Assignment No. 5 MATHEMATICS 2050	
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REMINDER: MIDTERM EXAM (WORTH 25%) is in classDr. Konratieva's SectionThursday October 21Dr. Goodaire's and Dr. Yuan's SectionsFriday October 22The midterm will cover Chapter 1 and Section 2.1 of the text.

This assignment is due as follows:

Dr. Kondratieva	Tuesday October 19	in class or assignment box
Dr. Goodaire	Wednesday October 20	10:00 a.m.
Dr. Yuan	Wednesday October 20	in class

- [2] 1. Suppose vectors **e** and **f** are orthogonal (and nonzero). Show that **e** and **f** are linearly independent.
- [2] 2. Let u, v, w be vectors and suppose w is in the plane spanned by u and v. Show that u, v, and w are linearly dependent.
- [1] 3. Write down the 2 × 3 matrix *A* for which a_{ij} is the larger of *i* and *j*.

[2] 4. Let $\mathbf{v} = \begin{bmatrix} 1\\ 2\\ -3 \end{bmatrix}$ and $\mathbf{w} = \begin{bmatrix} 0\\ 4\\ 5 \end{bmatrix}$. Let $A = \begin{bmatrix} \mathbf{v} & \mathbf{w} \\ \downarrow & \downarrow \end{bmatrix}$ be the 3 × 2 matrix whose columns are \mathbf{v} and \mathbf{w} and let $B = \begin{bmatrix} \mathbf{v}^T & \rightarrow \\ \mathbf{w}^T & \rightarrow \\ \mathbf{w}^T & \rightarrow \end{bmatrix}$ be the 2 × 3 matrix whose rows are \mathbf{v}^T and \mathbf{w}^T . Find $a_{11}, a_{13}, a_{21}, b_{32}, b_{12}$ and b_{22} , if possible.

[2] 6. Find *AB* and *BA* (if defined) given $A = \begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 1 \\ 4 & 3 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ -1 & 4 \\ 2 & 3 \end{bmatrix}$

[2] 7. Suppose a 2 × 2 matrix *A* commutes with $B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$; that is AB = BA. What can you say about the entries of *A*?

[12]