Dec 2013 MATH 204 Answers (UNEDITED)

1. $x_3 = t,\ x_2 = 2 - 4t,\ x_1 = 2 - 11t$ (General sol. in parametric form)

2 a) $M^{-1} = \begin{bmatrix} -18 & -3 & 5 \\ -12 & -2 & 3 \\ -5 & -1 & 1 \end{bmatrix}$, b) $C = \begin{bmatrix} 16 & -18 \\ 9 & -14 \\ 3 & -8 \end{bmatrix}$

3 a) $x_1 = \frac{18}{17},\ x_2 = \frac{1}{17},\ x_3 = -\frac{8}{17}$

b) -9

4. $w_1 = \frac{9}{35}\begin{bmatrix} 1 \\ 3 \\ 5 \end{bmatrix}$, $w_2 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} - \frac{9}{35}\begin{bmatrix} 1 \\ 3 \\ 5 \end{bmatrix} = \begin{bmatrix} 26/35 \\ 8/35 \\ -2/7 \end{bmatrix}$

5 a) $\frac{1}{2}\sqrt{77}$ b) $8x + 3y - 2z - 9 = 0$

6 a) $\begin{bmatrix} x-1 \\ y-2 \\ z-3 \end{bmatrix} \cdot \begin{bmatrix} 1 \\ 3 \\ 4 \end{bmatrix} = 0$ b) $x + 3y + 4z - 19 = 0$

7 a) $x = 2,\ y = -1$ b) Using the cross product we could use $\vec{v}_3 = \begin{bmatrix} -8 \\ 2 \\ 4 \end{bmatrix}$ or ANY other vector that makes $\vec{v}_1, \vec{v}_2, \vec{v}_3$ linearly indep.

8. $\begin{bmatrix} 3 \\ 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} -2 \\ 0 \\ -1 \\ -1 \\ 0 \end{bmatrix}, \begin{bmatrix} -5 \\ 0 \\ -6 \\ -1 \\ 1 \end{bmatrix}$

9. $P = \begin{bmatrix} -1 & -1 & -1 \\ 1 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix} \Rightarrow D = \begin{bmatrix} 0 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

(order of cols. of P effect the order of Eigenvalues on MAIN diagonal of D)

10. $A^{1000} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$