

$$A = 2 \ln(2) - 1 - 3 \ln(3/2) + 1$$

$$A = 2 \ln(2) - 3 \ln(3/2)$$



Esta es el area total:

$$A_T = \int_0^{\ln(2)} 2 dx = \left[2x \right]_0^{\ln(2)} = \{2 \ln(2)\}$$

$$2 \ln(2) \approx 1.38$$

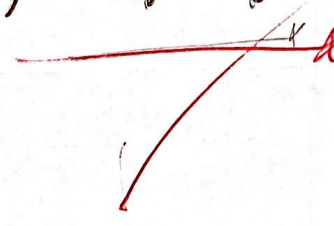
$$y = 2e^x - 1 ; y = e^x ; y = 2$$

$$y + 1 = 2e^x$$

$$\ln(y) = x$$

$$\frac{y+1}{2} = e^x$$

$$\ln\left(\frac{y+1}{2}\right) = x$$

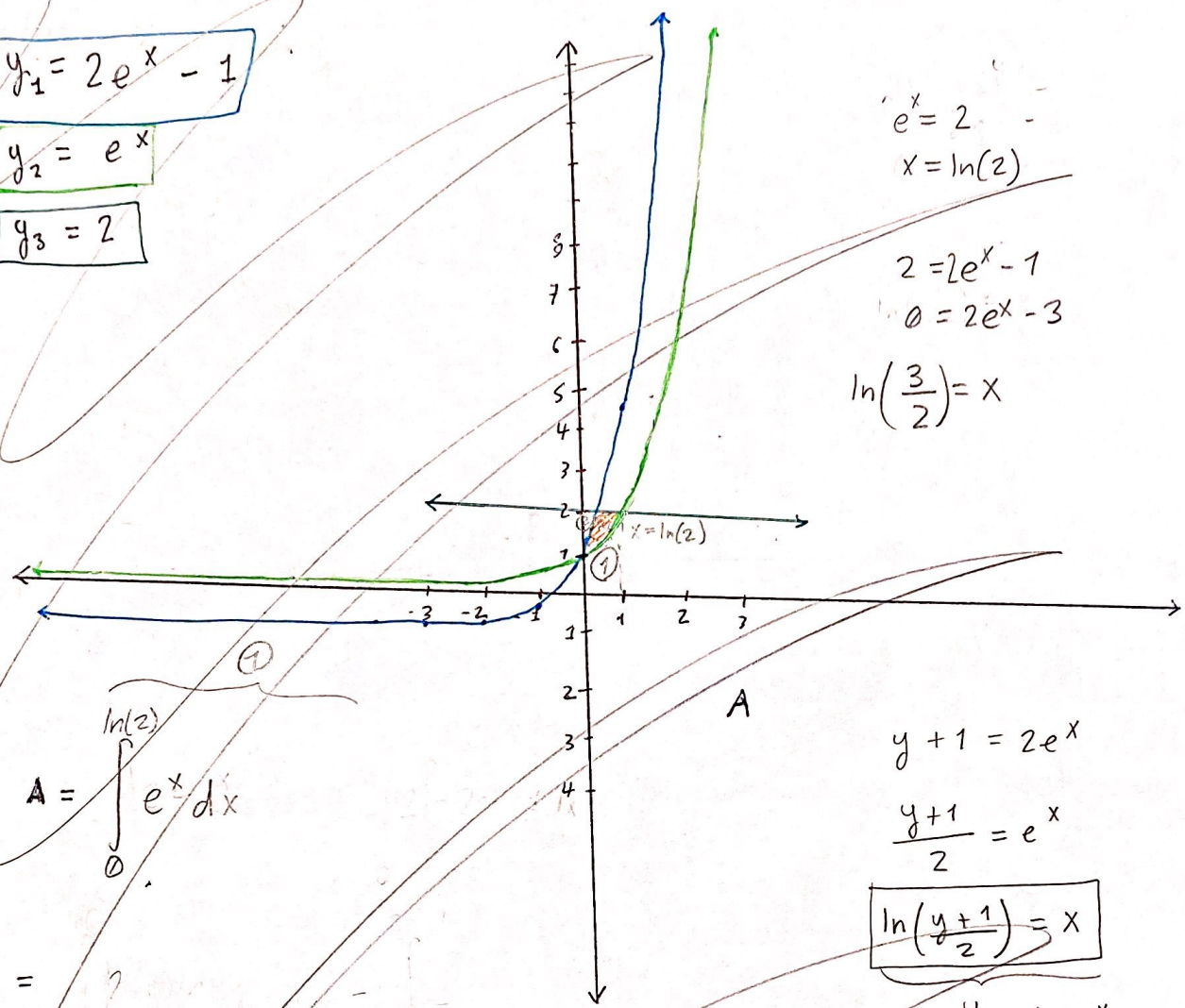
$$A = \int_0^2 \ln\left(\frac{y+1}{2}\right) - \ln(y) dy$$


