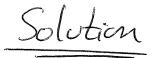
Homework 10 Section 3 MATH 304

Assigned:

Monday, October 13.

Potentially Collected:

Monday, October 20.



1. Which of the following vectors in \mathbb{R}^3 are linearly dependent? For those which are, express one vector as a linear combination of the rest.

(i)
$$\left\{\begin{bmatrix}1\\1\\0\end{bmatrix},\begin{bmatrix}0\\2\\3\end{bmatrix},\begin{bmatrix}1\\2\\3\end{bmatrix},\begin{bmatrix}3\\6\\6\end{bmatrix}\right\}$$
 in RREF $\left[\begin{bmatrix}1&0&0&2\\0&1&0&1\end{bmatrix}\right]$ $\left[\begin{bmatrix}3\\6\\6\end{bmatrix}\right] = 2\left[\begin{bmatrix}0\\1+1\end{bmatrix}\left[\frac{3}{3}\right]$

(ii)
$$\left\{ \begin{bmatrix} 1\\1\\0 \end{bmatrix}, \begin{bmatrix} 3\\4\\2 \end{bmatrix} \right\}$$
.

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$$\left\{ \begin{bmatrix} 1\\1\\0 \end{bmatrix}, \begin{bmatrix} 3\\4\\2 \end{bmatrix} \right\}$$
.

(iii) $\left\{ \begin{bmatrix} 1\\1\\0 \end{bmatrix}, \begin{bmatrix} 3\\4\\2 \end{bmatrix}, \begin{bmatrix} 1\\2\\3 \end{bmatrix}, \begin{bmatrix} 0\\0\\0 \end{bmatrix} \right\}$. in RREF $\begin{bmatrix} 0\\0\\0\\0 \end{bmatrix}$ \underbrace{LI}

2. For what values of
$$c$$
 are the vectors $\vec{v_1} = \begin{bmatrix} -1 \\ 0 \\ -1 \end{bmatrix}$, $\vec{v_2} = \begin{bmatrix} 2 \\ 1 \\ 2 \end{bmatrix}$, and $\vec{v_3} = \begin{bmatrix} 1 \\ 1 \\ c \end{bmatrix}$ linearly dependent?

3. For what values of c are the vectors x + 3 and $2x + (c^2 + 2)$ in P_1 , the vector space of degree 1 polynomials, linearly independent?

$$\begin{bmatrix}
-1 & 2 & 1 \\
0 & 1 & 1
\end{bmatrix} G = R_3 \cdot R_1 \begin{bmatrix}
-1 & 2 & 1 \\
0 & 0 & 1
\end{bmatrix}$$
There will be a free variable when $C - 1 = C$

$$\Rightarrow C = 1$$

3) To be LD there must be a nontrivial solution to

$$O = a(x+3) + b(2x+(c^{2}+2)) \Rightarrow O = (a+2b)x + (3a+bc^{2}+2b)$$

$$\Rightarrow a+b=0 \Rightarrow \begin{cases} 1 & 1 & 0 \\ 3 & c+2 & 0 \end{cases} = \begin{cases} 1 & 1 & 0 \\ 3 & c+2 & 0 \end{cases} = \begin{cases} 1 & 1 & 0 \\ 0 & c+2 &$$

· | So to be LI, C+±1/