MATH 204/4 all sections except EC: - VECTORS AND MATRICES
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Alternate Midterm - Saturday, March 8, 2014 (1h30min) 10:00 - 11:30
Only approved calculators are permitted.

Justify all your answers.

1. Solve by the Gauss-Jordan elimination

$$\begin{aligned} x - 3y + 2z - s + 2t &= 2 \\ 3x - 9y + 7z - s + 3t &= 7 \\ 2x - 6y + 7z + 4s - 5t &= 7 \end{aligned}$$

2. Determine the values of k so that the following system has
   (i) a unique solution
   (ii) no solution
   (iii) an infinite number of solutions

$$\begin{aligned} kx + y + z &= 1 \\ x + ky + z &= 1 \\ x + y + kz &= 1 \end{aligned}$$

3. If $(6A - 4I)^{-1} = \begin{pmatrix} 3 & 7 \\ 2 & 5 \end{pmatrix}$, find A.

4. Find the inverse of A if $A = \begin{pmatrix} 1 & -2 & 2 \\ 2 & -3 & 6 \\ 1 & 1 & 7 \end{pmatrix}$.

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

6. Write the vector $V = (2, -5, 3)$ as a linear combination of
   $U_1 = (1, -3, 2)$, $U_2 = (2, -4, -1)$, $U_3 = (1, -5, 7)$.