

Estudo de superfícies: Projeções

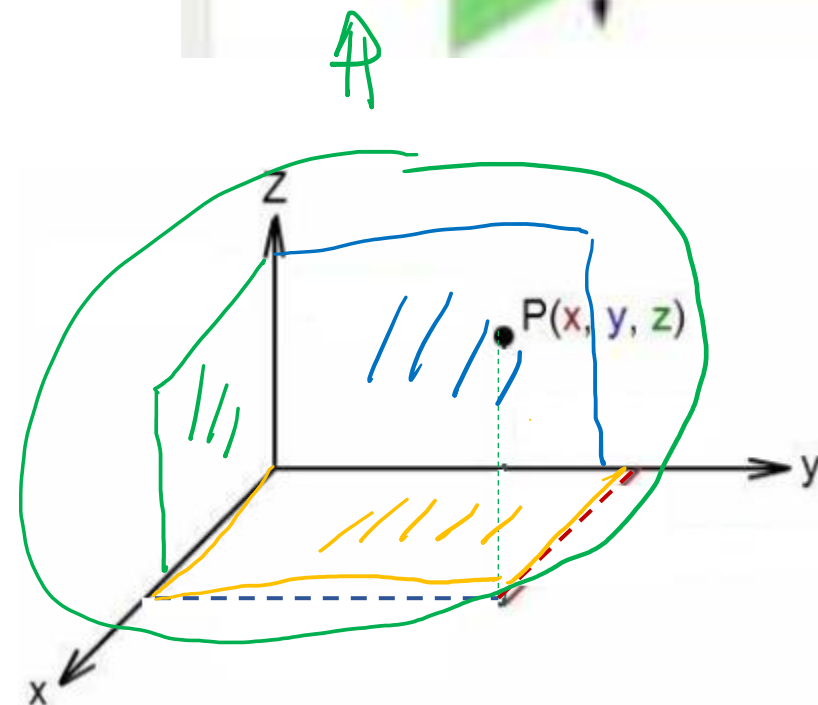
