Please PRINT your name _____

No calculators, cell phones, computers, notes, etc.

Circle your answer. Make your work correct, complete and coherent.

Please take a picture of your quiz (for your records) just before you turn the quiz in. I will e-mail your grade and my comments to you. I will keep your quiz.

The quiz is worth 5 points. The solutions will be posted on my website later today.

Quiz 5, October 20, 2022

Find the directional derivative of the function $f(x,y) = 2xy - 3y^2$ at the point $P_0 = (5,5)$ in the direction of $\vec{u} = 4\vec{i} + 3\vec{j}$.

ANSWER: We compute

$$D_{\vec{u}} f|_{P_0} = \vec{\nabla} f|_{P_0} \cdot \frac{\vec{u}}{|\vec{u}|} = \left(\frac{\partial f}{\partial x}\vec{i} + \frac{\partial f}{\partial y}\vec{j} \right)|_{P_0} \cdot \frac{4\vec{i} + 3\vec{j}}{\sqrt{4^2+3^2}}$$

$$= \left(2y\,\vec{i} + (2x - 6y)\,\vec{j} \right)|_{(5,5)} \cdot \frac{4\vec{i} + 3\vec{j}}{5}$$

$$= (10\,\vec{i} - 20\,\vec{j}) \cdot \frac{4\vec{i} + 3\vec{j}}{5}$$

$$= (2\,\vec{i} - 4\,\vec{j}) \cdot (4\,\vec{i} + 3\,\vec{j}) = 8 - 12 = \boxed{-4}$$