

Kalkulus Peubah Banyak (B)

2. $f(x, y) = \ln(x + y - 1)$

a. Hitunglah

• $f(1, 1) = \ln 1$ • $f(2, 1) = \ln 2$ • $f(2, 0) = \ln 1$

$= 0 //$

$= //$

$= 0 //$

• $f(x, \frac{1}{x^4}) = \ln(x + \frac{1}{x^4} - 1)$ • $f(a, a^3) = \ln(a + a^3 - 1)$

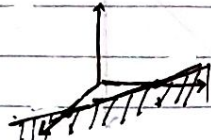
* $x + \frac{1}{x^4} - 1 > 0 //$

* $a + a^3 - 1 > 0 //$

b. Daerah asal f

$x + y - 1 > 0$

$x + y > 1$



$D_f = \{(x, y) \mid x + y > 1, (x, y) \in \mathbb{R}\}$

c. Daerah nilai f

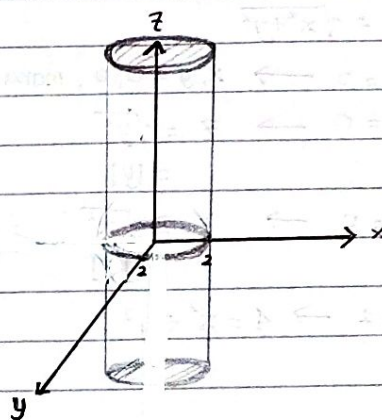
$R_f = \{z \mid z \in \mathbb{R}\}$

14. Gambarkan permukaan bidang dalam ruang

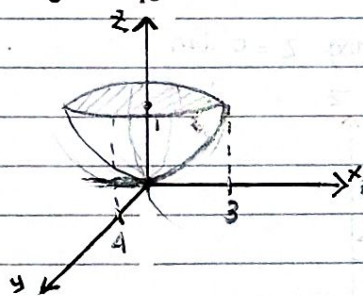
d). $x^2 + y^2 = 4$

↳ pada bidang xy akan terbentuk lingkaran yang berpusat di $(0, 0)$ dengan jari-jari 2

Lalu, akan memanjang sepanjang sumbu z



j). $z = \frac{x^2}{9} + \frac{y^2}{16}$



Saat $z = 0 \rightarrow$ akan menjadi titik di $(0, 0, 0)$

Saat $x = 0 \rightarrow z = \frac{y^2}{16}$ akan terbentuk parabola di bidang yz

Saat $y = 0 \rightarrow z = \frac{x^2}{9}$ akan terbentuk parabola di bidang xz

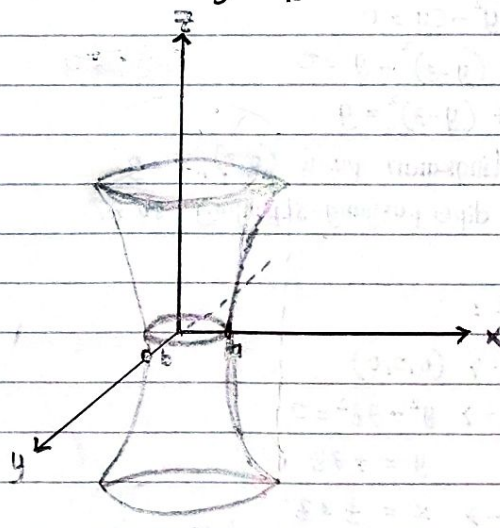
• Coba Substitusi $z = 1 \rightarrow \frac{x^2}{9} + \frac{y^2}{16} = 1$ (elips)

15 c). $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$

• $z = 0 \rightarrow \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (elips)

• $x = 0 \rightarrow \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$ (hiperbola)

• $y = 0 \rightarrow \frac{x^2}{a^2} - \frac{z^2}{c^2} = 1$ (hiperbola)