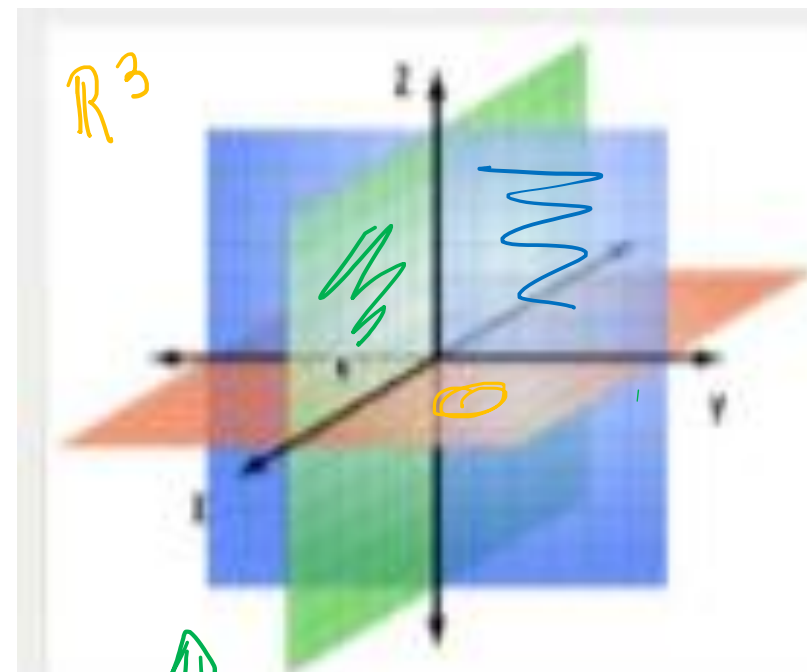
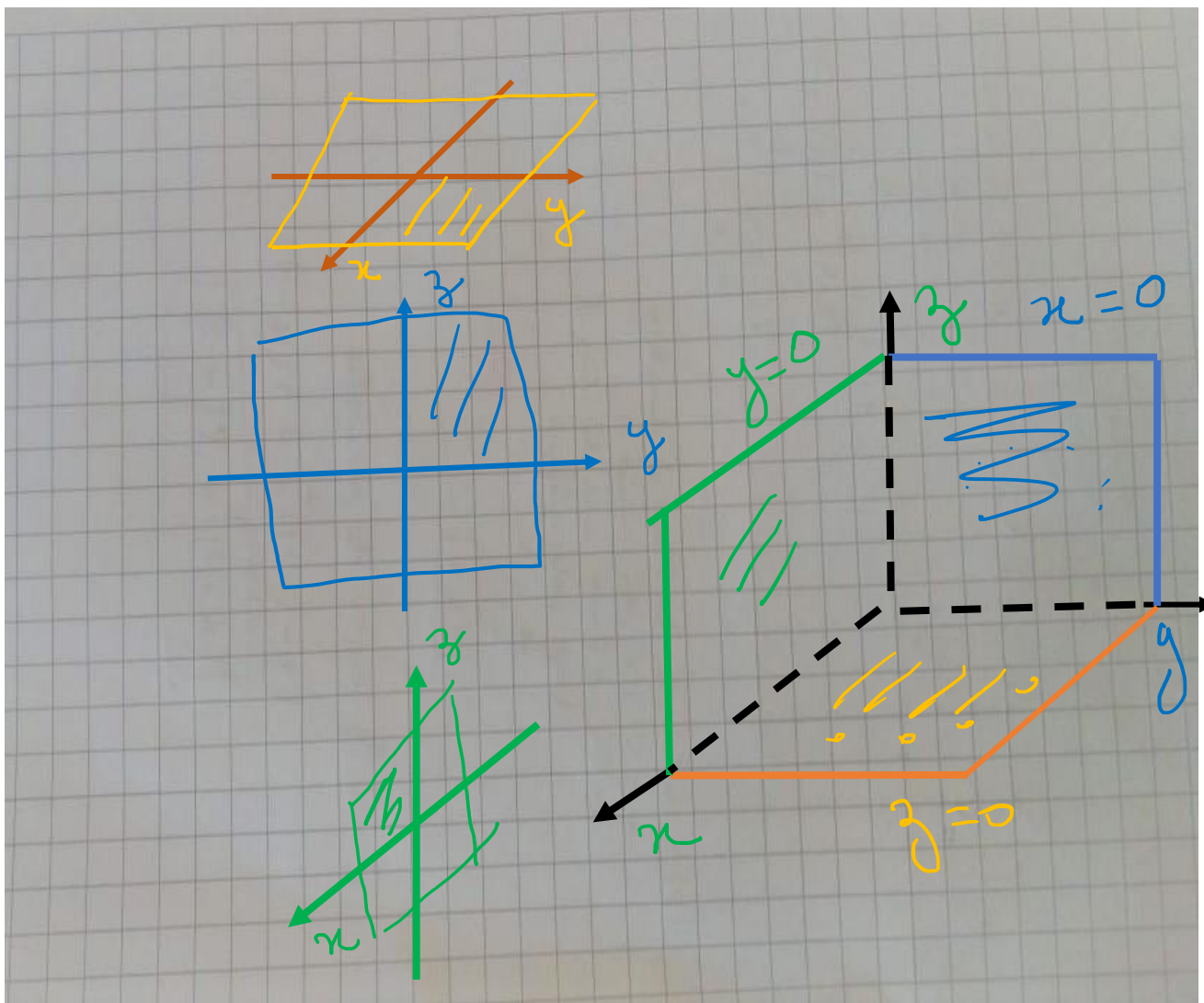
Aula em 07-10

