

M308D HW 2 answers

Sec1.5

8. a)  $\begin{bmatrix} 3 \\ 1 \end{bmatrix}$  b)  $\begin{bmatrix} -11 \\ 18 \end{bmatrix}$  c)  $\begin{bmatrix} -5 \\ 24 \end{bmatrix}$

20.  $a_1 = 9/11, a_2 = -17/11$

36.  $Bu = \begin{bmatrix} 7 \\ 13 \end{bmatrix}$

38.  $CB = \begin{bmatrix} 3 & 8 \\ 4 & 8 \\ 7 & 12 \\ 5 & 14 \end{bmatrix}$

44.  $\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} -1 + x_3 \\ 1 - 2x_3 \\ x_3 \\ 1 \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \\ 0 \\ 1 \end{bmatrix} + x_3 \begin{bmatrix} 1 \\ -2 \\ 1 \\ 0 \end{bmatrix}$

Sec 1.6

2.  $FE = \begin{bmatrix} 5 & 9 \\ 5 & 9 \end{bmatrix}, ED = \begin{bmatrix} 12 & 27 \\ 7 & 14 \end{bmatrix}, F(ED) = (FE)D = \begin{bmatrix} 19 & 41 \\ 19 & 41 \end{bmatrix}$

12.  $(EF)v = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$

20.  $3\sqrt{10}$

26. Let  $A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$ . Then  $(A - B)(A + B) = \begin{bmatrix} -1 & -1 \\ 0 & 0 \end{bmatrix}$

and  $A^2 - B^2 = \begin{bmatrix} -1 & 0 \\ 0 & 0 \end{bmatrix}$

42. a)  $\begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix}$

Sec 1.7

6. Linearly dependent.  $v_3 = 2v_1 - 2v_4$

12. linearly independent

18.  $C$  is nonsingular

20.  $BA$  is singular,  $7x_1 = -10x_2$

38.  $x = \begin{bmatrix} -2/3 \\ 4/3 \\ -1 \end{bmatrix}, u_1 = (-8F_1 - 2F_2 + 9F_3)/3$