

Calculating the Jacobian

TOTAL POINTS 5

1. In this quiz you will put into practice how to calculate the Jacobian from the lecture video.

For $f(x, y) = x^2y + \frac{3}{4}xy + 10$, calculate the Jacobian row vector J .

- ☐ $J = [xy + \frac{3}{4}y, x^2 + \frac{3}{4}xy]$
- ☐ $J = [xy + \frac{3}{4}y + 10, x^2 + \frac{3}{4}xy + 10]$
- ☒ $J = [2xy + \frac{3}{4}y, x^2 + \frac{3}{4}x]$
- ☐ $J = [2xy + \frac{3}{4}y + 10, x^2 + \frac{3}{4}x + 10]$

✓ **Correct**
Well done!

2. For $f(x, y) = e^x \cos(y) + xe^{3y} - 2$, calculate the Jacobian row vector J .

- ☐ $J = [e^x \cos(y) + e^{3y} - 2, -e^x \sin(y) + 3xe^{3y} - 2]$
- ☐ $J = [e^x \cos(y) + e^{3y} - 2, e^x \sin(y) + xe^{3y} - 2]$
- ☒ $J = [e^x \cos(y) + e^{3y}, -e^x \sin(y) + 3xe^{3y}]$
- ☐ $J = [e^x \cos(y) + e^{3y}, e^x \sin(y) + xe^{3y}]$

✓ **Correct**
Well done!

3. For $f(x, y, z) = e^x \cos(y) + x^2 y^2 z^2$, calculate the Jacobian row vector J .

☒ $J = [e^x \cos(y) + 2xy^2 z^2, -e^x \sin(y) + 2x^2 y z^2, 2x^2 y^2 z]$

☐ $J = [e^x \sin(y) + 2xy^2 z^2, -e^y \sin(x) + 2x^2 y z^2, 2x^2 y^2 z^2]$

☐ $J = [e^x \cos(y) + xy^2 z^2, -e^x \sin(y) + x^2 y z^2, x^2 y^2 z]$

☐ $J = [e^x \cos(y) + 2xy^2 z^2, e^x \sin(y) + 2x^2 y z^2, 2x^2 y^2 z^2]$



Correct

Well done!

4. For $f(x, y, z) = x^2 + 3e^y e^z + \cos(x) \sin(z)$, calculate the the Jacobian row vector and evaluate at the point $(0, 0, 0)$.

☐ $J(0, 0, 0) = [0, 2, 3]$

☐ $J(0, 0, 0) = [3, 0, 2]$

☒ $J(0, 0, 0) = [0, 3, 4]$

☐ $J(0, 0, 0) = [2, 3, 0]$



Correct

Well done!

5. For $f(x, y, z) = xe^y \cos(z) + 5x^2 \sin(y)e^z$, calculate the the Jacobian row vector and evaluate at the point $(0, 0, 0)$.

- ☐ $J(0, 0, 0) = [0, 0, 1]$
- ☐ $J(0, 0, 0) = [-1, 0, 1]$
- ☐ $J(0, 0, 0) = [1, 0, -1]$
- ☒ $J(0, 0, 0) = [1, 0, 0]$

✓ **Correct**
Well done!