MA 125 Test 3a

NAME : _____

STUDENT NO. _____

1. Calculate the limit of each function, provide a detailed calculation to get full credit. Write you final answer in the box.

(1).

$$\lim_{x\to\infty} \frac{x^2}{e^x}$$

(2).

$$\lim_{x\to 0^+} 2x \ln x$$

2. Let $f(x) = \dfrac{3x^2}{x^2 - 9}$.

(1) Find the horizontal asymptotes.

(2). Find the vertical asymptotes.

(3). Find the critical numbers of f

(4). Find the intervals of increase and the intervals of decrease.

(5). Find the local maximal and minimum values.

(6). Analysis the signs of the second derivative f''

(7) Find the intervals of concavity and the inflection points.

(8) Use the information from parts (1)-(7) to sketch the graph of f.

3. If A is the area of a square with edge length x and the area of the square expands at the constant rate of $300cm^2/sec.$. Find the rate at which the edge length x increases when $x = 10cm$.