Axum University
College of Natural and Computational Science
Department of Mathematics
Mathematics for Natural Science(Math1011)
Final exam for year I Regular Students.

Exam Date : 05/01/2014 E.C
Max Mark: 50 %
Time Allowed. 2hrs

Name _____ ID No _____ Sec_____

Part I: Write True if the statement is correct and Fales if it is wrong.(2pts each)

_____ 1.The graph of $\log_{\frac{1}{7}}^{x}$ is an increasing function.
_____ 2. For any two functions f and g, $f \circ g = g \circ f$.
_____ 3. The inverse of a function is a function.
_____ 4. Every one to one functions are onto.
_____ 5.The remainder when $p(x) = x^3 - 2x + 3$ is divided by $x+2$ is -1.

Part II: Fill in the following blank spaces with appropriate Short answer.(2pts each)

1. Let $A = \{1,2,4\}$, $B = \{1,4,8,12,32,64\}$ and $f : A \to B$ be defined by $f(x) = x^3$, then :
   (a) Domain of f is _____.
   (b) Range of f is _____.
   (c) Codomain of f is _____.
2. Given, $f(x) = \begin{cases} x^2 - 9, x < 3 \\ x^3 - 1, x \geq 3 \end{cases}$, then $f(-2) =$ _____.
3. If $f(x) = sin5x$, then:
   (a) amplitude of $f(x)$ is _____.
   (b) frequency of $f(x)$ is _____.
   (c) period of $f(x)$ is _____.
4. The simplified form of:
   (a) $(-125)^{\frac{2}{3}} =$ _____.
   (b) $sinh(\ln 3) =$ _____.
   (c) $\log_5^{(\log_3^{243})} =$ _____.

Part III:(Work out) Show all necessary steps briefly (5pts each)

1. Sketch the graph of the function $f(x) = \frac{1-x}{x^2-1}$
2. If $f(x) = x^2 - 6$ and $g(x) = \frac{x+1}{x+2}$,then find $(g \circ f)(x)$ and $Dom((g \circ f)(x))$.
3. If a root of $f(x) = x^3 - 3x^2 + x + 5$ is $2+i$, then find the other roots of f.
4. Let $f(x) = -2^{x-1} + 1$ be given, then find f^{-1}, domain and range of f^{-1}.