**a)**

If and intersect, there is a point that lies on both lines. There must be such that:

*and are only distinguished for legibility*

If and intersect, there is a point that lies on both lines. There must be such that:

If and intersect, there is a point that lies on both lines. There must be such that:

Therefore, , which is a point on and

If and are in the plane they describe, the normal to the plane must be perpendicular to and

*Cross product*

, which is a point on the plane

*Dot product*

**b)1**

is the vector perpendicular to the plane, where

*Convert into normal vectors*

*Cross Product*

*Find a point on the line. Choose the arbitrary point where*

*Use matrix to solve system of equations*

*Multiply both sides of the matrix equations with the inverse*

Therefore, a point that passes through the plane is

Therefore, the equation for the line of intersection of two planes

**c i)**

is a Cone (top portion)

is an Elliptic Paraboloid

is a Hyperbolic Hyperboloid

**c ii)**

Intersection where

The intersection of and is a circle

**d)**

Given ,

**Epsilon-Delta definition**

Multi variable

If

Then

*Because . This will always be a positive number*

*As the coordinate system approaches some random coordinate point the limit is L*

Prove from first principles that

If

Then

*Substitute =-1, ,*

If

Then

*Substitute , .*

*Add and for extra constants created by substitution*

If

Then

If

Then

From the Epsilon-Delta definition above, we now must find some relationship between and

or

Now we can start with the calculation using the function

*triangle inequality*

*Substitute ,*

From our earlier definition

If

Then

But for any if , then

Therefore

*Substitute*

If

Then

*Multiply all expressions by 6*

If

Then

If

Then

We can see that for any . Therefore