

Akan ditentukan $M(x,y)$ sehingga
 $M(x,y) dx + (2x^2y^3 + x^4y) dy = 0$ merupakan PD
Eksak.

Agar disebut PD Eksak, maka Relas kiri persamaan tersebut
haruslah merupakan hasil dari diferensial total suatu
fungsi, yakni :

$$\frac{\partial F}{\partial x} dx + \frac{\partial F}{\partial y} dy = 0$$

Dalam hal ini,

$$\frac{\partial F}{\partial x} = M(x,y) \quad , \quad \frac{\partial F}{\partial y} = 2x^2y^3 + x^4y = N(x,y)$$

Suatu Persamaan disebut PD eksak haruslah memenuhi

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

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

$$\frac{\partial N(x,y)}{\partial x} = \frac{\partial (2x^2y^3 + x^4y)}{\partial x} = 4xy^3 + 4x^3y$$

$$\text{Diperoleh, } \frac{\partial M(x,y)}{\partial y} = 4xy^3 + 4x^3y$$

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

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

Dipilih $\phi(x) = 0$

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