Math 3280 Worksheet 30: Row space, column space, nullspace, range

Group members (2 to 4):

All of the questions below concern the following matrix:

$$A = \begin{pmatrix} 1 & -1 & -1 & 4 & 2 \\ 2 & -2 & 1 & 2 & -5 \\ 3 & -3 & 0 & 6 & -3 \end{pmatrix}$$

(1) What is the dimension of the span of the rows of A?

(2) Find a basis for the nullspace (kernel) of A. The nullspace is the subspace of vectors sent to 0 by A, i.e.  $\{x \text{ such that } Ax = 0\}$ .

(3) What is a basis for the span of the columns of A?