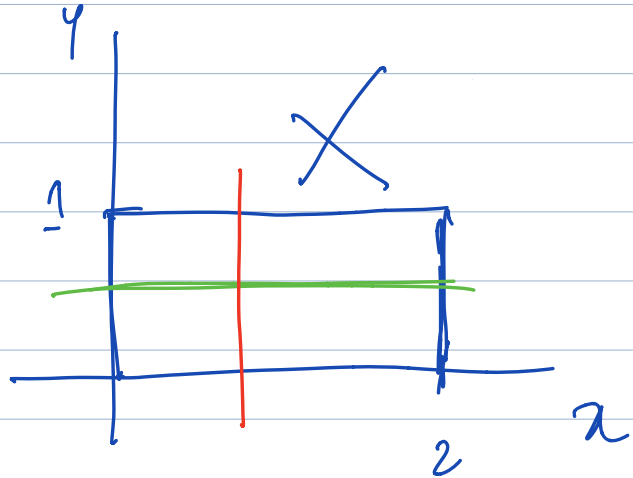


CD 1- Π - Practice #6 13/4/21

1-b) $\iint_X f$



$$\iint_X x \cos(xy) dy dx = \left(\begin{array}{c} x \text{ fixed} \\ \downarrow \\ y(x) \end{array} \right)$$

$$= \int_0^2 \left(\int_0^1 x \cos(xy) dy \right) dx$$

$$\frac{d}{dy} \sin(xy) = x \cos(xy)$$

$$= \int_0^2 \left(\text{Jen}(xy) \Big|_{y=0}^1 \right) dx$$

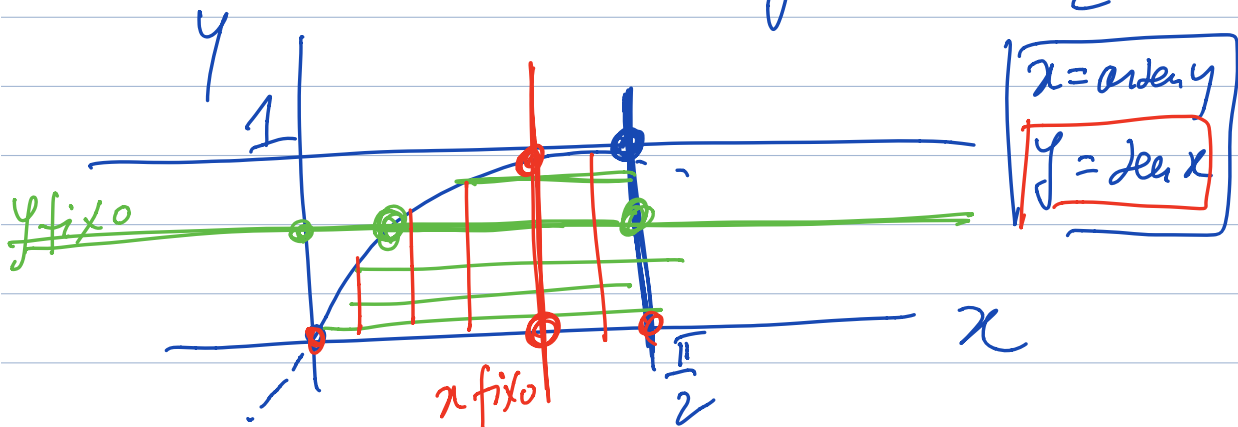
$$= \int_0^2 \text{Jen} x \, dx = -\cos(x) \Big|_{x=0}^2$$

$$= 1 - \cos(2).$$

2-b) X:

$$0 \leq y \leq 1$$

$$\arcsin y \leq x \leq \frac{\pi}{2}$$



$$\int_0^{\frac{\pi}{2}} \left(\int_0^{\sec x} y \sec x \, dy \right) dx =$$

x fixo

$$= \int_0^{\frac{\pi}{2}} \left(\frac{\sec x}{2} y^2 \Big|_{y=0}^{\sec x} \right) dx$$