Profa. Dra. Simone Leal Schwertl

FURB



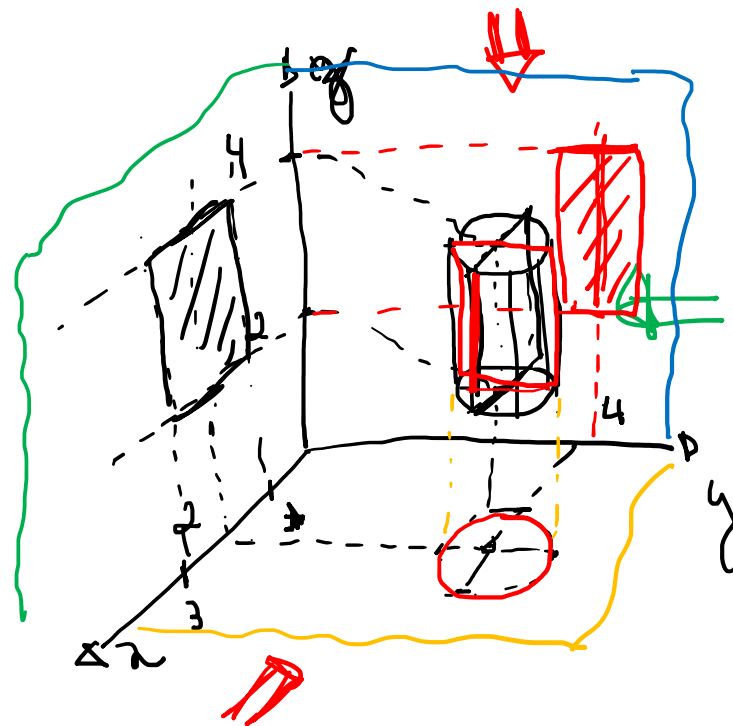
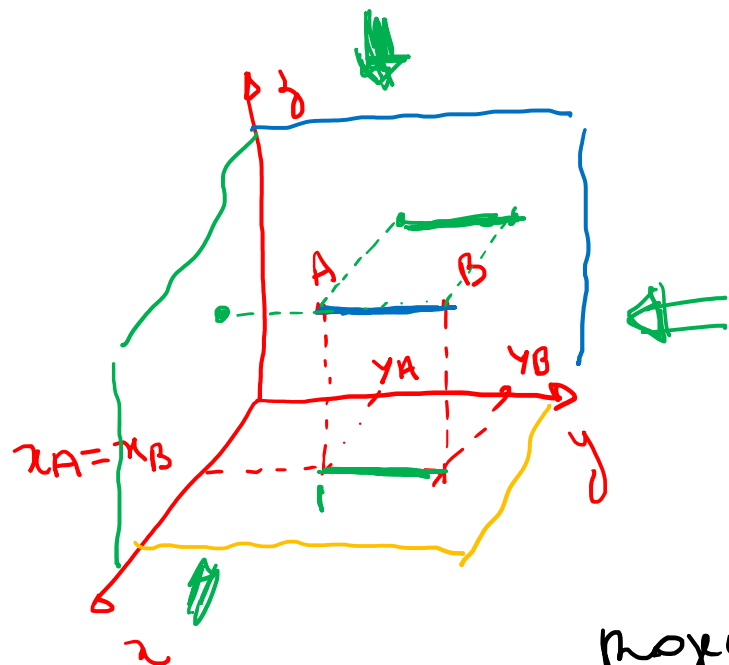
O Espaço \mathbb{R}^3
É formado pela interseção de 3
planos: xy , xz e yz .



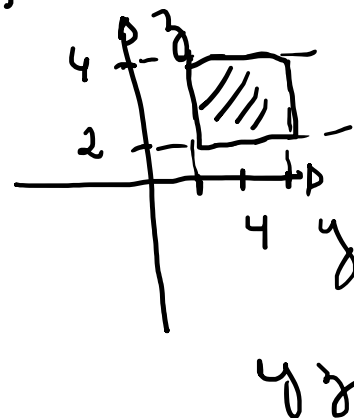
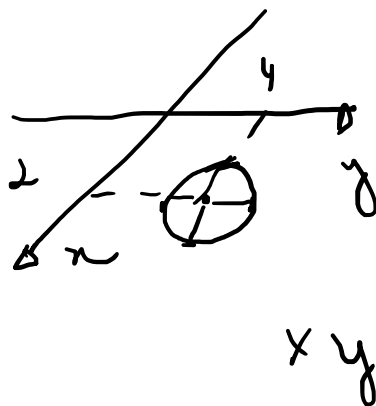
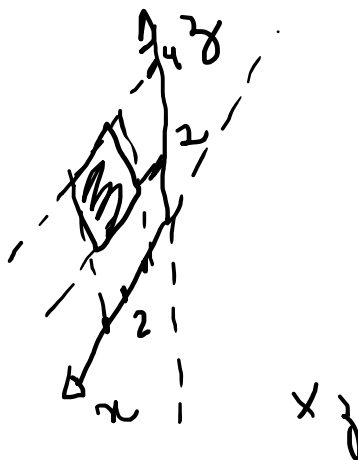
Projeções de superfícies em R3



projeção \Rightarrow nombras



projeção (nombras)

