

Problem 3. (10 pts) The line L parametrized by $\vec{r}(t) = \langle 3t + 1, 1 - 3t, 3t + 1 \rangle$ intersects the plane which contains $(0, 0, 4)$ and is perpendicular to the vector $\langle -1, 1, 1 \rangle$ at the point

- A. $\vec{r}(-2)$
- B. $\vec{r}(-1)$
- C. $\vec{r}(0)$
- D. $\vec{r}(1)$
- E. None of the above

$$\begin{aligned} \text{PLANE: } & -x + y + (z - 4) = 0 \\ & -(3t + 1) + (1 - 3t) + (3t - 3) = 0 \\ & -3t - 3 = 0 \\ & t = -1 \end{aligned}$$

Problem 4. (10 pts) Consider the line L in Problem 3 above and consider the planes $x + 2y + z - 3 = 0$ and $x + 2y + z - 5 = 0$.

- A. The line L intersects one of the planes exactly in one point.
- B. The line L intersects both planes.
- C. The line L does not intersect the two planes.
- D. The line L lies in one of the two planes.
- E. None of the above

$$\begin{aligned} x + 2y + z &= 3t + 1 + 2(1 - 3t) + 3t + 1 \\ &= 4 \neq 3 \\ &\quad \neq 5 \end{aligned}$$