PRINT Your Name:

There are 10 problems on 5 pages. Each problem is worth 5 points. SHOW your work. [CIRCLE] your answer. NO CALCULATORS!

I will put your exam outside my office door by noon on Friday. You may pick it up any time before class on Monday. If I know your e-mail address, I will e-mail your score on Exam 2 to you.

1. Graph and describe the graph of $xy = 0$ in 3-space.

   The graph is the union of the $yz$ plane (when $x > 0$) together with the $xz$ plane (when $y > 0$).

2. Graph and describe the graph of the curve whose position vector is

   $$\mathbf{r}(t) = \cos t \mathbf{i} + t \mathbf{j} + \sin t \mathbf{k}$$

   in 3-space.

   This is $x = \cos t$. If we ignore the $y$-coordinate on a screen, the graph looks like a circle in the $xz$ plane. Now let's think about this $x$-coordinate. The $x$ and $y$ coordinates run around a circle and $y$ is growing with time. We have a helix which lies on a cylinder with the $y$-axis down its center.