UNIVERSITY OF MANITOBA
COURSE: MATH 1210
DATE & TIME: ,
Quiz 5v1
DURATION: 25 minutes EXAMINER: various

Academic Integrity Contract I understand that cheating is a serious offence. "As members of the University Community, Students have an obligation to act with academic integrity. Any Student who engages in Academic Misconduct in relation to a University Matter will be subject to discipline." (2.4 - Student Academic Misconduct Procedure). :

Signature: _____
(*In Ink*)

INSTRUCTIONS

I. No texts, notes, or other aids are permitted. There are no calculators, cellphones or electronic translators permitted.

II. This exam has a title page, 8 pages including this cover page. Please check that you have all the pages.

III. The value of each question is indicated in the lefthand margin beside the statement of the question. The total value of all questions is 20 points.

IV. **Answer all questions on the exam paper** in the space provided beneath the question. **Unjustified answers will receive little or no credit.** If you need more space, continue on the back of the page, CLEARLY INDICATING THAT YOUR WORK IS TO BE CONTINUED. **Techniques from this course must be used.**

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[6] 1. Determine whether each of the following sets of vectors is linearly dependent or linearly independent. Justify your answer.

(a) $\langle -3, 7\rangle$, $\langle 11, 12\rangle$, $\langle 14, 29\rangle$

(b) $\langle 1, -1, 1\rangle$, $\langle 2, 1, 2\rangle$, $\langle 1, 3, -2\rangle$

(c) $\langle 2, -4, 2, 0\rangle$, $\langle -5, 10, -5, 0\rangle$

(d) $\langle 11, 21, 3, 4\rangle$, $\langle 0, 0, 0, 0\rangle$, $\langle -29, 1, 2, -31\rangle$

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[5] 2. Suppose that matrices A and B are such that

$$A^{-1} = \begin{pmatrix} 1 & 2 \\ 3 & 0 \end{pmatrix} \quad \text{and} \quad B^T = \begin{pmatrix} 2 & 2 \\ 0 & -1 \end{pmatrix}.$$

Without finding the matrix A, find $(A^T B)^{-1}$.

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[5] 3. Suppose that matrix A is such that $\det(A) < 0$ and

$$\text{adj}A = \begin{pmatrix} 10 & -1 & 0 \\ 0 & 2 & 3 \\ -1 & 0 & 3 \end{pmatrix}.$$

Find A^{-1} or show that it does not exist.

[4] 4. Solve a system of linear equations that is written in the matrix form as $AX = B$, where

$$X = \begin{pmatrix} x \\ y \\ z \end{pmatrix} \quad , \quad B = \begin{pmatrix} 1 \\ -1 \\ -2 \end{pmatrix} \quad \text{and} \quad A^{-1} = \begin{pmatrix} 1 & 2 & -1 \\ 3 & -11 & 2 \\ -3 & 5 & -7 \end{pmatrix}.$$

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