Tutorial questions- 10

Let $A=\begin{bmatrix}1 & 0\\0 & 2\end{bmatrix}$, $B=\begin{bmatrix}0 & 1\\1 & 0\end{bmatrix}$. Determine if A and B are in

$$\operatorname{span}\{M_1, M_2\}=\operatorname{span}\left\{\begin{bmatrix}1 & 0\\0 & 0\end{bmatrix},\begin{bmatrix}0 & 0\\0 & 1\end{bmatrix}\right\}$$

Show that $p(x)=7x^2+4x-3$ is in $\operatorname{span}\{4x^2+x, x^2-2x+3\}$.

Let $S=\{x^2+1, x-2, 2x^2-x\}$

. Show that S is a spanning set for $\mathbb{P}_2$, the set of all polynomials of degree at most 2.

Determine whether the polynomial $p_1=1-x+2x^2$,
$p_2=5-x+4x^2$, $p_3=-2+-2x+2x^2$ span P_2.

For Problems 1–3, determine whether the given set of vectors spans $\mathbb{R}^2$.

1. $\{(1,-1), (2,-2), (2,3)\}$.
2. $\{(2,5), (0,0)\}$.
3. $\{(6,-2), (-2, 2/3), (3,-1)\}$.

Show that $\mathbf{v}_1=(-1,3,2)$, $\mathbf{v}_2=(1,-2,1)$, $\mathbf{v}_3=(2,1,1)$ span $\mathbb{R}^3$, and express $\mathbf{v}=(x,y,z)$ as a linear combination of $\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3$.

Determine whether the vectors

$$\mathbf{v}_1 = (1, -1, 4),\ \mathbf{v}_2 = (-2, 1, 3),\ \text{and } \mathbf{v}_3 = (4, -3, 5)$$

span $\mathbb{R}^3$.

Determine if the given set of vectors is a linearly independent set in $\Re^3$.

1. $\{(\mathbf{2, 1, 5}), (\mathbf{4, 1, 10})\}$
2. $\{(\mathbf{0, 0, 0}), (\mathbf{-6, 4, -5})\}$
3. $\{(\mathbf{2, 1, 5}), (\mathbf{4, 1, 10}), (\mathbf{4, -1, 10})\}$
4. $\left\{(\mathbf{3, -2, \tfrac{5}{2}}), (\mathbf{-6, -4, -5}), (\mathbf{1, 2, 0})\right\}$