Dawson College: **Linear Algebra** (SCIENCE): 201-NYC-05-S1: Winter 2024: **Quiz 11** name: _____

Books, watches, notes or cell phones are **not** allowed. The **only** calculators allowed are the Sharp EL-531**. You **must** show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

Question 1. Given the line $\mathscr{L} : (x,\ y,\ z) = (2,\ 2,\ 3) + t(1,\ -1,\ -3)$ where $t \in \mathbb{R}$, the plane $\mathscr{P} : 3x - 2y + 2z = 7$ and the point $A(1,1,1)$.

a. *(4 marks)* Find parametric equations of the line which contains A, intersects $\mathscr{L}$ and which is parallel to $\mathscr{P}$.

b. *(4 marks)* Find parametric equations of the line which contains A and which intersects $\mathscr{L}$ at a right angle.

Question 2. *(4 marks)* If $(3,\ -2,\ 1)$ is a particular solution of $A\mathbf{x} = \mathbf{b}$ and $\mathbf{x} = t(1,\ 3,\ -2)$ where $t \in \mathbb{R}$ is the solution set of $A\mathbf{x} = \mathbf{0}$. Give a geometric interpretation of the system $A\mathbf{x} = \mathbf{0}$ and its solution set. Determine whether $\mathbf{x} = (4,\ 1,\ -1) + t(-2,\ -6,\ 4)$ where $t \in \mathbb{R}$ is the solution set of $A\mathbf{x} = \mathbf{b}$, justify.