## EXAM 2 - MATH 251 YOUR NAME:

Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Find the distance between the parallel planes x + 4y - z = 10 and 3x + 12y - 3z = 1.



2. Find an equation for the plane containing the lines  $\mathbf{r}_1(t) = \langle t, 2t, 3t \rangle$  and  $\mathbf{r}_2(t) = \langle 3t, t, 8t \rangle$ .



3. Find an equation for the plane passing through the point (1, 1, 1) that is perpendicular to the two planes x + y = 3 and x + 2y - z = 4.



4. Find a vector equation for the tangent line to the curve  $\mathbf{r}(t) = \langle 1 - t^2, 5t, 2t^3 \rangle$  at t = 2.



5. Suppose a moving object has velocity  $\mathbf{v}(t) = e^{3t}\mathbf{i} + 2t \ln t\mathbf{j} + \frac{2}{t^3}\mathbf{k}$  for t > 0. If the object is at the point  $(e^3, 1, 2)$  at time t = 1, what is its position vector  $\mathbf{r}(t)$  at time t?

