First semester	(alternative) First exam	King Saud University
(1st Dec. 2025)-(10/6/1447)	131 Math	College of Science
Without calculators	Time: 90 minutes	Mathematics Department

Name: **University Number:**

Q_1: Using symbols, definitions and theorems that you have studied, fill in the blanks, where U is the universal set: (12 marks)

1- $\sim(\forall x \in \mathbb{R}, \forall y \in \mathbb{R}, x+1<y) \equiv \cdots\cdots$

2- $\overline{A} = \{\cdots \mid \cdots\cdots\}$ and $A \cap B = \{\cdots \mid \cdots\cdots\}$

3- A compound statement S is called a **contradiction** if .....

4- $\sim(A \Rightarrow (\sim B)) \equiv \cdots\cdots$

5- If A={1} and B={3}, then A×B=..... and p(A×B)=.....

6- If A and B are disjoint sets such that |A∪B|=5 and |A−B|=2, then |B|=..., |A∩B|=..., |A×B|=... and |p(A)|=....

Q_2: Answer the following questions:

1- Use the truth table to show that $A \wedge (B \vee C) \equiv (A \wedge B) \vee (A \wedge C)$ (4 marks)

2- Show that if $3x^4+1$ is even then $5x+2$ is odd. (4 marks)

3- Show that the set $P = \{\mathbb{Z}\}$ is a partition of the set of integer numbers. (3 marks)

4- Evaluate the proposed proof of the following result:

"If x and y are positive odd numbers, then $x+y$ is even".

Proof: Suppose $x=2k+1$ and $y=2k+1$. Observe that

$$x+y=4k+2=2(2k+1)$$

which is an even number since 2k+1 is an integer number. (2 marks)