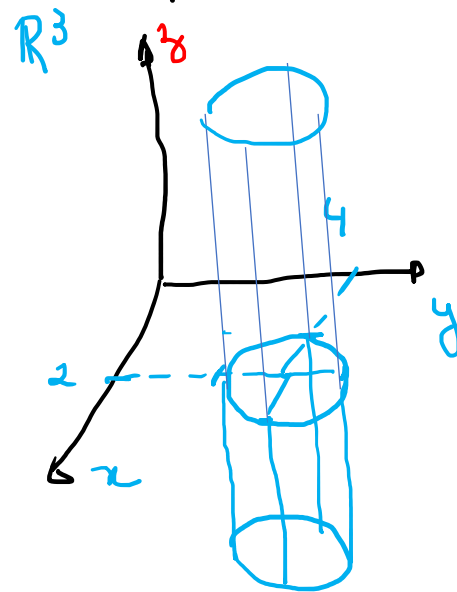
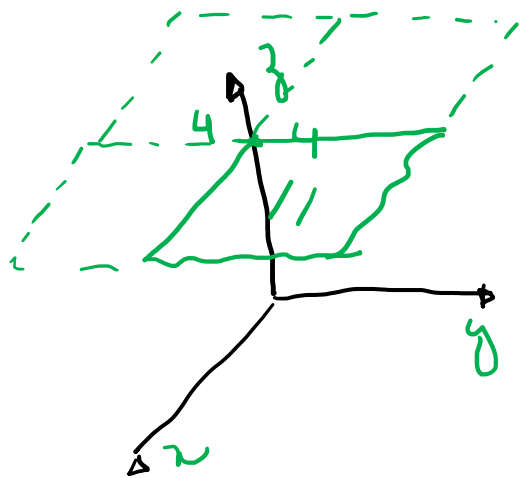
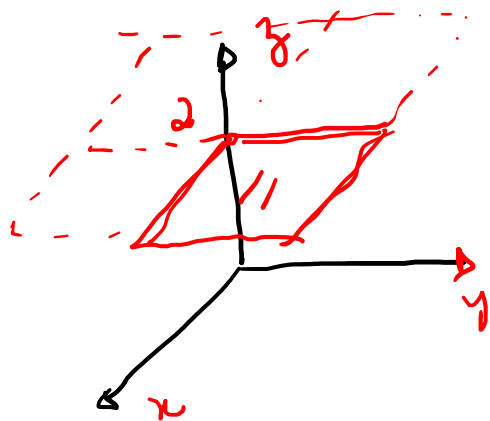


Problema

Fazer o estudo das projeções do sólido limitado pelas superfícies dadas pelas seguintes equações:

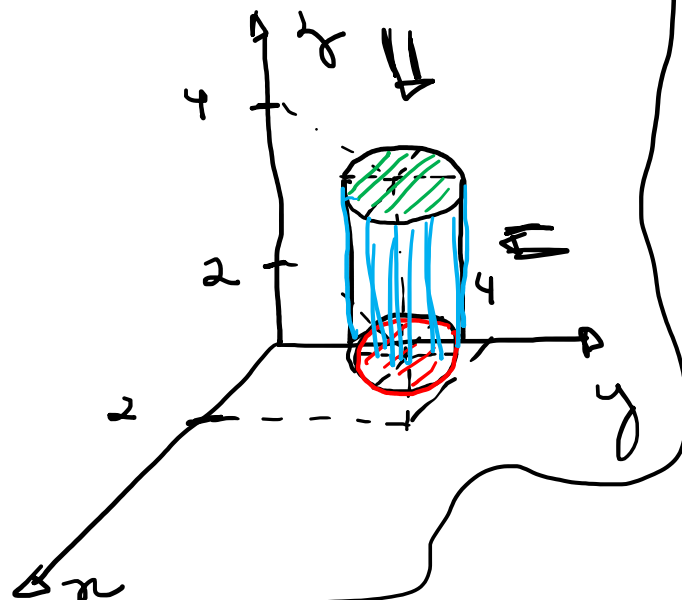
a) $\boxed{z=2}$ (plano), $\boxed{z=4}$ (plano), $\boxed{(x-2)^2 + (y-4)^2 = 1}$ (sup. cilíndrica, circunferência $C(2,4) \ r=1$)

