Lyell C Read CHAPTER 12.1, 12.2 REVIEW 10/16/2018

12.1 PLANES IN 3D

- Eq. for a plane by Point (P_0) and normal ($\vec{n}$), and (P)

  $P=(x,y,z)$ $P_0=(x_0,y_0,z)$ $n=\langle a,b,c\rangle$

  $\rightarrow ax+by+cz = ax_0+by_0+cz_0$

- Eq for a plane with two vectors $\vec{v}_1$, $\vec{v}_2$

  $\rightarrow \vec{n} = v_1 \times v_2$

- Eq for a plane with three points P, Q, X

  $\rightarrow v_1 = \vec{PQ}$ $v_2 = \vec{PX}$ $P="P_0"$, $\vec{n} = \vec{PQ} \times \vec{PX}$

- Axis Intersections: x axis: $y=0, z=0$ y axis: $x=0, z=0$

  z axis: $x=0, y=0$

- Plane Intersection XY: $z=0$, XZ: $y=0$, YZ: $x=0$

- Parallel Planes: have $\vec{n}$ that is a scalar factor of $\vec{n}_1$

- Perpendicular Planes: $\vec{n}_1 \cdot \vec{n}_2 = 0$

- Line of intersection of two planes: substitute $z=0$ and solve sim eq's. $P_0=(x,y,0)$. find cross product of normals for direction.

- Norm ($\vec{n}$) from $n_1x+n_2y+n_3z=\ldots$ $\vec{n}=\langle n_1,n_2,n_3\rangle$

12.2 3D FUNCTIONS AND LEVEL CURVES

- Graphing: Make shadows in applicable planes, substituting & where applicable (Planes XY, XZ, YZ, See above)

- Level Curves: $z=\alpha$ (α for any value), solve for y and graph in XY

- Domain: all values of x and y that make eq valid, Range: Output (z)