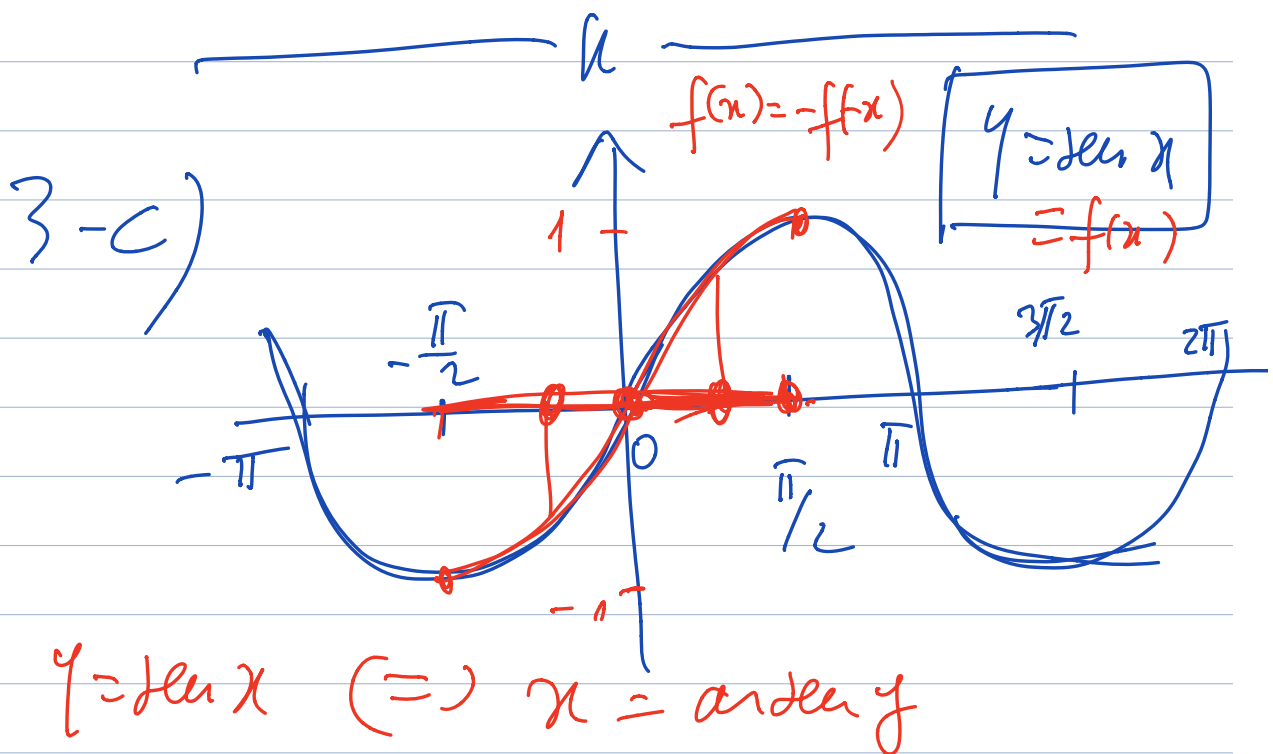
$$= \frac{1}{2} \int_0^{\frac{\pi}{2}} \sec^3 x \, dx$$

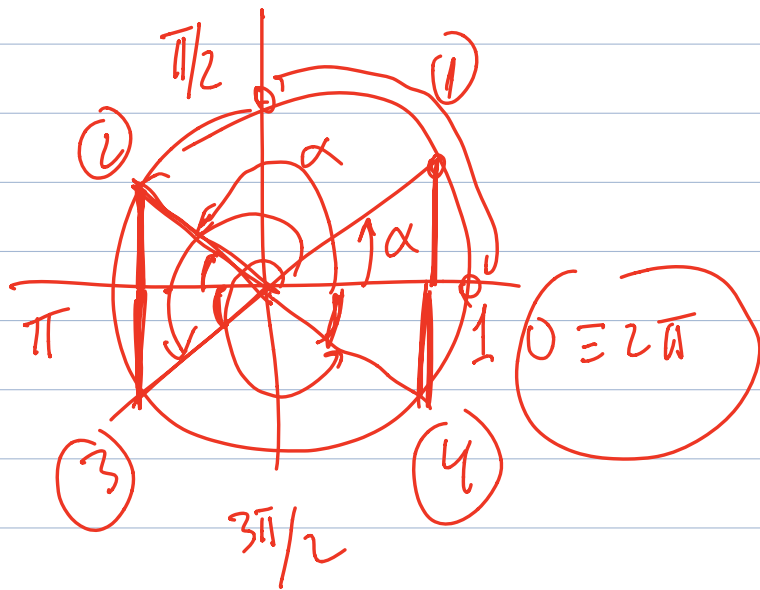
$$= \frac{1}{2} \int_0^{\frac{\pi}{2}} \sec x (1 - \cos^2 x) \, dx$$