1º) Etapa \Rightarrow reconhecer cada superfície

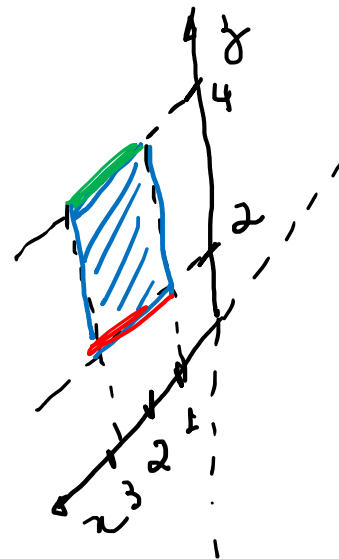


2º) Etapa

2ª etapa) Fazer a representação do sólido obtido pelo \cap das superfícies

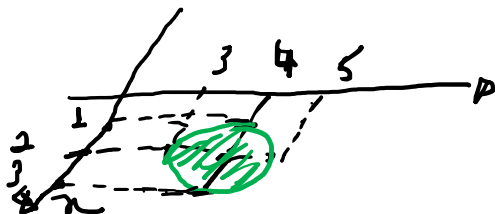


projeção em xz

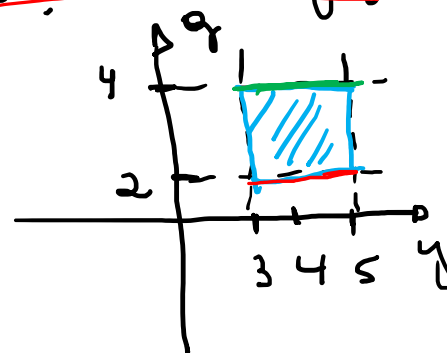


3ª etapa) Projeções (nombradas)

em xy



projeção em yz



$$z = 6$$

$$y = 0$$

$$x^2 + y^2 + 2 = z$$

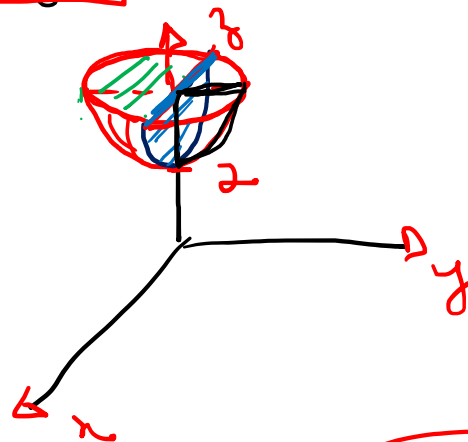
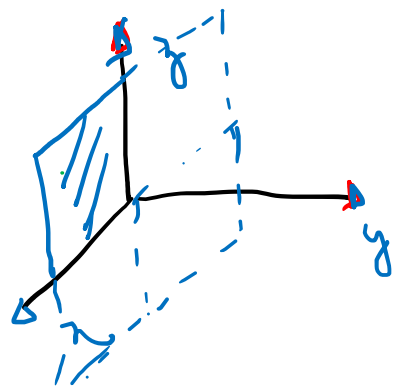
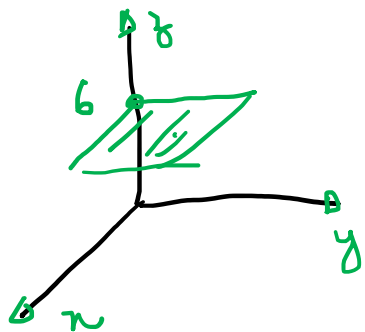
parabolóide

$$\begin{cases} x=0 \\ y=0 \end{cases} \quad \begin{cases} z = y^2 + 2 \\ z = x^2 + 2 \end{cases}$$

