MAT 2213.02 — Calculus III
Final Exam — Fall 1993

Name _____

Show your work. Answers alone are not sufficient. Box your answers. All questions carry the same weight.

1. Find all maxima, minima and saddle points of the function
$$f(x, y) = x^2 + 2xy.$$

2. Find a unit vector normal to the surface defined by
$$z = x^2 + e^{(x+y)}$$
at the point $(0, 0, 1)$.

3. Find the Taylor series of the function
$$f(x) = \frac{x^{17}}{2 + x^2}.$$

4. Find the interval of convergence for the power series

a) $\displaystyle\sum_{n=0}^{\infty} x^n$, b) $\displaystyle\sum_{n=0}^{\infty} \frac{x^n}{n!}$.

5. Find the distance from the point $(1, 7, -2)$ to the plane defined by $2x - 3y + z = 4$.

6. Given that the position of a particle at time t is defined by $\mathbf{r}(t) = t\mathbf{i} - e^t\mathbf{j}$, find the component of the acceleration normal to the velocity vector.

7. Find the area of the triangle with vertices $(1, 0, 0)$, $(0, 1, 0)$, $(0, 0, 1)$.

1	2	3	4	5	6	7	total (140)