

## Week 1 Review Answers

2.

Let,  $X_t = \begin{pmatrix} x_{1,t} \\ x_{2,t} \\ x_{3,t} \end{pmatrix}$  and  $A = \begin{pmatrix} 1 - \mu_{12} - \mu_{13}, & \mu_{21}, & \mu_{31} \\ \mu_{12}, & 1 - \mu_{21} - \mu_{23}, & \mu_{32} \\ \mu_{13}, & \mu_{23}, & 1 - \mu_{31} - \mu_{32} \end{pmatrix}$  then

$$X_{t+1} = AX_t$$

$$3. Var[\ln(X)] = Var(X) \left( \frac{d\ln(X)}{dX} \right)^2$$

$$\frac{d\ln(X)}{dX} = \frac{1}{X} \text{ evaluated at } E(X) = \mu_X, \text{ is } \frac{1}{\mu_X}$$

$$Var[\ln(X)] = \frac{\sigma_X^2}{\mu_X^2}$$