Normal To Plane

- If given the equation of a plane, $ax + by + cz = d$, one can produce a normal simply by pulling off the coefficients: $\langle a, b, c \rangle$.

- If the plane is tangent to a level surface of a function $f$ one may evaluate $\nabla f$ at the point of tangency.

Dean’s Method

One can take any two vectors in the plane and cross them.

S.T.P.

- The Scalar Triple Product of vectors $a, b, c$ is $a \cdot (b \times c)$.
- The S.T.P represents the volume of the parallelepiped determined by the vectors in question.

- The S.T.P also represents the amount of effective force exerted by a pressure represented by $\mathbf{a}$ on a surface represented by $\mathbf{b}$ and $\mathbf{c}$.

**Gradient**

- The gradient is an operation that takes a function and gives a vector field.

- The gradient represents the direction of steepest ascent, and the size of that ascent.
• The gradient of a function $f$ at $p$ gives a vector orthogonal to the level surface $f(x, y, z) = f(p)$.

• The gradient is calculated as $\nabla f = \frac{\partial f}{\partial x} \mathbf{i} + \frac{\partial f}{\partial y} \mathbf{j} + \frac{\partial f}{\partial z} \mathbf{k}$