Due: Oct. 17

Consider a tri-varite Normal distribution of X_1, X_2 and X_3, with the variance covariance matrix equal to

$$\mathbb{V} = \begin{bmatrix} 4 & -5 & 6 \\ -5 & 9 & -9 \\ 6 & -9 & 16 \end{bmatrix}$$

and the means of $\mu_1 = 1$, $\mu_2 = -1$ and $\mu_3 = 2$.

1. What is the corresponding correlation matrix?
2. Find a matrix $\mathbb{A}$ such that
$$\mathbb{A}\mathbb{A}^{\mathrm{T}} = \mathbb{V}$$
3. With the help of $\mathbb{A}$, generate a random independent sample of size 12 from the above distribution.
4. What is the joint distribution of X_1 and X_3, given that X_2 has been observed to have the value of -2.7 .