The Second Derivative Test MCQ Questions

Q1. A Hessian matrix is Nondegenerate when

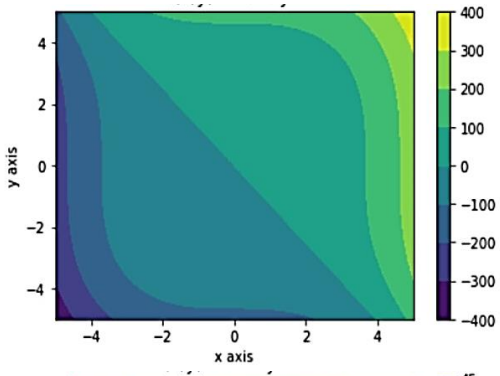
- $f_{xx} \neq 0 \; and \; f_{yy} \neq 0$
- $f_{xx} \neq 0 \; or \; f_{yy} \neq 0$
- $f_{xy} = f_{yx}$
- $f_{xy} \neq f_{yx}$

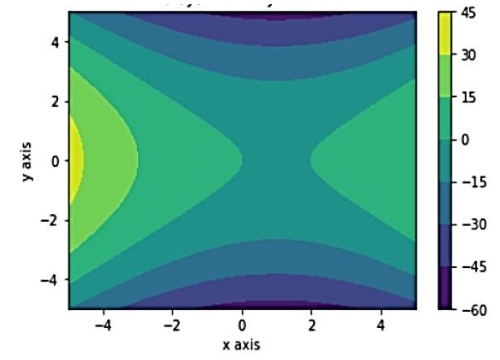
Q2. Consider the function

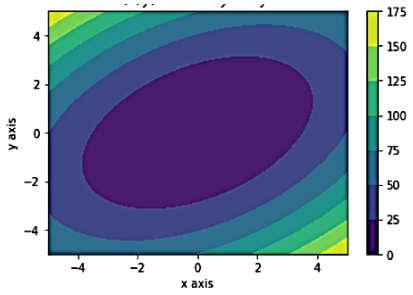
$$f(x, y) = 4 + x^3 + y^3 - 3xy$$

- $f(x, y)$ has a saddle point
- $f(x, y)$ is inconclusive
- $f(x, y)$ has a relative maximum and a saddle point
- $f(x, y)$ has a relative minimum and a saddle point

Q3. The contour diagram of a saddle point is

- 

- 

- 

Q4. A saddle point is the local extrema of a function

- TRUE
- FALSE

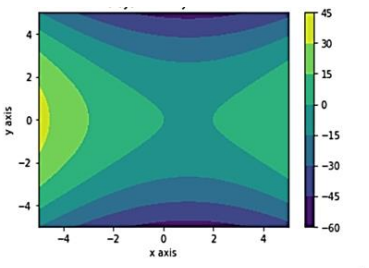
Q5. Niklaus I gave a proof of the equality of the mixed derivatives.

- TRUE
- FALSE

ANSWER KEY

Q1. $f_{xx} \neq 0 \; and \; f_{yy} \neq 0$

Q2. $f(x, y)$ has a relative minimum and a saddle point

Q3. 

Q4. FALSE

Q5. TRUE