

<p><b>Instructors:</b> 1. Dr. Rola Alseidi</p>	 <p><b>Philadelphia University</b> Faculty of Science Department of Mathematics Midterm Exam</p>	<p><b>Academic Year:</b> 2022-2023 <b>Semester:</b> Second <b>Date:</b> 8/05/2023 <b>Course:</b> Real Analysis (2) 1 <b>Duration:</b> 75 Min</p>
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**Name:**

**I.D. Number:**

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**Question One:** [5 points] Let  $I \subseteq \mathbb{R}$  be an interval and let  $f : I \rightarrow \mathbb{R}$  and  $g : I \rightarrow \mathbb{R}$  be functions that are differentiable at  $c$ . Show that  $fg$  is differentiable at  $c$  and  $(fg)'(c) = f'(c)g(c) + f(c)g'(c)$

**Question five:** [5 points ]

State and prove the mean value theorem.

**Question Two:** [8 points (4+4)]

**Question five:** [5 points ]

Circle True or False. Read each statement carefully before answering.

**Part I**

**True False**

T If  $f : \mathbb{R} \rightarrow \mathbb{R}$  is an even function and has a derivative at every point, then the derivative is an odd function

**Part II**

**True False**

F If  $a > b$  and  $c < 0$ , then  $ca > cb$ .

**Part III**

**True False**

F Every bounded sequence is convergent.

**Part IV**

**True False**

F The sum of two divergent sequences diverges.

**Part V**

**True False**

F A monotone sequence of real numbers is divergent.

**Good Luck**