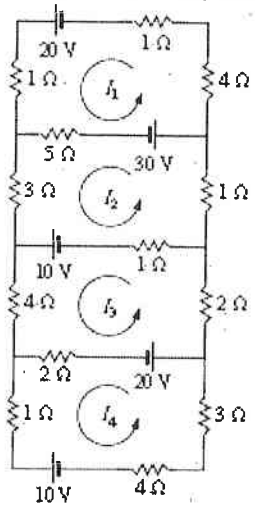
Math 2568, Quiz #5, Spring 2013 Name KEY

Instructions: Show all work. Be sure to solve each equation to the end. Use exact answers unless specifically asked to round.

1. For the circuit graphed below, write a system of equations that models the circuit and then solve it. You may use your calculator to obtain the solution. Round to two decimal places.



$$11I_1 - 5I_2 = 50$$

$$-5I_1 + 10I_2 - I_3 = -40$$

$$-I_2 + 9I_3 - 2I_4 = 30$$

$$-2I_3 + 10I_4 = -30$$

$$\vec{I} = \begin{bmatrix} 3.68 \\ -1.90 \\ 2.57 \\ -2.49 \end{bmatrix}$$

2. For the matrices $A = \begin{bmatrix} 1 & 1 \\ -3 & 2 \end{bmatrix}, B = \begin{bmatrix} 5 & -3 \\ 0 & 4 \end{bmatrix}, C = \begin{bmatrix} 2 & 1 & 1 \\ -1 & 3 & 7 \end{bmatrix}, D = \begin{bmatrix} -2 \\ 5 \\ 1 \end{bmatrix}$ perform the indicated operations or state why the operation is not possible. Do these operations by hand.

a. AB

$$\begin{bmatrix} 1 & 1 \\ -3 & 2 \end{bmatrix}\begin{bmatrix} 5 & -3 \\ 0 & 4 \end{bmatrix} = \begin{bmatrix} 5+0 & -3+4 \\ -15+0 & 9+8 \end{bmatrix} = \begin{bmatrix} 5 & 1 \\ -15 & 17 \end{bmatrix}$$

b. A+B $\begin{bmatrix} 6 & -2 \\ -3 & 6 \end{bmatrix}$

c. A^{-1} $\frac{1}{2+3}\begin{bmatrix} 2 & -1 \\ 3 & 1 \end{bmatrix} = \begin{bmatrix} 2/5 & -1/5 \\ 3/5 & 1/5 \end{bmatrix}$

d. CD $\begin{bmatrix} 2 & 1 & 1 \\ -1 & 3 & 7 \end{bmatrix}\begin{bmatrix} -2 \\ 5 \\ 1 \end{bmatrix} = \begin{bmatrix} -4+5+1 \\ 2+15+7 \end{bmatrix} = \begin{bmatrix} 2 \\ 24 \end{bmatrix}$

2×3 3×1 ✓

e. C^T $\begin{bmatrix} 2 & -1 \\ 1 & 3 \\ 1 & 7 \end{bmatrix}$