

Math 322
February 28, 2017

Names: _____

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

a. Find $\det A$ using cofactor expansion about the second column.

b. Find $\det A$ by using row reduction to echelon form.

2. Let H be a subspace with basis $\mathcal{B} = \left\{ \begin{bmatrix} 3 \\ 1 \\ -7 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ -2 \end{bmatrix} \right\}$. Find the \mathcal{B} -coordinate vector of

$$\mathbf{x} = \begin{bmatrix} 2 \\ 2 \\ -6 \end{bmatrix}.$$

3. If $\det \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} = 12$, find $\det \begin{bmatrix} 3a & 3b & 3c \\ g & h & i \\ d & e & f \end{bmatrix}$. (Justify)

4. If A is invertible, show that $\det(A^{-1}) = \frac{1}{\det A}$. *Hint:* What is $\det I_n$?