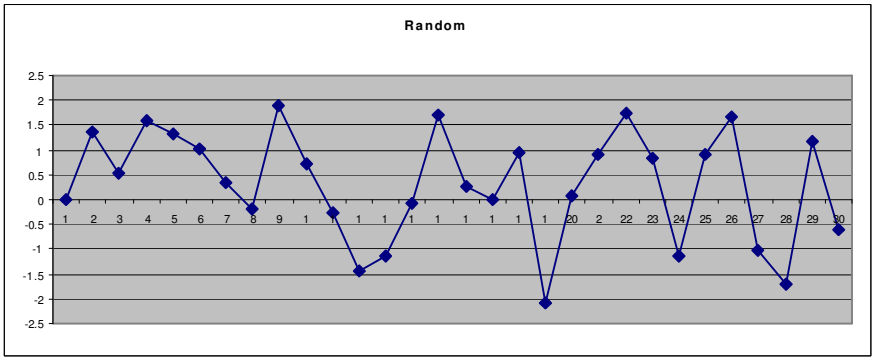
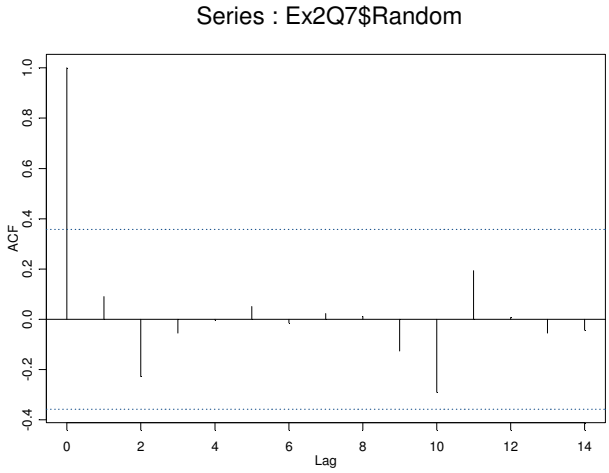
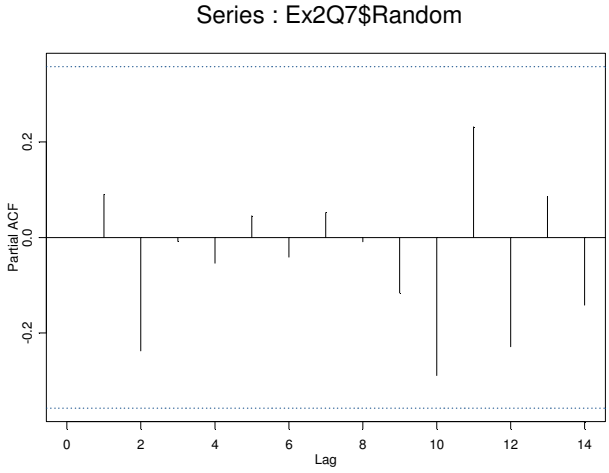
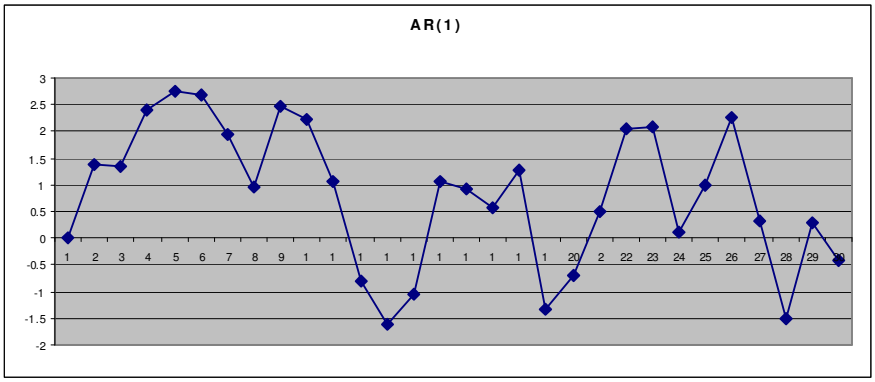
Question 17 Solution

