1. Determine whether or not the following lines intersect. If they do, find the point of intersection.
   $\mathbf{r_1} = (3+t)\mathbf{i} + (3-3t)\mathbf{j} + (-t)\mathbf{k}$
   $\mathbf{r_2} = (1+t)\mathbf{i} + (6t)\mathbf{j} + \mathbf{k}$

2. Find the equation of the plane passing through $(1,0,0)$, $(0,1,0)$, and $(0,0,1)$

3. Find the equation of the plane passing through $(-1,2,6)$, $(-1,-1,1)$, and $(0,-1,2)$

4. Find the distance between the point $P(1,2,3)$ and the plane defined by $4x - y - 2z = 3$

5. Find the distance between the point $P(-1,-1,-1)$ and the plane defined by $-x + 2y - 5z = 1$

(6-8) Determine whether the following planes are Parallel, Identical, or Intersecting, or Skew. If intersecting, find the line where they intersect.

6. $3x + 4y - z = 1$
   $x - y + 5z = 6$

7. $16x + 4y - 12z = 20$
   $12x + 3y - 9z = 15$

8. $2x + 6y - 10z = 4$
   $-5x - 15y + 25z = 4$

9. Find the limit: $\lim_{t \to \infty} e^{-t}\mathbf{i} + \dfrac{4t^2 + 5}{2t^2 + t}\mathbf{j} + \tan^{-1}(t)\mathbf{k}$

10. Find the derivative, $\mathbf{T}$, $\mathbf{N}$, $\mathbf{B}$, and the osculating plane for $f(t) = \cos(t)\mathbf{i} + \sin(t)\mathbf{j} + t\mathbf{k}$