16. d). $z = e^{-(x^2+y^2)}$

$x=0 \rightarrow z = e^{-y^2}$

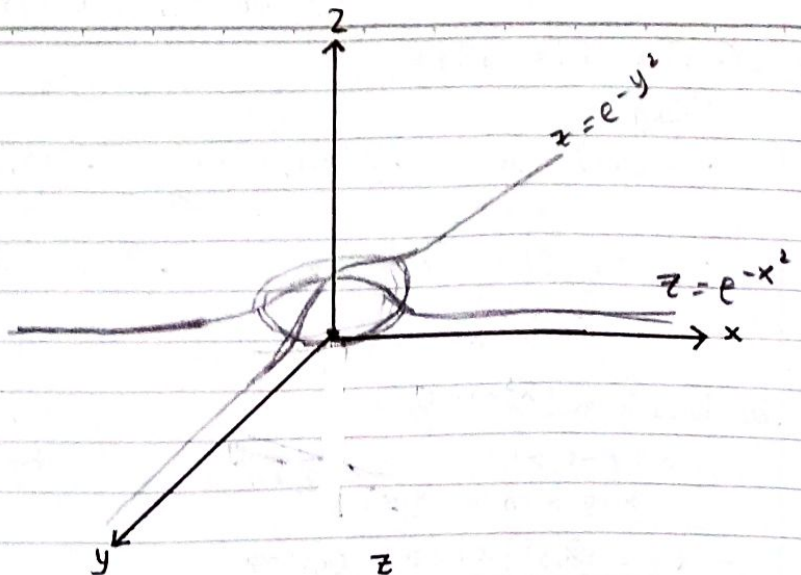
$y=0 \rightarrow z = e^{-x^2}$

$z = \frac{1}{4} \rightarrow \frac{1}{4} = e^{-(x^2+y^2)}$

$\ln 4^{-1} = \ln e^{-(x^2+y^2)}$

$-\ln 4 = -(x^2+y^2)$

$x^2+y^2 = \ln 4$



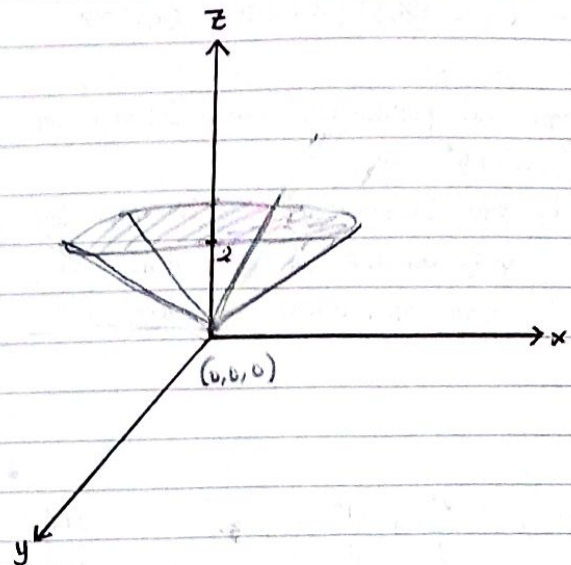
f). $z = \sqrt{x^2+y^2}$

$z=0 \rightarrow x, y = 0, 0$, maka di $(0,0,0)$

$x=0 \rightarrow z = \sqrt{y^2} = |y|$

$y=0 \rightarrow z = \sqrt{x^2} = |x|$

$z=2 \rightarrow 4 = x^2+y^2$



20. Sketsa permukaan kerucut $x^2+y^2-gz^2=0$ di atas bidang $z=0$ dan di dalam tabung $x^2+y^2=6y$

• Gambar tabung :

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

$x^2+(y-3)^2-9=0$

$x^2+(y-3)^2=9$

$\rightarrow$ Lingkaran pusat $(0,3)$, $r=3$
diper panjang sepanjang sb z

• Kerucut :

$z=0 \rightarrow (0,0,0)$

$x=0 \rightarrow y^2-gz^2=0$

$y = \pm gz$

$y=0 \rightarrow x = \pm gz$