$$= \frac{1}{2} - \frac{1}{3} \int_0^{\frac{\pi}{2}} 3 \sin x \cos^2 x \, dx$$

$$\frac{d}{dx} \cos^3(x) = 3 \cos^2(x) (-\sin x)$$

$$= \frac{1}{2} + \frac{1}{3} \cos^3(x) \Big|_{x=0}^{\frac{\pi}{2}} = \frac{1}{2} - \frac{1}{3} = \frac{1}{6}$$



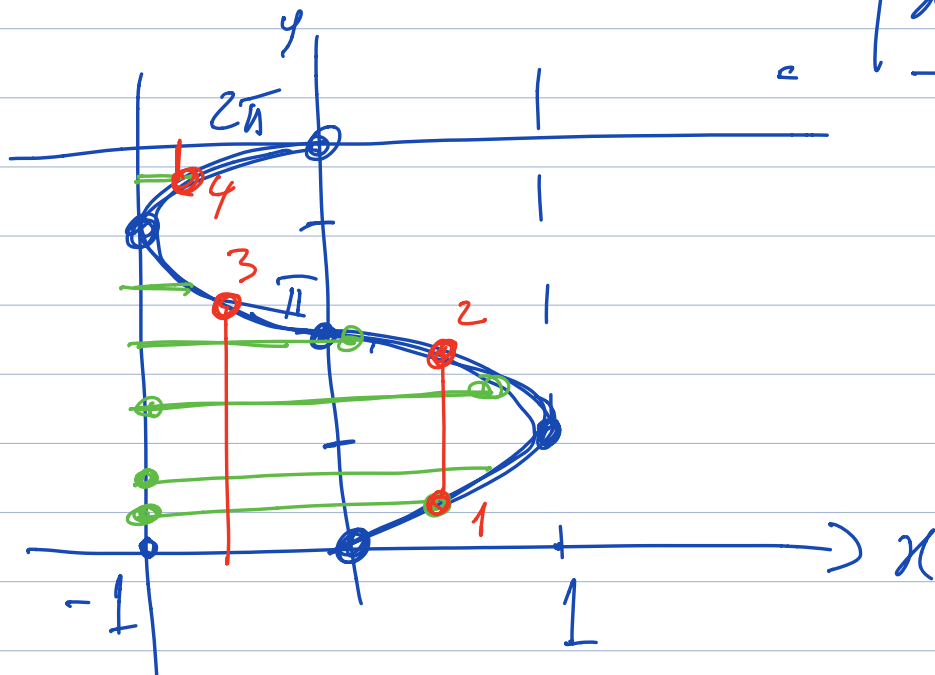


3-c)

