

UNIVERSITY OF DHAKA

Department of Mathematics

Second Year B.S. (Honors) 2019-2020

Subject: Mathematics

Course No: **MTH 250** Course Title: **MATH Lab II**

Assignment-1

Name:	Roll:	Group:
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Write a Script file to solve each of the following problems.

Q1. Use Definition with x_i^* as the right endpoint (left endpoint or midpoint) of each subinterval to find the area under the graph of $f(x) = 2 - x^2$ and over the interval $[0, 2]$.

Q2. (i) Find the Minimum of $f(x, y) = x^2 + y^2 + 4x - 6y + 18$ in the window $[0, 2] \times [2, 4]$ with increment 0.01 for x and y .

(ii) Find the absolute extrema of $f(x, y) = x^2 - 2xy + 4y^2 - 4x - 2y + 24$ for $0 \leq x \leq 4$ and $0 \leq y \leq 2$,

Q3. Find the local extrema and saddle points of $f(x, y) = xy - x^3 - y^2$ in the following format

Critical points	Value of f	f_{xx}	$D = f_{xx}f_{yy} - [f_{xy}]^2$	conclusion

Q4. If $f(x, y) \geq 0$, then the volume of the solid that lies above the rectangle R and below the surface $z = f(x, y)$ is

$$V = \iint_R f(x, y) dA = \lim_{m, n \rightarrow \infty} \sum_{i=1}^m \sum_{j=1}^n f(x_{ij}^*, y_{ij}^*) \Delta A$$

Estimate the volume of the solid that lies above the square $R = [0, 2] \times [0, 2]$, and below the elliptic paraboloid $z = 16 - x^2 - 2y^2$. Divide R into four equal squares and choose the sample point to be the upper right corner point (left or middle point) of each square. Try this for large number of squares.