MATH 22005 HOMEWORK #2 (10 pts) SPRING 2006
SHOW ALL WORK FOR FULL CREDIT — PLEASE CIRCLE FINAL ANSWER

DUE: TUESDAY, FEBRUARY 7, 2006 AT THE BEGINNING OF CLASS

1. (1 pt each) Sketch the graph of each function. Label your graph.

   (a) $f(x, y) = 5 - x^2 - y^2$

   (b) $f(x, y) = -\sqrt{16 - x^2 - 16y^2}$

2. (1 pt) Find and sketch the domain of each function.

   (a) $f(x, y) = 4\sqrt{y - x}\ln(x + y)$

   (b) $f(x, y) = \dfrac{4x + 3y}{5x - 2y} + \ln(2x^2 + 2y^2 - 8)$

3. (2 pts) A particle starts at the origin with initial velocity $\mathbf{i} - \mathbf{j} + 3\mathbf{k}$. Its acceleration is $\mathbf{a}(t) = 6t\mathbf{i} + 12t^2\mathbf{j} - 6t\mathbf{k}$. Find its position function.

4. (1 pt each) A particle has a position function $\mathbf{r}(t) = t\mathbf{i} + \cos^2 t\mathbf{j} + \sin^2 t\mathbf{k}$.

   (a) Find the tangential component of the acceleration vector.

   (b) Find the normal component of the acceleration vector.

5. (2 pts) Sketch the contour map of the function $f(x, y) = x^2 + 16y^2$. Label your graph.