In Class Work

1. Consider the surface $-x^2 - y^2 + z^2 = 1$

   (a) Sketch the traces in the yz-plane, the xz-plane, and the planes $z = 0$, $z = \pm 1$, $z = \pm 5$.

   (b) Use your traces to sketch a graph of the surface.

   (c) Check your sketch on Maple. Experiment with the following two ways of displaying this surface:

   ```
   implicitplot3d(-x^2-y^2+z^2=1,x=-2..2, y=-3..3, z=-3..3);
   ```

   and

   ```
   plot3d([sqrt(1+x^2+y^2),-sqrt(1+x^2+y^2)], x=-3..3, y=-3..
   ```

   Experiment with making the circular cross-sections of the graph more apparent by adjusting the z-range:
   right-click on the graph, then select `axes - properties` and then play around with the interval for z.
   This surface a **hyperboloid of two sheets**.

2. Consider the surface $z = x^2 - y^2$.

(a) Sketch the traces in the yz-plane, the xz-plane, the xy-plane and the planes $z = \pm 1$, $z = \pm 2$.

(b) Use your traces to sketch a graph of the surface.

(c) Check your sketch on Maple. Again, experiment with `implicitplot3d` versus `plot3d`.

This is a **hyperbolic paraboloid**.