$$0 \leq y \leq 2\pi$$

$$-1 \leq x \leq \cos y$$

$$x = \cos y$$



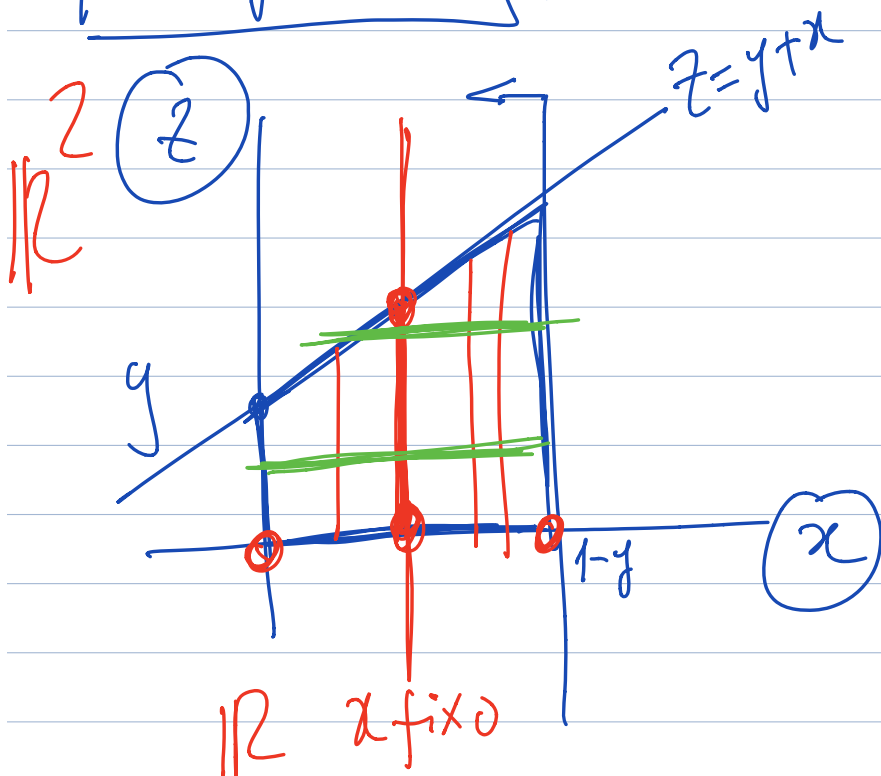
$$5-a) \begin{cases} x > 0, y > 0, x+y < 1 \\ 0 < z < x+y \end{cases} \quad \mathbb{R}^3$$

$dxdzdy$

$$d + \frac{dz}{dy} \quad \boxed{y \text{ fixo}} \rightarrow \frac{dz}{dx} \rightarrow z(x,y)$$

$$0 < y < x+y < 1$$

$$\boxed{0 < y < 1} \text{ fixo}$$



$$\begin{cases} x > 0 \checkmark \\ z > 0 \checkmark \\ x < 1-y \checkmark \\ x+y > z \end{cases}$$

$$x+y = z$$

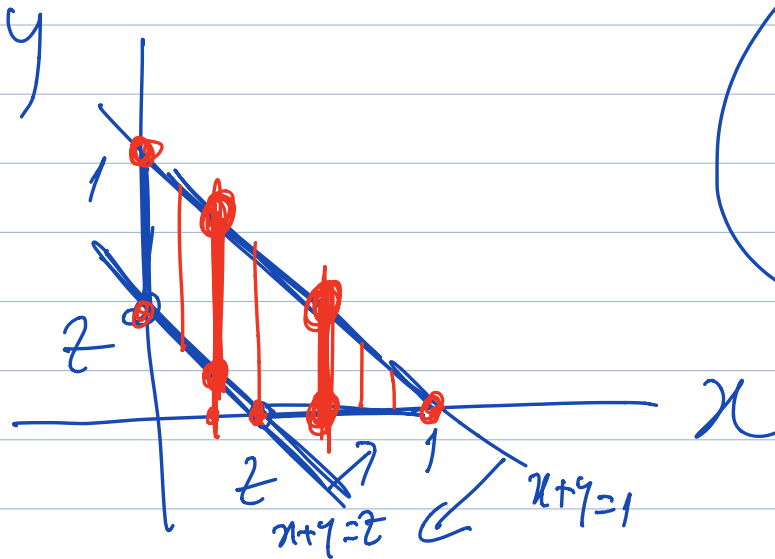
$$\boxed{z = y + x}$$

$$\int_0^1 \left(\int_0^{1-y} \left(\int_0^{x+y} dz \right) dx \right) dy$$

$\int dy dx dz$ $z \text{ fixo} \rightarrow x(z) \rightarrow y(x, z)$

$$0 < z < x+y < 1$$

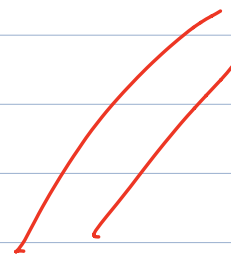
$$\boxed{0 < z < 1} \text{ fixo}$$



$$\begin{aligned} x > 0 \\ y > 0 \\ z < x+y < 1 \end{aligned}$$

$$\text{Vol}_3(X) = \int_0^1 \left(\int_0^z \left(\int_{z-x}^{1-x} dy \right) dx \right) dz$$

