Jiangsu University

Preliminary Mathematics Test

Second Semester of Academic Year 2015-2016

Major_____ Class_____ Name_____ I.D. NO._____

Time: 2 hours Date: _____

Items	I (10')	II (10')	III (10')	IV (10')	V (10')	VI (10')	VII (10')	VIII (10')	IX (10')	X (10')	Total (100')
Scores											
critics											

I. Suppose that $A=\{1,2,3\}$, $B=\{1,2,3,4,5\}$ and $C=\{3,4,5\}$.

(a) Find $A\cup B$;

(b) Find $A\cap C$;

(c) Find $\overline{A\cup B}$.

II. Suppose that $f(x)=2x$ and $g(x)=x^3+1$.

(a) Find $f(g(x))$ and $g(f(x))$;

(b) Sketch the figures of $f(g(x))$ and $g(f(x))$, respectively.

III. Examine whether the following functions are even, odd or neither.

$$x\sin x+\sec x \quad \text{and} \quad \frac{1}{\sqrt{1+x^2}-\sqrt{1-x^2}}.$$

IV. If sinx+cosx=$\sqrt{2}\cos x$, show that

$$\text{cosx-sinx}=\sqrt{2}\sin x.$$

V. Solve the equation $e^{x^2-1}=0.$

VI. Solve the system $\begin{cases}5x+2y=-1,\\ x-3y=-6.\end{cases}$

VII. Prove that the line whose intercepts on the axes of x and y are respectively -2 and 3, pass though the point $(2,6)$.

VIII. Rewrite $-1\le x-3\le 1$ in the form:

(a) $a\le x\le b$;

(b) $|x-c|\le d.$

Ⅸ. P and Q are two points on the line $x-y+1=0$ and are at distance 5 from the origin. Find the area of the triangle OPQ.

Ⅹ. If we have known the graph of $y=x^2$, then describe how to derive the graph of $y=x^2+4x+1.$