

# Your grade: 100%

Your latest: 100% • Your highest: 100% • To pass you need at least 80%. We keep your highest score.

Next item →

- In this assessment, you will be tested on all of the different topics you have covered this module. Good luck!

1 / 1 point

Calculate the Jacobian of the function  $f(x, y, z) = x^2 \cos(y) + e^z \sin(y)$  and evaluate at the point  $(x, y, z) = (\pi, \pi, 1)$ .

- $J(x, y, z) = (-2\pi, e, 1)$
- $J(x, y, z) = (-2\pi, -e, 1)$
- $J(x, y, z) = (-2\pi, e, 0)$
- $J(x, y, z) = (-2\pi, -e, 0)$

✓ Correct

Well done!

- Calculate the Jacobian of the vector valued functions:

1 / 1 point

$u(x, y) = x^2 y - \cos(x) \sin(y)$  and  $v(x, y) = e^{x+y}$  and evaluate at the point  $(0, \pi)$ .

- $\begin{bmatrix} 0 & e^\pi \\ 1 & e^\pi \end{bmatrix}$
- $\begin{bmatrix} 0 & 1 \\ e^\pi & e^\pi \end{bmatrix}$
- $\begin{bmatrix} e^\pi & 1 \\ e^\pi & 0 \end{bmatrix}$
- $\begin{bmatrix} e^\pi & 1 \\ 0 & e^\pi \end{bmatrix}$

✓ Correct

Well done!

3. Calculate the Hessian for the function  $f(x, y) = x^3 \cos(y) - x \sin(y)$ .

1 / 1 point

- $$H = \begin{bmatrix} 6x \cos(y) & -3x^2 \sin(y) - \cos(y) \\ -3x^2 \sin(y) - \cos(y) & x \sin(y) - x^3 \cos(y) \end{bmatrix}$$
- $$H = \begin{bmatrix} 6x^2 \cos(y) & -3x^2 \sin(y) - \cos(x) \\ -3x^2 \sin(y) - \cos(y) & x \sin(y) - x \cos(y) \end{bmatrix}$$
- $$H = \begin{bmatrix} 6 \cos(y) & -3x^2 \sin(y) - \cos(y^2) \\ -3x^2 \sin(y) - \cos(y) & x^2 \sin(y) - x^3 \cos(y) \end{bmatrix}$$
- $$H = \begin{bmatrix} 6 \cos(x) & -3x^2 \sin(y) - \cos(y) \\ -3x^2 \sin(y) - \cos(y) & x \sin(y) - y^3 \cos(x) \end{bmatrix}$$

 **Correct**

Well done!

4. Calculate the Hessian for the function  $f(x, y, z) = xy + \sin(y)\sin(z) + z^3 e^x$ .

1 / 1 point

- $$H = \begin{bmatrix} e^x z^3 & 1 & 3e^x z^2 \\ 1 & -\sin(y)\sin(z) & \cos(y)\cos(z) \\ 3e^x z^2 & \cos(y)\cos(z) & 6e^x z - \sin(y)\sin(z) \end{bmatrix}$$
- $$H = \begin{bmatrix} 2e^x z^3 & 1 & e^x z^2 \\ 0 & -\sin(x)\sin(z) & \cos(y)\cos(z) \\ 3e^x z^2 & \cos(y)\cos(z) & 6e^{2x} - \sin(y)\sin(x) \end{bmatrix}$$
- $$H = \begin{bmatrix} 3e^x z^2 & -1 & 3e^x z \\ 1 & -\sin(x^2)\sin(z) & \cos(y)\cos(z) \\ 3e^x z & \cos(y)\cos(z) & 6e^y z^2 - \sin(y)\sin(z) \end{bmatrix}$$
- $$H = \begin{bmatrix} -e^x z^3 & 0 & 3e^y z^2 \\ 1 & \sin(y)\sin(z) & \cos(y)\cos(z) \\ 3e^x z & \cos(y)\cos(z) & 6e^{-xz} - \sin(y)\sin(z) \end{bmatrix}$$

 **Correct**

Well done!

5. Calculate the Hessian for the function  $f(x, y, z) = xycos(z) - \sin(x)e^y z^3$  and evaluate at the point  $(x, y, z) = (0, 0, 0)$

1 / 1 point

$$H = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$

$$H = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$H = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

$$H = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$

 **Correct**

Well done!