Math 290 Test #1
September 7, 2006

Do all five problems. Write your full name legibly on every sheet that you turn in. You may keep this sheet.

#1 [30 pts] Consider the following system of linear equations.

$$\begin{cases} x & & & - & 2z & = & 3 \\ 3x & + & y & + & z & = & 10 \\ 4x & + & y & - & z & = & 13 \\ & & y & + & 7z & = & 1 \end{cases}$$

Find all solutions to the given system. You may use either Gaussian elimination with back-substitution or Gauss-Jordan elimination. Giving only the correct answer(s), with no work shown, will earn half credit. *To receive full credit, you must indicate clearly what you are doing at each step in your calculation.*

#2 [5x5 = 25 pts] For each of the following matrix expressions, either evaluate it or explain why it is undefined. *No partial credit.*

(a) $3\begin{bmatrix} 2 & 1 \\ 2 & 4 \end{bmatrix} - 2\begin{bmatrix} 1 & 6 \\ 0 & 7 \end{bmatrix}$

(b) $\begin{bmatrix} 7 & -2 & 3 \end{bmatrix}\begin{bmatrix} 1 & -1 \\ 0 & 3 \\ 4 & 0 \end{bmatrix}$

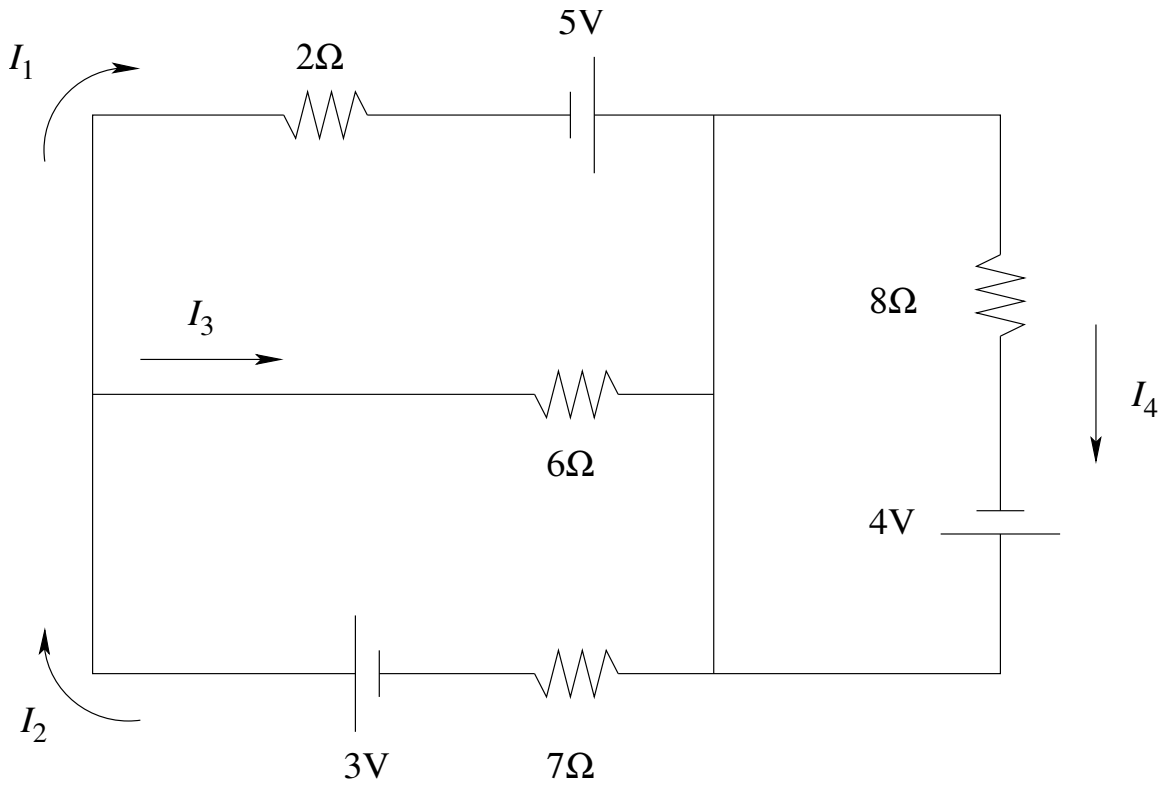
(c) $\begin{bmatrix} 1 & -1 \\ 3 & 2 \\ 5 & 6 \end{bmatrix}^T + I_2\begin{bmatrix} -1 & 3 & 4 \\ 0 & 0 & 0 \end{bmatrix}$

(d) $I_2 I_3$

(e) $O_{58}O_{85}$

#3 [15 pts] Set up a system of linear equations to find the equation of the parabola passing through the points $(1, -2)$, $(4, 1)$, and $(-2, 4)$. You don't need to solve the system; just set it up.

#4 [20 pts] Set up a system of linear equations to find the currents $I_1, \ldots, I_n$ in the following circuit. Again, don't actually solve the system.



#5 [10 pts] Explain why the following matrix equation **cannot** be true. *To receive full credit, your answer should* not *involve a long arithmetic calculation.*

$$\begin{bmatrix} 346 & 584 & 708 & 616 \\ 600 & 632 & 532 & 462 \\ 652 & 486 & 218 & 472 \\ 330 & 788 & 804 & 514 \end{bmatrix} \begin{bmatrix} 346 & 600 & 652 & 330 \\ 584 & 632 & 486 & 788 \\ 708 & 532 & 218 & 804 \\ 616 & 462 & 472 & 514 \end{bmatrix} = \begin{bmatrix} 1341492 & 1237936 & 954512 & 1460228 \\ 1237936 & 1255892 & 1032392 & 1361212 \\ 954512 & 1125440 & 931608 & 1016008 \\ 1460228 & 1543488 & 1386274 & 1640456 \end{bmatrix}$$