

Name: \_\_\_\_\_

Math 362 Linear Algebra – Crawford

Quiz 2

27 September 2017

Books and notes (in any form) are not allowed. You may use a calculator – but you must clearly show your set-up for the problem. Please also indicate when you use the matrix functions on the calculator. Show all other work for credit. ***Good luck!*** [Note: Each quiz score will be scaled to 15 points after grading.]

1. (6 pts) Let  $A = \begin{bmatrix} 1 & -2 \\ 0 & 4 \\ 3 & -1 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 0 & -1 \\ 2 & 3 & 4 \end{bmatrix}$ .

(a). Compute  $(2I_3)A$  or explain why it is undefined.

(b). Compute  $B^T - 2A$  or explain why it is undefined.

2. (3 pts) Let  $B = \begin{bmatrix} 2 & -1 \\ -6 & 3 \end{bmatrix}$ . Construct a  $2 \times 2$  matrix  $A$  that contains no zero entries, such that  $AB$  is the zero matrix.

3. (7 pts) Given  $\mathbf{v}_1 = \begin{bmatrix} 1 \\ -4 \\ 2 \end{bmatrix}$ ,  $\mathbf{v}_2 = \begin{bmatrix} -2 \\ 2 \\ -3 \end{bmatrix}$ ,  $\mathbf{v}_3 = \begin{bmatrix} 2 \\ h \\ 4 \end{bmatrix}$ ,

(a). Find all value(s) of  $h$  for which the vectors are linearly *dependent*. Show work to justify your answer.

(b). TRUE or FALSE: Part (a) is equivalent to asking “For what value(s) of  $h$  is  $\mathbf{v}_3$  in the  $\text{Span}\{\mathbf{v}_1, \mathbf{v}_2\}$ ?”  
[No explanation necessary.]

4. (5 pts) Prove: If a set  $S = \{\mathbf{v}_1, \mathbf{v}_2, \dots, \mathbf{v}_p\}$  in  $\mathbb{R}^n$  contains the zero vector, then the set is linearly dependent.