$$z = x^2 + 2$$

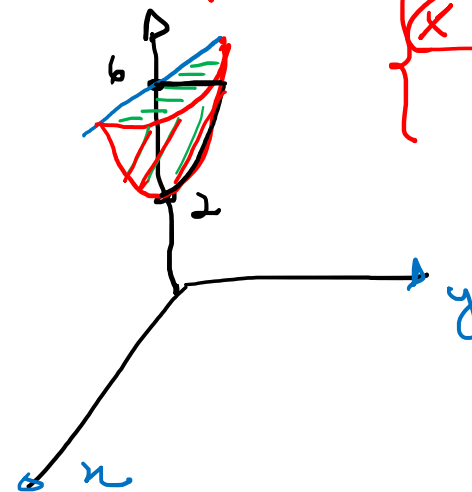
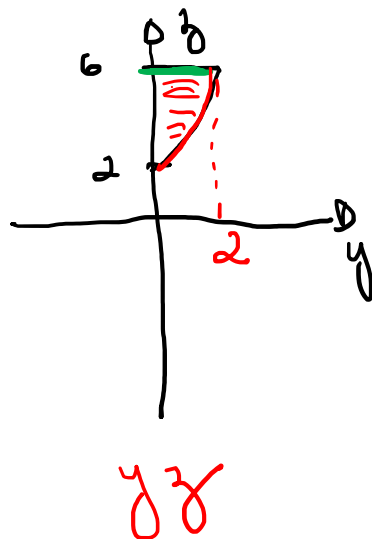
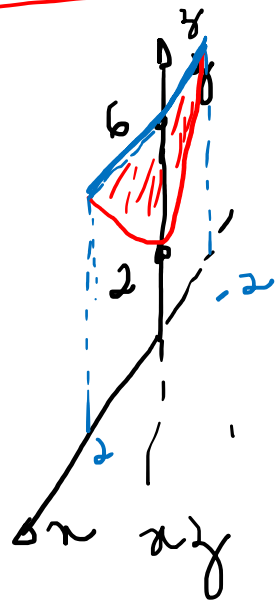
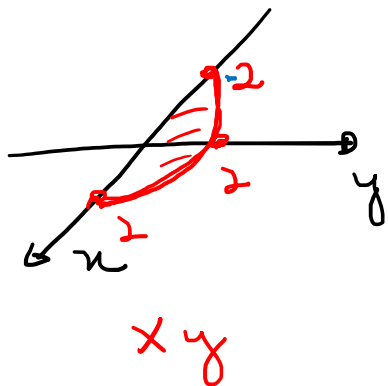


1)



2) Sólido limitado por todas as superfícies

3) projeções

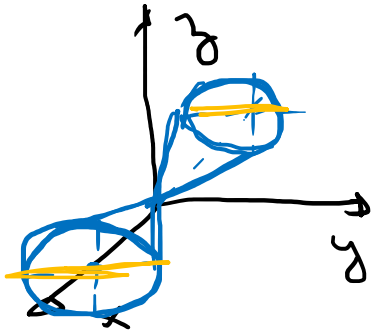


$$\begin{cases} x^2 + y^2 + 2 = z \\ z = 6 \end{cases}$$

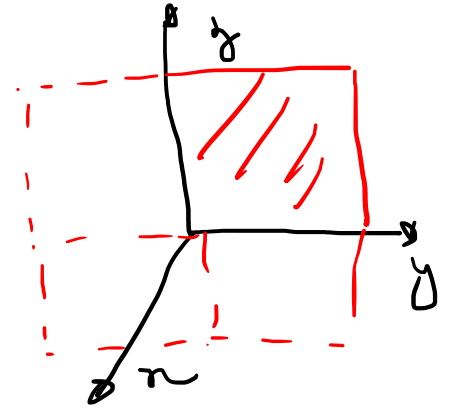
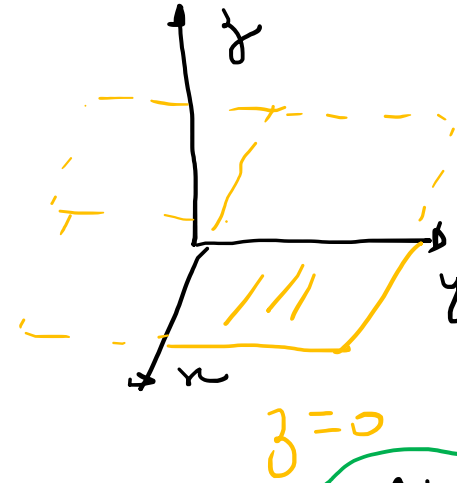
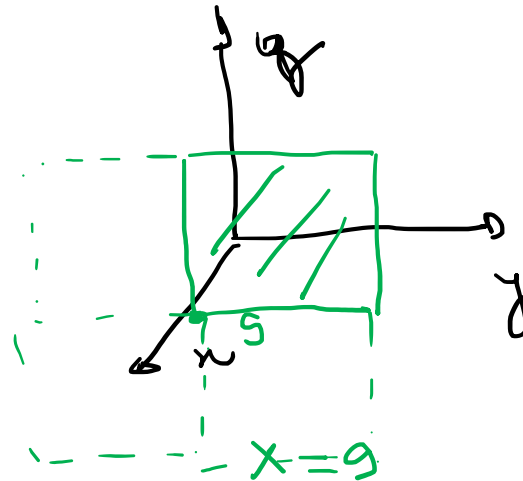
$$\begin{aligned} z &= 6 \\ x^2 + y^2 + 2 &= 6 \\ x^2 + y^2 &= 4 \end{aligned}$$

