# MATH 2270: QUIZ 2

**1. (2 points)** Describe the solution set of $x_1 - 3x_2 + 5x_3 = 0$ by writing it as the span of a set of vectors.

**2. (4 points)** Consider matrices:
$$A = \begin{pmatrix} 0 & 0 & -3 \\ 0 & 5 & 4 \\ 2 & -8 & 1 \end{pmatrix}, \ B = \begin{pmatrix} 1 & 4 & -3 & 0 \\ -2 & -7 & 5 & 1 \\ -4 & -5 & 7 & 5 \end{pmatrix}.$$
Are the columns of $A$ linearly independent? Are the columns of $B$ linearly independent? Explain your reasoning (Hint: Don't do row or column operations unless you have to - this problem is designed so that the computation is really minimal.)

**THERE ARE PROBLEMS ON THE BACK SIDE OF THIS QUIZ**

**3. (1 point each)** Short answer (no justification needed).

Let $A$ be a $3 \times 6$ matrix and $\mathbf{b}$ be a vector in $\mathbb{R}^3$. Answer True or False to the following:

A) The equation $A\mathbf{x} = \mathbf{b}$ always has at least one solution.

B) If $A$ is a $3 \times 6$ matrix then the equation $A\mathbf{x} = \mathbf{0}$ always has infinitely many solutions.

C) If $\mathbf{p}$ is one particular solution to $A\mathbf{x} = \mathbf{b}$ then there are infinitely many solutions to $A\mathbf{x} = \mathbf{b}$.

D) The columns of $A$ are linearly dependent.