$$+ \int_0^1 \left(\int_z^1 \left(\int_0^{1-x} dy \right) dx \right) dz$$



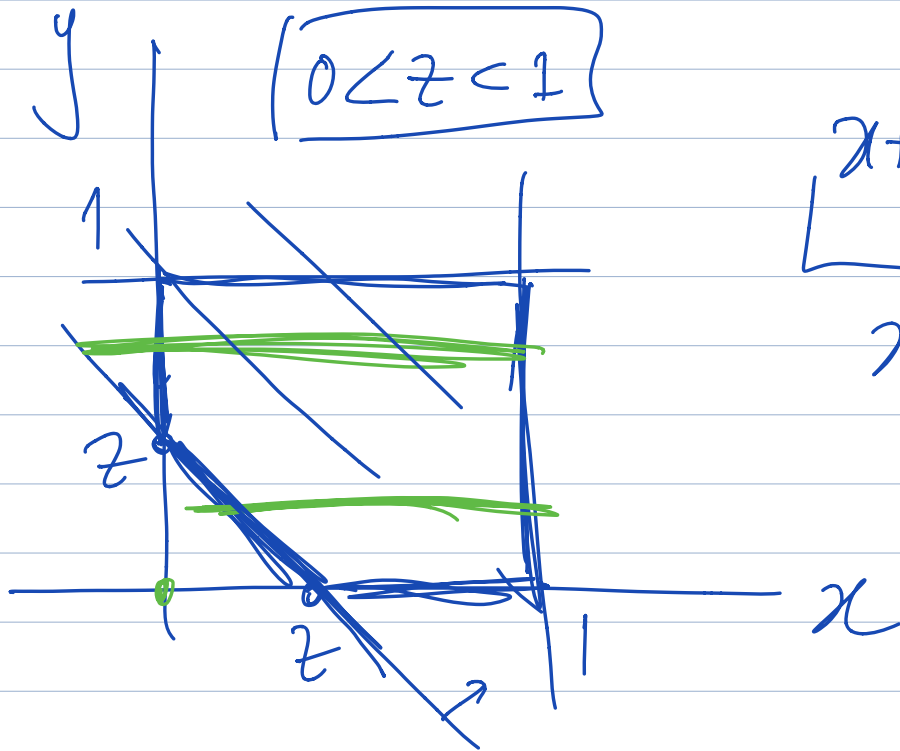
$$\text{f- } \overbrace{0 < x < 1} ; \overbrace{0 < y < 1} ; \overbrace{0 < z < x+y}$$

$\left. \begin{array}{l} dz dx dy \\ dz dy dx \end{array} \right\} \rightarrow 1 \text{ integral tuple.}$

