BRDA	Math 3A Midterm I	Oct 22, 99

PRINT NAME:_____

STUDENT ID NUMBER:_____

(1) No books and notes are allowed.
(2) You may use a calculator and a notecard.
(3) Show your work in details.

(1) (10 points) Solve the equation

$$\ln(\ln x) = 1$$

for x.

(2) (30 points) Let $f(x) = \dfrac{x+1}{x-1}$. (The domain of $f(x)$ is wherever $\dfrac{x+1}{x-1}$ is defined.)

(a) (10 points) Find the inverse function $f^{-1}(x)$ of $f(x)$.

(b) (10 points) What are the domains and ranges of $f(x)$ and $f^{-1}(x)$?

(c) (10 points) Find all horizontal asymptotes of $y = f(x)$ and $y = f^{-1}(x)$.

(3) (15 points) Find the tangent line of the curve $y = x^3$ at the point $(1, 1)$. (Do not use the laws of derivative to find the slope. Compute it using its definition.)

(4) (10 points) Let

$$f(x) = \begin{cases} \sin x & \text{if } x \geq 0 \\ \cos x & \text{if } x < 0 \end{cases}.$$

Is $f(x)$ continuous everywhere on $(-\infty, \infty)$? You must justify your answer.

(5) (15 points) Find all the horizontal asymptotes of the curve

$$y = \sqrt{x^2 + x + 2} - \sqrt{x^2 + 1}.$$

(6) (20 points) Find the following limits if they exist.

(a) (10 points) $\lim_{x \to 1} \dfrac{x^2 - 4x + 3}{x^2 - 3x + 2}$.

(b) (10 points) $\lim_{x \to 0^-} e^{1/x}$.