

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 ∇f at the point of tangency.

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

S.T.P.

- The Scalar Triple Product of vectors \mathbf{a} , \mathbf{b} , \mathbf{c} is $\mathbf{a} \cdot (\mathbf{b} \times \mathbf{c})$.

- 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 a on a surface represented by b and 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 $\nabla f = \frac{\partial f}{\partial x}\mathbf{i} + \frac{\partial f}{\partial y}\mathbf{j} + \frac{\partial f}{\partial z}\mathbf{k}$