Problem:

Calculate the gradient of function $z = xy\cos xy$ at point $M(0;-3)$.

Solution:

$z = xy\cos xy$, $M(0;-3)$ the gradient of z at point M has the coordinates

$$grad\ z(M) = \overrightarrow{\left(\frac{\partial z}{\partial x}(M), \frac{\partial z}{\partial y}(M)\right)} \Rightarrow \frac{\partial z}{\partial x}(M) = (y\cos xy - xy^2\sin xy)\Big|_{\substack{x=0\\y=-3}} = -3,$$

$$\frac{\partial z}{\partial y}(M) = (x\cos xy - x^2 y\sin xy)\Big|_{\substack{x=0\\y=-3}} = 0, \Rightarrow grad\ z(M) = \overrightarrow{(-3,0)} = -3\vec{\imath}.$$

Answer: $-3\vec{\imath}$.