

Quiz 1/test prep 1
(front and back)

Name: _____
(please print neatly!)

Directions: Answer each of the following questions. Make sure to read the instructions for each question as you proceed. *For multiple choice questions, indicate your choice(s) by circling/drawing a box around the appropriate selection(s).*

Throughout, let

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 0 & 1 & 1 \end{pmatrix} \quad B = \begin{pmatrix} -1 & 2 \\ 1 & 3 \end{pmatrix} \quad C = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \quad \mathbf{v} = \begin{pmatrix} 1 \\ -1 \\ 3 \end{pmatrix}.$$

1. Compute each of the following or state that it does not exist. If it does not exist, please indicate why!

(a) $A + C$

(b) $B - 2C$

(c) AB

(d) BA

(e) $\mathbf{v}A$

(f) $A\mathbf{v}$

2. Which of the following matrices are in Row Echelon Form (REF)? **Hint:** There may be more than one but there may also be none!

(a) $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

(d) $\begin{pmatrix} 1 & -1 & 0 \\ 0 & 1 & 2 \end{pmatrix}$

(b) $\begin{pmatrix} 0 & 0 \\ 2 & 2 \\ 0 & -5 \end{pmatrix}$

(e) $\begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$

(c) $\begin{pmatrix} 0 & 2 & 2 \\ 0 & 0 & 1 \end{pmatrix}$

(f) $\begin{pmatrix} 0 & 0 & 2 & 2 \\ 0 & 0 & 0 & 1 \end{pmatrix}$

3. Which of the following matrices are in Reduced Row Echelon Form (RREF)? **Hint:** There may be more than one but there may also be none!

(a) $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

(d) $\begin{pmatrix} 1 & -1 & 0 \\ 0 & 1 & 2 \end{pmatrix}$

(b) $\begin{pmatrix} 0 & 0 \\ 2 & 2 \\ 0 & -5 \end{pmatrix}$

(e) $\begin{pmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & -2 & 1 \end{pmatrix}$

(c) $\begin{pmatrix} 0 & 2 & 2 \\ 0 & 0 & 1 \end{pmatrix}$

(f) $\begin{pmatrix} 0 & 0 & 2 & 2 \\ 0 & 0 & 0 & 1 \end{pmatrix}$

4. Each of the following matrices needs only **one** elementary row operation to be in RREF.

Indicate which operation is required and show the RREF matrix that results from performing that operation.

(a)
$$\begin{pmatrix} 1 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

(b)
$$\begin{pmatrix} 1 & 0 & 1 & 0 \\ 0 & 2 & -2 & 1 \end{pmatrix}$$

(c)
$$\begin{pmatrix} 1 & 0 & 1 \\ -1 & 1 & -2 \end{pmatrix}$$

Scratch Paper