VECTORS

**PROBLEM TYPES**

1. SURFACE REPRESENTATION
   1. What surfaces are represented by z=3?
      1. All points on the x-y plane where z = 3
   2. Y=5?
      1. All points on x-z plane where y = 5
2. SATISFYING EQUATIONS
   1. (x^2) + (y^2) = 1 , z=3
      1. Know difference between = and <
      2. Horizontal plane at z=3, circle with radius 1
   2. What does the EQ (x^2) + (y^2) = 1 represent in terms of surfaces?
      1. Since we have no restriction on z, this is a circular cylinder with radius 1 covering the whole z axis
3. DISTANCE BETWEEN POINTS
   1. Know distance formula
      1. |PQ| = sqrt ((x-x1)^2)+((y-y1)^2)+((z-z1)^2)
4. EQ OF SPHERE
   1. ((x-h)^2)+((y-k)^2)+((z-l)^2)=r^2
   2. Completing the square with quadratic peices
   3. h, k and l fall off if circle is centered at origin
5. What region is represented by 1 < (x^2) + (y^2) + (z^2) < 4 and z < 0
   1. Since z is less than or equal to 0, we are negative in that plane
   2. Square rooting everything gives us the radius’s of 1 and 2
   3. So we have the area of spheres under the z axis who’s radius’s are between 1 and 2

**CHAPTER SUMMARY**