1. Exercise 3.9

2. Let \( \{Z_t\} \sim \text{IID}(0, \sigma^2) \), and let \( c \) be a constant, consider the process

\[
X_t = Z_1 \cos(ct) + Z_2 \sin(ct).
\]

Find the mean and autocovariance function and determine whether the process is stationary.

3. Determine which of the following ARMA processes are causal and which of them are invertible.

(a) \( X_t = -0.2X_{t-1} + 0.48X_{t-2} + Z_t \)

(b) \( X_t + 1.9X_{t-1} + 0.88X_{t-2} = Z_t + 0.2Z_{t-1} + 0.7Z_{t-2} \)

(c) \( X_t = -0.6X_{t-1} + Z_t + 1.2Z_{t-1} \)

(d) \( X_t + 1.8X_{t-1} + 0.81X_{t-2} = Z_t \)

(e) \( X_t + 1.6X_{t-1} = Z_t - 0.4Z_{t-1} + 0.04Z_{t-2} \)