MATH2210Q - Quiz #2 Name:

For full credit, you must show all work and circle your final answer.

$\boxed{1}$ Calculate the determinants for the following matrices.

(a) $A = \begin{bmatrix} 1 & 2 & 0 & 4 & -1 \\ 3 & 1 & 0 & 3 & 0 \\ 2 & 2 & 0 & -2 & 2 \\ 6 & -3 & 0 & 3 & -1 \end{bmatrix}$

A is 4×5 det A is undefined

(b) $B = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 3 & 5 & 0 & 0 \\ 2 & 2 & 2 & 0 \\ 8 & -3 & 0 & 3 \end{bmatrix}$

$\det B = 1 \cdot 5 \cdot 2 \cdot 3 = 30$

2 (a) Compute $\det\left(\begin{bmatrix}1&0&0\\3&2&0\\1&2&2\end{bmatrix}\cdot\begin{bmatrix}3&2&0\\0&1&2\\0&1&1\end{bmatrix}\right)$

$A = \begin{bmatrix}1&0&0\\3&2&0\\1&2&2\end{bmatrix}$ $B = \begin{bmatrix}3&2&0\\0&1&2\\0&1&1\end{bmatrix}$

$\det A = 4$ $\det B = 3\det\begin{bmatrix}1&2\\1&1\end{bmatrix} = -3$

$\det(AB) = -12$

(b) Is the following matrix invertible?

$$A = \begin{bmatrix}1&2&3\\2&-1&1\\0&0&0\end{bmatrix}$$

A has a zero row $\det A = 0$

so A is not invertible

3 Consider the vector space $\mathbb{P}_2(t)$.

(a) Are $\mathbf{p}_1(t) = 3$, $\mathbf{p}_2(t) = 2 - 4t$, and $\mathbf{p}_3(t) = 5t$ linearly independent?

No, $\vec{p}_2(t) = \frac{2}{3}\vec{p}_1(t) - \frac{4}{5}\vec{p}_3(t)$

(b) Write a basis for the subspace $H = \text{span}\{\mathbf{p}_1(t), \mathbf{p}_2(t), \mathbf{p}_3(t)\}$.

$\vec{p}_1$ & $\vec{p}_3$ are linearly indep

Basis for $H = \{\vec{p}_1(t), \vec{p}_3(t)\}$