Worksheet For DLS 201/210 Section 1.5

Problem 1: $\begin{cases} x_1 + 4x_2 - 5x_3 = 0 \\ 2x_1 - x_2 + 8x_3 = 9 \end{cases}$ Find the general solution, write it as parametric vector form. then describe the meaning of it (. that means describe the intersection of the 2-planes)

Problem 2: Describe the solution in parametric vector form

$$\begin{cases} x_1 + 3x_2 - 5x_3 = 4 \\ x_1 + 4x_2 - 8x_3 = 7 \\ 2x_1 + x_2 - 2x_3 = 8 \end{cases}$$

Problem 3: Quick Questions

(1) True or False

(a) A homogeneous equation is always consistent

(b) If $Ax = 0$ only have trivial solution. then $Ax = b$ has at most one solution

(c) The equation $Ax = b$ is homogeneous if the solution set pass through the origin

(d) if A is 3x3 zero matrix. then the solution set of $Ax = 0$ is $\mathbb{R}^3$

(2) Construct a matrix (3x3 nonzero) such that the vector $\begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$ as a solution of $Ax = 0$

(3) Can you find a vector $\underline{b}$ in $\mathbb{R}^3$ not spaned by $\underline{a_1}$ $\underline{a_2}$?

$\underline{a_1} = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$ $\underline{a_2} = \begin{pmatrix} 3 \\ 4 \\ 5 \end{pmatrix}$