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Kelas : Matematika II (B)
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UAS MTK II

1. $f(x,y) = \frac{\sqrt{y-x^2}}{\sqrt{4-x^2-y^2}}$

$\Rightarrow y - x^2 \geq 0$

$4 - x^2 - y^2 \geq 0 \neq 0$

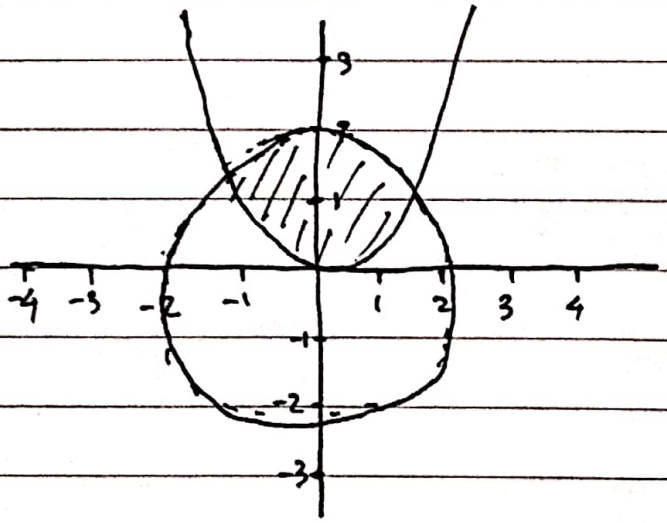
$y \geq x^2$

Jadi :

$-x^2 - y^2 < -4$

$x^2 + y^2 < 4$ //

$Df = \{(x,y) \in R \mid y \geq x^2, x^2 + y^2 < 4\}$



2. $\frac{df(x,y)}{dx}$ dan $\frac{\partial f(x,y)}{\partial y}$ dari fungsi $f(x,y) = e^{xy} + \sin(xy) + xy + 2$

- $\frac{\partial f(x,y)}{\partial x} = ye^{xy} + y\cos(xy) + y + 0$

$= ye^{xy} + y\cos(xy) + y$

- $\frac{\partial f(x,y)}{\partial y} = xe^{xy} + x\cos(xy) + x + 0$

$= xe^{xy} + x\cos(xy) + x$

3) Hitunglah integral berikut

a. $\int_0^4 \int_0^{\sqrt{3}} 3xy\sqrt{x^2+1}\, dx\, dy = \int_0^4 \left(3\int_0^{\sqrt{3}} xy\sqrt{x^2+1}\, dx\right) dy$

$= \int_0^4 \left(3y \int_0^{\sqrt{3}} x \cdot \sqrt{u}\, \frac{du}{2x}\right) dy$

$= \int_0^4 \frac{3}{2} \cdot \left[\frac{2u^{\frac{3}{2}}}{3}\right]_0^{\sqrt{3}} dy$

$= \int_0^4 \frac{3}{2} \cdot \frac{2}{3} \sqrt{(x^2+1)\sqrt{x^2+1}}\Big|_0^{\sqrt{3}} - dy$

$= \int_0^4 y\left[(\sqrt{3})^2 + 1\sqrt{(\sqrt{3})^2+1}\right) - (0^2+1\sqrt{0^2+1})\Big]^{dy}$

$= \int_0^4 (8-1)\, y\, dy$

$= \int_0^4 7y\, dy$

$= \frac{7}{2} y^2 \Big|_0^4 = \frac{7}{2}(16)^8 = 56$ //

b. $\int_0^{\pi} \int_0^x \frac{4x}{x^2+y^2}\, dy\, dx = \int_0^{\pi} 4x \int_0^x \frac{1}{x^2+y^2}\, dx\, dx$

$= \int_0^{\pi} 4x \int_0^1 \frac{1}{x(u^2+1)}\, du\, dx$

$= \int_0^{\pi} 4x \frac{1}{x} \int_0^1 \frac{1}{u^2+1}\, du\, dx$

$= \int_0^{\pi} 4 \left[\arctan(u)\right]_0^1 dx$

$= \int_0^{\pi} 4 \cdot \frac{\pi}{4}\, dx = \int_0^{\pi} \pi\, dx$

$= \pi x \Big|_0^{\pi} = \pi^2$ //

4. batas : $x = \sqrt{y}$

$y = 6$

$x = 0$

$$V = \int_0^6 \int_0^{\sqrt{y}} \frac{x^3}{\sqrt{3x^4+y^2}}\, dx\, dy$$

$$= \int_0^6 \int_0^{\sqrt{y}} \frac{x^3}{\sqrt{u}} \frac{dy}{12x^3}\, dy$$

$$= \int_0^6 \sqrt{u}\, \frac{x}{12}\Big]_0^{\sqrt{y}}\, dy$$

$$= \int_0^6 \frac{\sqrt{3x^4+y^2}}{6}\Big]_0^{\sqrt{y}}\, dy$$

$$= \int_0^6 \frac{2y}{6} - \frac{y}{6}\, dy$$

$$= \int_0^6 \frac{y}{6}\, dy$$

$$= \frac{y^2}{12}\Big]_0^6 = \frac{36}{12} = 3 \;//$$

→

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

$\frac{dy}{dx} = 12x^3$

$dx = \frac{dy}{12x^3}$