**Warm up: Find the distance between two lines**

**Given :  and **

 **The Equation of a Plane**

**To determine a line we need \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ OR \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**To determine a plane we need**

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ OR \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ OR \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

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| --- | --- |
| Suppose plane  contains point A and **b** and **c** are non-parallel vectors in . Let R be any point on . | **Vector Equation of a Plane** |
| Suppose R(x, y, z) is on plane  containing a known point A(x1, y1, z1) and  has normal vector **n** = a**i** + b**j** + c**k**.  | **Cartesian Equation of a Plane** Equation of Plane using a normal vector. |

Example 1) Find the equation of the plane containing A(1, 5, -2), B(-7, 12, 3), & C(4, -8, 9) in

a. Vector Form

b. Cartesian Form

Example 2) State the normal vector to the plane with equation 5x – 12y – 42z = 17.

Example 3) Write the equation of a plane  into a Cartesian form.

Example 4) Find an equation for the plane with normal vector  contains the point (7, -2, 1)