You have 20 minutes to complete this quiz. To receive full credit, you must justify your answers.

Name : _____

1. (5 points) What are the dimensions of the null space and column space of

$$A = \begin{bmatrix} 1 & -1 & 7 \\ 2 & 1 & 8 \\ 3 & 3 & 9 \end{bmatrix}$$

2. (5 points) If an $m \times n$ matrix A has rank k, find the dimension of the null space of A^T.