Dawson College: **Linear Algebra** (SCIENCE): 201-NYC-05-S5: Winter 2017

Name: ____________________

Quiz 9

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. §3.4 #23

a. *(3 marks)* Find a homogeneous linear system of two equations in three unknowns whose solution space consists of those vectors in $\mathbb{R}^3$ that are othogonal to $\vec{a} = (1,1,1)$ and $\vec{b} = (-2,3,0)$.

b. *(2 marks)* What kind of geometric object is the solution space?

Question 2. §3.5 #35 *(5 marks)* Show that if $\vec{u}, \vec{v}$ and $\vec{w}$ are vectors in $\mathbb{R}^3$, no two of which are collinear, then $\vec{u} \times (\vec{v} \times \vec{w})$ lies in the plane determined by $\vec{v}$ and $\vec{w}$.

Question 3. *(2.5 marks)* Prove: If $AX = 0$ for some $X \neq 0$, then $\det(A) = 0$.

Question 4. *(2.5 marks)* Prove or disprove: There does not exist an $n \times n$ matrix A where n is odd such that $A^2 + I = 0$.