

Name: _____

MA242, Quiz #2
Spring 2009

a) Show that the vector $\begin{pmatrix} 7 \\ 12 \\ 2 \end{pmatrix}$ is in the span of the vectors $\begin{pmatrix} 3 \\ 4 \\ -1 \end{pmatrix}, \begin{pmatrix} -2 \\ 0 \\ 5 \end{pmatrix}$.

Ans:

$$\begin{pmatrix} 7 \\ 12 \\ 2 \end{pmatrix} = 3 \begin{pmatrix} 3 \\ 4 \\ -1 \end{pmatrix} + 1 \begin{pmatrix} -2 \\ 0 \\ 5 \end{pmatrix}$$

b) Show that the vector $\begin{pmatrix} 2 \\ -7 \\ -18 \end{pmatrix}$ is *not* in the span of the vectors $\begin{pmatrix} 3 \\ 4 \\ -1 \end{pmatrix}, \begin{pmatrix} -2 \\ 0 \\ 5 \end{pmatrix}$.

Ans:

The augmented matrix is row equivalent to e.g.

$$\begin{pmatrix} 1 & -5 & 18 \\ 0 & 20 & -79 \\ 0 & 13 & -52 \end{pmatrix}$$

which has no solution, as the last two lines are contradictory: $20x_2 = -79$ and $13x_2 = -52$ have no solution. Alternatively, the RREF form of the augmented matrix is of the form

$$\begin{pmatrix} 1 & * & * \\ 0 & * & * \\ 0 & * & \square \end{pmatrix}$$

with $\square \neq 0$. The last line of this matrix is $0x_1 + 0x_2 = \square$, which has no solution.