King Fahd University of Petroleum & Minerals
Department of Mathematics & Statistics
Instructor: Khaled Furati

MATH 311 - Exam 3 - Term 141

Duration: 90 minutes

Student Name:

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1. State without proof the following:
   (a) Mean Value Theorem.
   (b) Darboux's Theorem (Intermediate value property of derivatives)
2. Show that if $f : I \to \mathbb{R}$ is differentiable at $c \in \mathbb{R}$ then f is continuous at c.
3. Use Mean Value Theorem to show that for $x > 1$,
$$\frac{x-1}{x} < \ln x < x - 1.$$
4. Prove that if $f \in \mathcal{R}[a, b]$, then f is bounded on $[a, b]$.
5. Prove that if $f : [a, b] \to \mathbb{R}$ is increasing on $[a, b]$, then $f \in \mathcal{R}[a, b]$.

Question Number	**Points**	**Maximum Points**
1		10
2		10
3		10
4		10
5		10
Total		50