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Bagaimana ide kalian untuk menentukan fungsi $M(x,y)$ sedemikian sehingga PD berikut merupakan PD eksak

$$M(x,y)\,dx + (2x^2y^3 + x^4y)\,dy = 0$$

Jawab.

$$M(x,y) = \frac{\partial F}{\partial x}(x,y) \qquad N(x,y) = \frac{\partial F}{\partial y}(x,y)$$

$$N(x,y) = 2x^2y^3 + x^4y$$

$$\frac{\partial N}{\partial x} = 4xy^3 + 4x^3y$$

•> Persamaan diferensial dapat dikatakan eksak apabila memenuhi:

$$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$$

Sehingga $\frac{\partial M}{\partial y} = 4xy^3 + 4x^3y \longrightarrow M(x,y) = \int \frac{\partial M}{\partial y}(x,y)\,\partial y$

$$= \int 4xy^3 + 4x^3y\,\partial y$$

$$M(x,y) = xy^4 + 2x^3y^2 + C$$

$$C = 0$$

$$M(x,y) = xy^4 + 2x^3y^2$$

Jadi, persamaan eksak tersebut:

$$M(x,y)\,dx + N(x,y)\,dy = 0$$

$$(xy^2 + 2x^3y^2)\,dx + (2x^2y^3 + x^4y)\,dy = 0.$$