QUIZ 7 Math 304-06   Print your name _____
Oct. 23, 2023

No consultation!—that includes no electronics.

(1) (3 points each) A, B are $n \times n$ matrices. Circle your answer: true or false.

   (a) True   False $\det A = \det(A^{-1})$.

   (b) True   False $\det A = \det(A^T)$.

   (c) True   False $\det A = 1$ if $A = I_n$.

   (d) True   False $\det A = 1$ is impossible if $A \neq I_n$.

   (e) True   False $\det(AB) = (\det A)(\det B)$.

   (f) True   False   If E is the elementary matrix that interchanges rows i and j
       (where $i \neq j$), then $\det E = -1$.

(2) (12 points) A linear transformation $T : \mathbb{R}^2 \to \mathbb{R}^2$ has the matrix $[T]_{\mathcal{B}} = \begin{bmatrix} 1 & 3 \\ 1 & -1 \end{bmatrix}$
   with respect to the basis $\mathcal{B} = \{\mathbf{b}_1, \mathbf{b}_2\}$ where $\mathbf{b}_1 = \begin{bmatrix} 3 \\ 0 \end{bmatrix}$ and $\mathbf{b}_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$. Problem:
   Evaluate $T(\mathbf{x})$ where $\mathbf{x} = \begin{bmatrix} 4 \\ 2 \end{bmatrix}$.