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SOAL:

BAGIAN A (12.1)

5. Domain $f(x,y) = \sqrt{xy}$

maka $f : R \to R^{+} \cup \{0\}$ domainya $0 \leq xy < \infty$

atau $[0, \infty) \ni xy$

BAGIAN B (12.2)

9.

$$F(x,y) = \frac{x}{(x+y)^2} = \frac{x}{x^2+y^2+2xy} = x.(x+y)^{-2}$$

division rule $\frac{d}{dx}\frac{u}{v} = \frac{u'v - v'u}{v^2}$

$$\frac{dF}{dx} = F_x(x,y) = \frac{(x+y)^2 - 2(x+y).x}{(x+y)^4} = \frac{x+y-2x}{(x+y)^3} = \frac{y-x}{(x+y)^3}$$

$$\frac{dF}{dy} = F_y(x,y) = -2x \cdot (x+y)^{-3} = -\frac{2x}{(x+y)^3}$$

BAGIAN C (12.3)

3.

$$\lim_{(x,y)\to(1,0)} \ln\left(\frac{1+y^2}{x^2+xy}\right) = \lim_{(x,y)\to(1,0)} \ln\frac{1}{x} + \lim_{(x,y)\to(1,0)} \ln\left(\frac{1+y^2}{1+y}\right)$$

$$= \lim_{(x,y)\to(1,0)} \ln\frac{1}{x} + \ln(1)$$

$$= 0$$

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BAGIAN D (12.4)

(4.) $\nabla f(p) = f_x(p)i + f_y(p)j$ , $f(x,y) = \sin^3(x^2y)$

$\nabla f = \langle 3\sin^2(x^2y)\cos(x^2y)\, 2xy \; , \; 3\sin^2(x^2y)\cos(x^2y)\, x^2 \rangle$

BAGIAN E (12.5)

(3.) $\nabla g(p,q) = \langle 4p^3 - 2q^3p \; , \; 3p^2q^2 \rangle$

$\nabla g(2,1) = \langle 28 , 12 \rangle$

$v = \langle 1 , 3 \rangle$

$D_u \nabla f(2,1) = 28 + 36 = 64$ //

BAGIAN F (12.6)

(3.) $\frac{dz}{dt} = \frac{dz}{dx} \cdot \frac{dx}{dt} + \frac{dz}{dy} \cdot \frac{dy}{dt}$ , $z = \arctan\left(\frac{y}{x}\right)$

$\frac{dz}{dx} = -\frac{y}{x^2+y^2}$ , $\frac{dz}{dy} = \frac{x}{y^2+x^2}$

$\frac{dx}{dt} = e^t$ , $\frac{dy}{dt} = e^t$

$\frac{dz}{dt} = \frac{xe^t}{y^2+x^2} - \frac{ye^t}{x^2+y^2} = \frac{x^2 - xy}{x^2+y^2}$ //

BAGIAN G (12.7)

(4.) ~~Ex~~ $F_x(x,y,z) = e^{xy} + xye^{xy}$ , $F_y(x,y,z) = x^2e^{xy}$ , $F_z = 0$

bidang singgung $\Rightarrow (z-2)0 = (x-2) + 4(y)$

titik (2,0,2) $0 = 4y + x - 2$ //