c) $\underbrace{-x^2 + y^2 + z^2 = 0}_{\text{cone}} \quad \underbrace{x = 9}_{\text{plane}} \quad \underbrace{y = 0}_{\text{plane}} \quad \underbrace{z = 0}_{\text{plane}}$

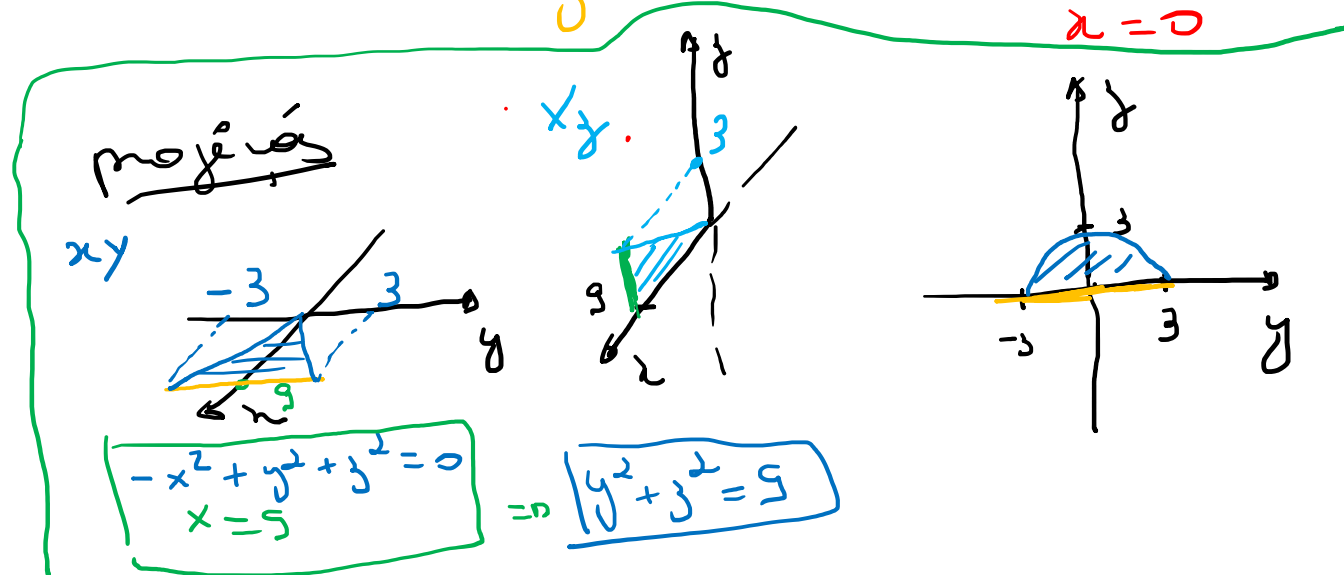
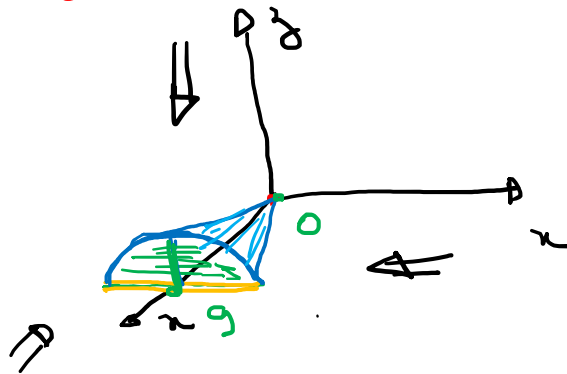
1) Reconhecer as superfícies