2

$$y_1 = 2e^x - 1$$

$$y_2 = e^x$$

$$y_3 = 2$$



$$e^x = 2$$

$$x = \ln(2)$$

$$2 = 2e^x - 1$$

$$0 = 2e^x - 3$$

$$\ln\left(\frac{3}{2}\right) = x$$

2.b)

$$A = \int_0^{\ln(2)} e^x dx$$

2.c) A =

$$y + 1 = 2e^x$$

$$\frac{y+1}{2} = e^x$$

$$\ln\left(\frac{y+1}{2}\right) = x$$

y1 o sea x1

límite e^x con 2
 $x_2 = x_3$

$$\ln(y) = 2$$

$$e^{\ln(y)} = e^2$$

$$y = e^2$$

$$\ln(y) = x$$

y2 o sea x2

$$y = 2$$

$$x = 2$$

lim de sustracción
 $x_1 = x_3$

$$\ln\left(\frac{y+1}{2}\right) = 2$$

$$\ln(y+1) - \ln(2) = 2$$

$$\ln(y+1) = 2 + \ln(2)$$

$$y = e^{2+\ln(2)} - 1$$

$$y = 2e^2 - 1$$

③

$$y_1 = \sin(x)$$

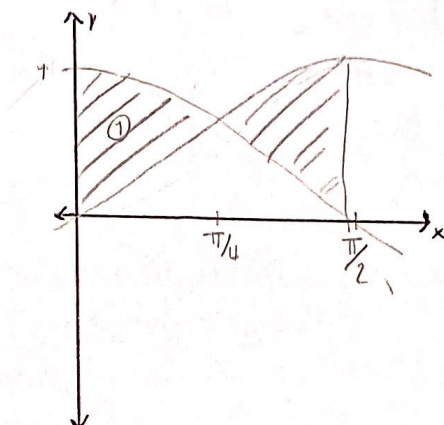
$$y_2 = \cos(x)$$

$$x = 0$$

$$x = \frac{\pi}{2}$$

$$A_1 = \int_0^{\pi/4} (\cos(x) - \sin(x)) dx$$

$$A_2 = \int_{\pi/4}^{\pi/2} (\sin(x) - \cos(x)) dx$$



$$A_1 = \left[\sin(x) + \cos(x) \right]_0^{\pi/4}$$

$$A_1 = \left\{ \left(\frac{\sqrt{2}}{2} \right) + \left(\frac{\sqrt{2}}{2} \right) \right\} - \{ 1 \}$$

$$A_1 = \{ \sqrt{2} - 1 \}$$

$$\sin(x) = \cos(x)$$

$$\sin(\pi/4) = \cos(\pi/4)$$

$$\frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2}$$

$$A_2 = \left[-\cos(x) - \sin(x) \right]_{\pi/4}^{\pi/2}$$

$$A_2 = -(\cos(x) + \sin(x))$$

$$A_T = \sqrt{2} - 1 + (-1 + \sqrt{2}) = \{ -(0 + 1) \} - \{ -(\sqrt{2}) \}$$

$$\sqrt{2} - 1 - 1 + \sqrt{2} = -1 + \sqrt{2}$$

$$\sqrt{2} - 2 + \sqrt{2}$$

$$-2 + \sqrt{2} + \sqrt{2}$$

$$\underline{-2 + 2\sqrt{2}} \cong 0.82$$