**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 #21

a. *(3 marks)* The equation $x+y+z=1$ can be viewed as a linear system of one equation in three unknowns. Express a general solution of this equation as a particular solution plus a general solution of the associated homogeneous system.

b. *(2 marks)* Give a geometric interpretation of the result in part a.

**Question 2.** §3.5 # 29 *(5 marks)* Prove: If $\vec{a},\vec{b},\vec{c}$ and $\vec{d}$ lie in the same plane, then $(\vec{a}\times\vec{b})\times(\vec{c}\times\vec{d})=\vec{0}$.

**Question 3.** *(3 marks)* Prove: There does not exist $n \times n$ invertible matrices $A$ and $B$ where $A$ is symmetric, $B$ is skew symmetric, $n$ is odd such that $AB$ is symmetric.

**Question 4.** *(2 marks)* Prove or disprove: There does not exist two unit vectors $\vec{u}$, $\vec{v} \in \mathbb{R}^n$ such that $\vec{u} \cdot \vec{v} = -2$.