CONCORDIA UNIVERSITY
Department of Mathematics & Statistics

MATH 204/2 all sections except EC: - Vectors and Matrices
Midterm - Sunday, October 19, 2014 (1h30min)

Only approved calculators are permitted.
Justify all your answers.

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1. Solve by using the Gauss-Jordan elimination

$$\begin{aligned} 3x_1 + 2x_2 + 3x_3 - 2x_4 &= 1 \\ x_1 + x_2 + x_3 &= 3 \\ x_1 + 2x_2 + x_3 - x_4 &= 2 \end{aligned}$$

2. Determine the values of a for which the system has no solutions, exactly one solution, or infinitely many solutions

$$\begin{aligned} x + y + 7z &= -7 \\ 2x + 3y + 17z &= -16 \\ x + 2y + (a^2+1)z &= 3a \end{aligned}$$

3. If $(5I - 2A)^{-1} = \begin{pmatrix} 4 & 11 \\ 1 & 3 \end{pmatrix}$, find A.

4. Find the inverse of $A = \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{pmatrix}$.

5. Find the determinant of $A = \begin{pmatrix} 3 & 3 & 0 & 5 \\ 2 & 2 & 0 & -2 \\ 4 & 1 & -3 & 0 \\ 2 & 10 & 3 & 2 \end{pmatrix}$.

6. Solve by Cramer's rule only

$$\begin{aligned} 4x + 5y &= 2 \\ 11x + y + 2z &= 3 \\ x + 5y + 2z &= 1 \end{aligned}$$