Answers to even homework problems from week 4

3.8 #10: (a) both are two; (b) both are two.

3.8 #18: (a) singular; (b) nonsingular

3.8 #20: (a) has nontrivial solutions; (b) does not have nontrivial solutions.

3.8 #24: has nonunique solutions

3.8 #26: yes

3.8 #28: (a) three

3.8 #30: (a) zero (only if it's the zero matrix), one, two, three; (b) three; (c) two.

3.7 #30: $L(at^2+bt+c) = \begin{bmatrix} a \\ b \\ c \end{bmatrix}$ works

3.7 #32: coordinates work

2.2 #8: $A^{-1} = \begin{bmatrix} 1 & -1 & 0 \\ 3/2 & 1/2 & -1/2 \\ -1 & 0 & 1 \end{bmatrix}$

2.2 #10: (a) not invertible; (b) $A^{-1} = \begin{bmatrix} 1 & -1 & 0 \\ 1 & -2 & 1 \\ -3/2 & 5/2 & -1/2 \end{bmatrix}$; (c) $A^{-1} = \begin{bmatrix} -1 & 3/2 & 1/2 \\ 1 & -3/2 & 1/2 \\ 0 & 1/2 & -1/2 \end{bmatrix}$; (d) $A^{-1} = \begin{bmatrix} 3/5 & -3/5 & -1/5 \\ 2/5 & 3/5 & -4/5 \\ -1/5 & 1/5 & 2/5 \end{bmatrix}$

2.2 #12: (a) $A^{-1} = \begin{bmatrix} 1 & -1 & 0 & -1 \\ 0 & -1/2 & 0 & 0 \\ -1/5 & 1 & 1/5 & 3/5 \\ 2/5 & -1/2 & -2/5 & -1/5 \end{bmatrix}$; (b) not invertible

2.2 #18: (a) no; (b) yes; (c) yes

2.2 #20: $a = -1, 3$

5.3 #2:

5.3 #4: $\begin{bmatrix} \cos\phi & -\sin\phi \\ \sin\phi & \cos\phi \end{bmatrix}$

5.3 #6:

5.3 #8:

5.3 #10:

5.3 #14: (a) $\begin{bmatrix} 5 \\ 13 \end{bmatrix}$; (b) $\begin{bmatrix} -1 \\ 3 \end{bmatrix}$; (c) $\begin{bmatrix} 3 \\ 7 \end{bmatrix}$; (d) $\begin{bmatrix} -1 \\ 1 \end{bmatrix}$; (e) $\begin{bmatrix} 2 \\ 3 \end{bmatrix}$

5.3 #18: $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$

5.3 #20: (a) $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$

5.3 #22:

5.5 #2:

5.5 #4:

5.5 #10:

5.5 #12:

5.5 #14: