Dawson College: **Linear Algebra** (SCIENCE): 201-NYC-05-S7: Fall 2022: **Quiz 10** 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. *(4 marks)* Given $\mathscr{P}_1 : 6x-3y+6z=-3$ and $\mathscr{P}_2 : 4x-2y+4z=2$. Determine whether $P(1,2,1)$ is between $\mathscr{P}_1$ and $\mathscr{P}_2$.

Question 2. Given $\mathscr{L}_1 : \mathbf{x} = (1,2,1)+t(2,-1,1),\ t \in \mathbb{R}$ and $\mathscr{L}_2 : \mathbf{x} = (3,3,3)+t(-4,2,-2),\ t \in \mathbb{R}$

a. *(4 marks)* Find the equation of the line that passes throught the point $(3,3,3)$ and intersect perpendicularly $\mathscr{L}_1$.

b. *(2 marks)* Find the parametric equation of the plane that contains $\mathscr{L}_1$ and $\mathscr{L}_2$.

Question 3. If the statement is false provide a counterexample. If the statement is true provide a proof of the statement.

1. *(3 marks)* The general solution of the nonhomogeneous linear system $A\mathbf{x} = \mathbf{b}$ can be obtained by adding $\mathbf{b}$ to the general solution of the homogeneous linear system $A\mathbf{x} = \mathbf{0}$.

Question Bonus. *(2 marks)* A former Prime Minister of Canada defined a proof as

> I don't know — a proof is a proof. What kind of a proof? It's a proof. A proof is a proof, and when you have a good proof, it's because it's proven.

In your own words correctly define proof.