$\int dx dy dz$ or $dy dx dz$

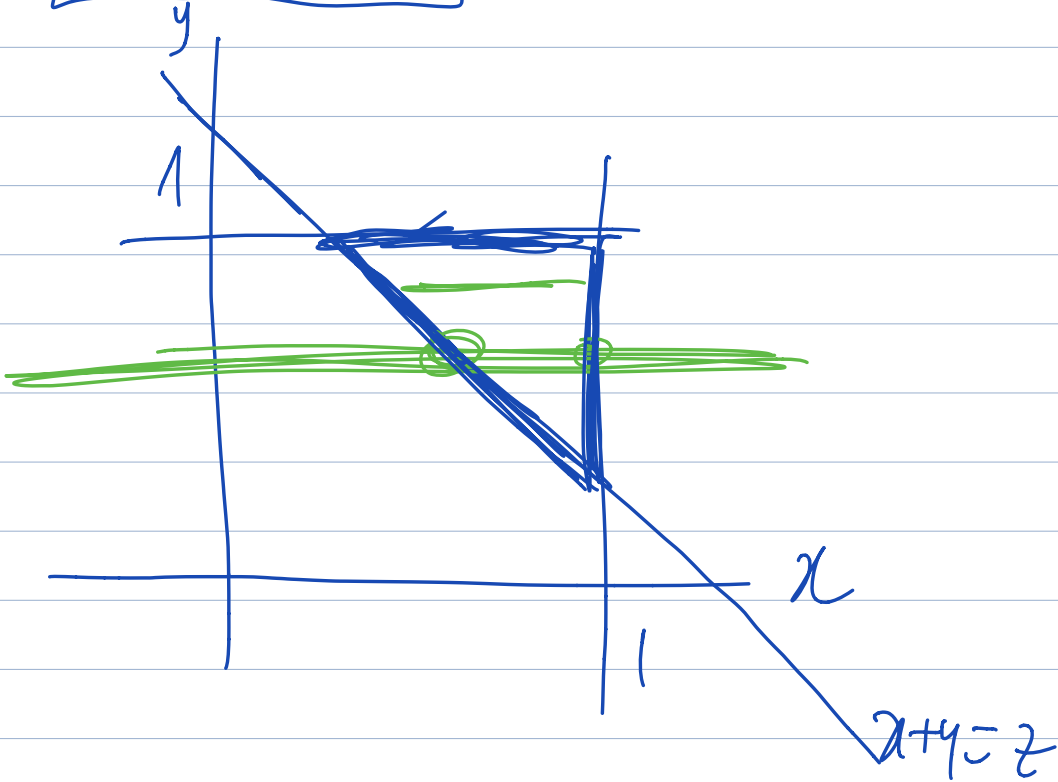
fixar z: $0 < z < x+y < 1+1=2$

$0 < z < 2$ fixo.



$$\begin{cases} x+y > z \\ x+y = z \end{cases}$$

$$1 < z < 2$$

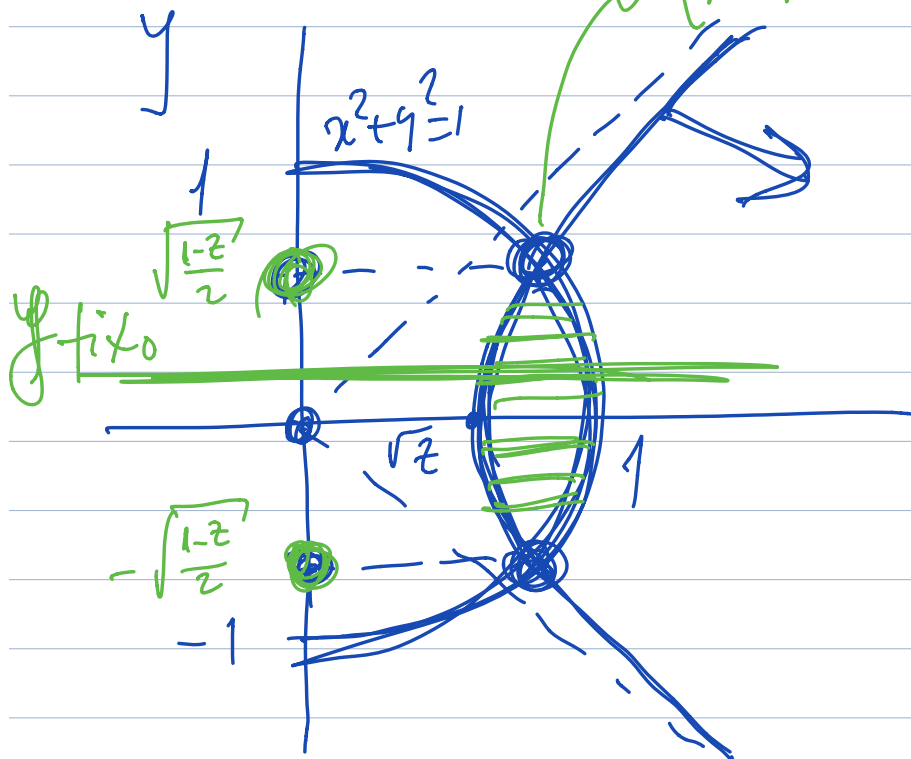


||

$$6-b) \left\{ \begin{array}{l} x^2 + y^2 < 1 \\ 0 < z < x^2 - y^2 \\ x > 0 \end{array} \right.$$

$$z \text{ fixo} \quad 0 < z < x^2 - y^2 < x^2 < x^2 + y^2 < 1$$

$$0 < z < 1 \text{ fixo}$$



$$\begin{array}{l} x^2 + y^2 < 1 \\ x^2 - y^2 > z \end{array}$$

$$x^2 - y^2 = z$$

x

$$\begin{array}{l} y=0, x^2=z \\ x=\sqrt{z} \end{array}$$

$$9- \begin{cases} 0 < x < 1 \\ 0 \leq z < x^2 - y^2 \end{cases}$$