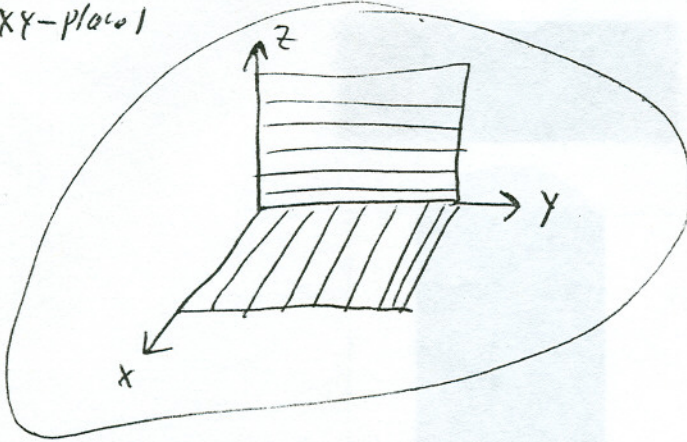


PRINT Your Name: \_\_\_\_\_

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

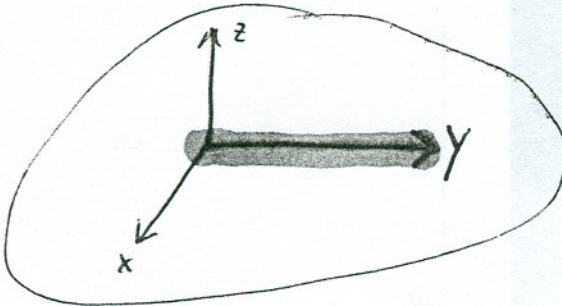
1. Graph and describe the graph of  $xz = 0$  in 3-space.

The graph is the union of the planes  $x=0$  (this is the  $yz$ -plane) and  $z=0$  (this is the  $xy$ -plane)



2. Graph and describe the graph of  $x^2 + z^2 = 0$  in 3-space.

In this graph  $x$  must be zero,  $z$  must be zero, and  $y$  can be anything. This is the  $y$ -axis



3. Graph and describe the graph of  $x^2 + z^2 = 1$  in 3-space.

In the  $xz$  plane, this is a circle with center  $(0,0)$  and radius 1. In 3-space it is a cylinder