$-x^2 + y^2 + z^2 = 0$
cone



2) Sólido limitado por todas as superfícies



$$e) \quad x^2 + y^2 = 4, \quad z = 3 \text{ e } z = 10$$

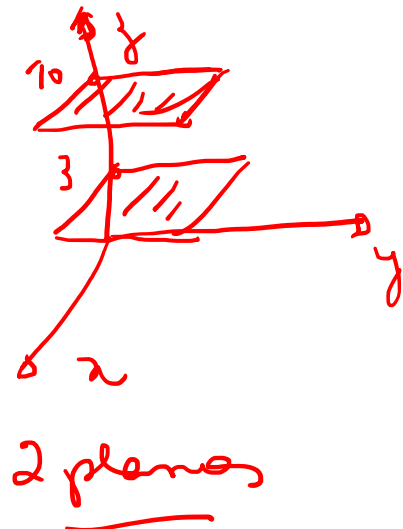
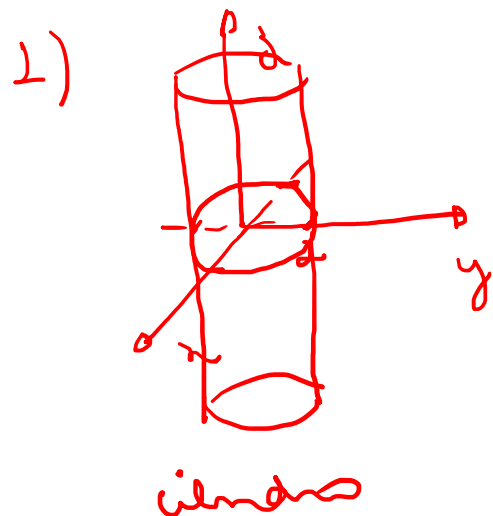
$$f) \quad x^2 + y^2 = 4, \quad z = 3, \quad z = 10 \text{ e } y = 0$$

$$g) \quad x^2 + y^2 = 4, \quad z = 3, \quad z = 10 \text{ e } x = 0$$

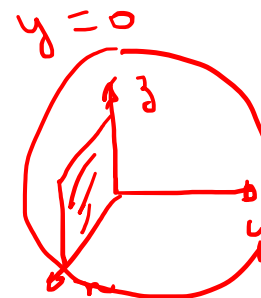
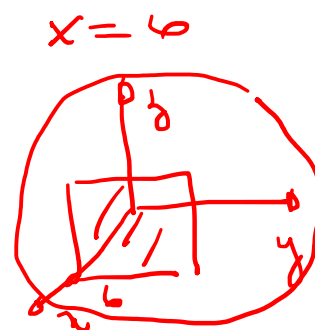
$$h) \quad x = y^2 + z^2, \quad x = 16, \quad y = 0 \text{ e } z = 0$$

$$i) \quad z = x^2 + y^2 \text{ e } z = 16$$

a) $x^2 + y^2 = 4$ $z = 3$ $z = 10$



2) e 3)



b) $x = z^2 + y^2$, $x = 6$, $y = 0$ e $z = 0$

$z^2 + y^2 = x$

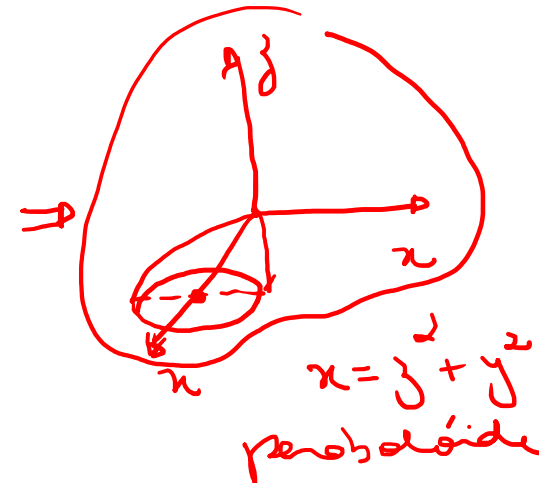
parabolóide

$\begin{cases} z = 0 \\ x = y^2 \end{cases}$

parábola

$\begin{cases} y = 0 \\ x = z^2 \end{cases}$

parábola



$\begin{cases} x = 0 \\ z^2 + y^2 = 0 \end{cases}$ 1 pt 0