Math 241, Spring 1998, exam 4

PRINT Your Name:_____

There are 7 problems on 4 pages. Problems 1 and 2 are worth 15 points each. Each of the other problems is worth 14 points. SHOW your work. $\boxed{CIRCLE}$ your answer. **NO CALCULATORS!** CHECK your answer, whenever possible.

1. Find the maximum of $f(x,y) = xy$ on $x^2 + y^2 = 1$.

2. Find the absolute extreme points of $f(x,y) = x^2 + y^2$ on $\{(x,y) \mid -1 \le x \le 3,\ -1 \le y \le 4\}$.

3. Find the volume of the solid which is bounded by $z = 9 - x^2 - y^2$ and $z = 0$.

4. Find the area inside $r = 4\sin\theta$ and outside $r = 2$.

5. Find the volume of the solid which is bounded by $x = 0$, $y = 0$, $z = 0$, and $x + 2y + 3z = 6$.

6. Find the volume of the solid which is bounded by $z = \sqrt{9 - x^2 - y^2}$ and $z = \sqrt{x^2 + y^2}$.

7. Find the volume of the intersection of $x^2 + y^2 + (z-6)^2 \le 16$ and $x^2 + y^2 + z^2 \le 16$.