



# COMSATS University Islamabad

Attock Campus

## Department of Mathematics

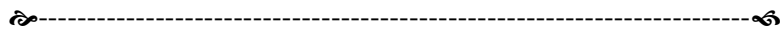
### Assignment # 02

**Class:** BSM-VII  
**Subject:** Convex Analysis  
**Instructor:** Dr. Atiq ur Rehman

**Due Date:** 05-03-2024  
**Course Code:** MTH424  
**Marks:** 9

### Instructions: (one must follow the instructions)

- You may submit the assignment in group.
- Please make sure that the PDF or other file is good before sending.
- Email PDF at [atiq@cuiatk.edu.pk](mailto:atiq@cuiatk.edu.pk).
- Please send email only once.
- Do not forget to read the academic honesty requirement before sending.



#### Question # 1

Prove that if  $f$  is convex on  $I$ , then  $F(x) = \frac{f(x) - f(c)}{x - c}$ ,  $x \neq c$  is increasing on  $I$ .

#### Question # 2

If  $f$  is convex on  $[a, b]$ , then prove that

$$f\left(\frac{a+b}{2}\right) \leq \frac{f(a) + f(b)}{2}.$$

#### Academic Honesty Requirements:

You are encouraged to work with others in the completion of assignments, but it doesn't include copying. However, in the spirit of Academic Honesty, which includes crediting others for their contribution to your work, please include one of the following statements with every submitted assignment on title page:

1. **I worked alone on this assignment and write myself.**
2. **I worked with the following: List their full names. Include their relationship to you if they are not also a member of this class and write myself.**