Name_____   ID No._____

Points: Each question is worth 3 points

1) Determine the intervals on which the function $f(x) = (x^2 - 3x + 2)^2$ is increasing and on which it is decreasing. Also determine the x-ccordinates of relative maxima and relative minima.

2) Find the Absolute extrema for $y = x^3/3 + x^2/2 - 2x -$ ™™™ on the interval $[0, 3]$.

3) If $y = x^4 + 4x^3 - 18x^2 - 3x + 4$, detremine the interval on which the function is concave up or down, and find all inflection points.

4) Determine the equations of all asymptotes for the graph of $y = \dfrac{4x^2 - 2x + 3}{9 - x^2}$.

5) A rectangular plot adjacent to a river is to be fenced in by using the river as one side of the enclosed area (i.e. no fence is needed along the river side). If 2000 ft of fencing are to be used, find the maximum area that can be enclosed.

6) Use differentials to approximate the value of $\sqrt{3.9}$.

7) If $y'' = 6x + 2$ and $y'(1) = 2$ and $y(0) = 3$, find $y(-1)$.

8) Determine: $\displaystyle\int (2x + 3)e^{x^2+3x+5}\, dx$

9) Sketch a graph of a function $f(x)$ with the following properties:

(a) $x = 1$ is a vertical asymptote.

(b) $\lim\limits_{x \to -\infty} f(x) = -3$.

(c) $\lim\limits_{x \to \infty} f(x) = \infty$.

(d) $f'(x) > 0$ for all $x \neq 1$.

(e) $f''(x) > 0$ if $x < 1$ or $x > 3$.

(e) $f''(x) < 0$ if $1 < x < 3$.