

UNIVERSITY OF REGINA
DEPARTMENT OF MATHEMATICS AND STATISTICS
MATH 122 200610 Quiz 3 (C Version)

Time: 30 minutes

Instructor: Dr. Edward Doolittle

Name: _____

Student #: _____

(marks) Please do questions 1 and 2. You have 10 minutes to do each question, and 10 minutes to check your work, for a total of 30 minutes for the quiz. A non-programmable calculator is allowed but is not necessary. You may leave early if you can do so without disturbing any of your colleagues. If you finish early, I suggest you check your work thoroughly.

(10) 1. Find a matrix B with no zero entries such that $AB = O$ where

$$A = \begin{bmatrix} 1 & -3 \\ -3 & 9 \end{bmatrix}, \quad O = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}.$$

Use matrix multiplication to show that your answer is correct.

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(10) 2. Let

$$A = \begin{bmatrix} 1 & 1 & 1 \\ -2 & -2 & 0 \\ 3 & 1 & -1 \end{bmatrix}, \quad B = \begin{bmatrix} -1 & 3 & -9 \\ 2 & 1 & 4 \\ 2 & -4 & 14 \end{bmatrix}.$$

Show that the columns \mathbf{b}_1 , \mathbf{b}_2 , and \mathbf{b}_3 of B are linearly dependent by finding a non-trivial linear relation $x_1\mathbf{b}_1 + x_2\mathbf{b}_2 + x_3\mathbf{b}_3 = \mathbf{0}$. Find AB by matrix multiplication and show that the columns of AB satisfy the same non-trivial linear relation as the columns of B .