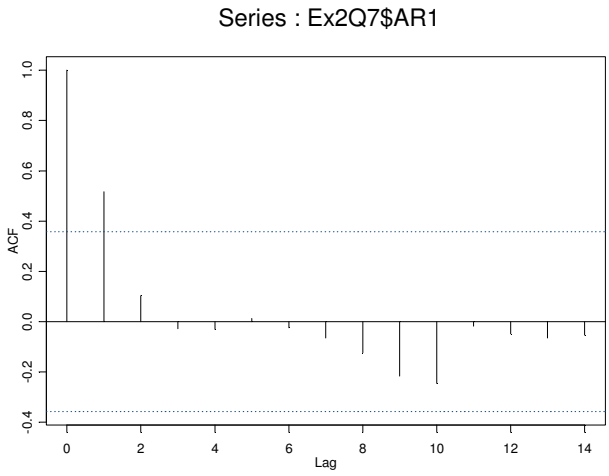


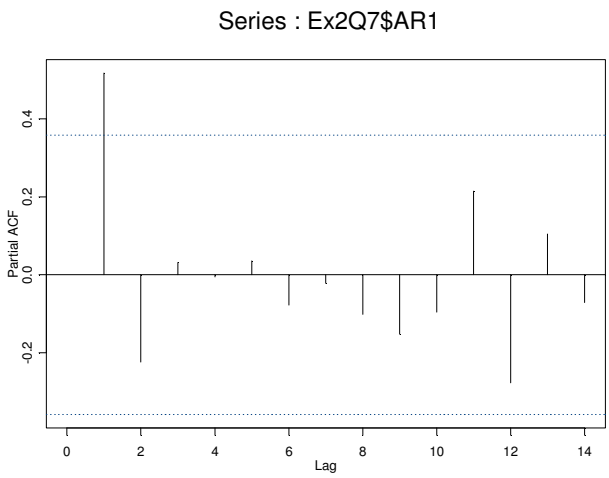




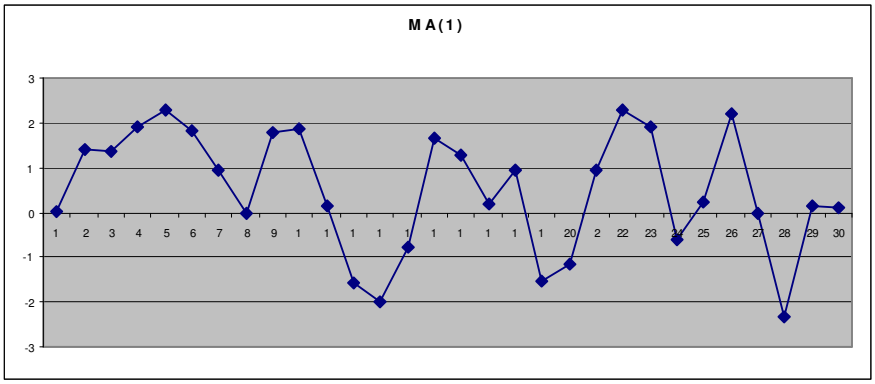
We expect both the acf and pacf to be close to zero, which they are.

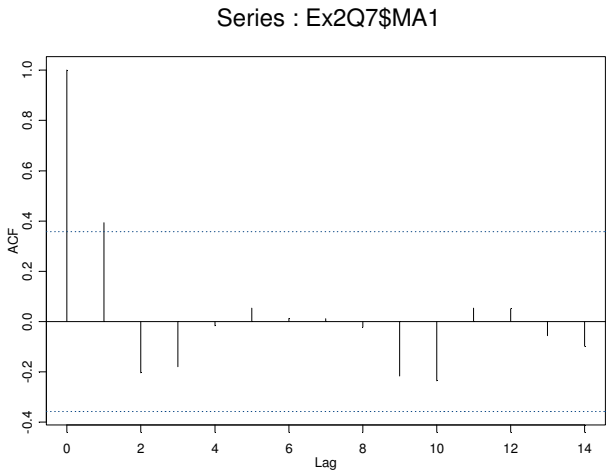


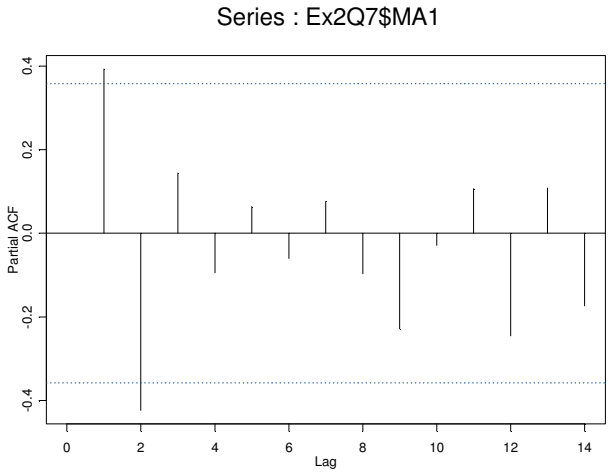




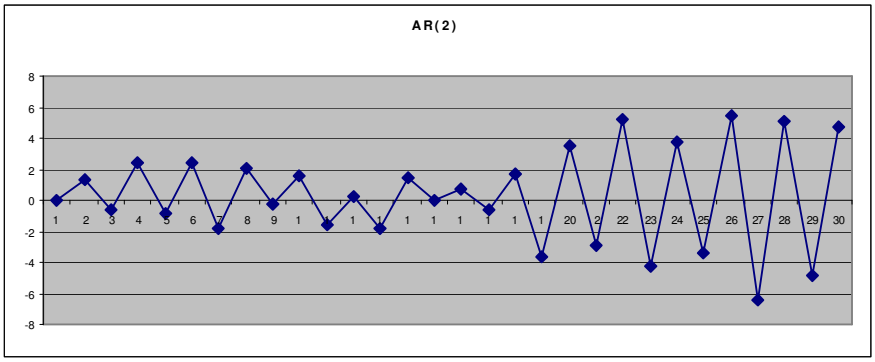
The acf and pacf are both insignificant after lag 1, indicating either an AR(1) or MA(1) process

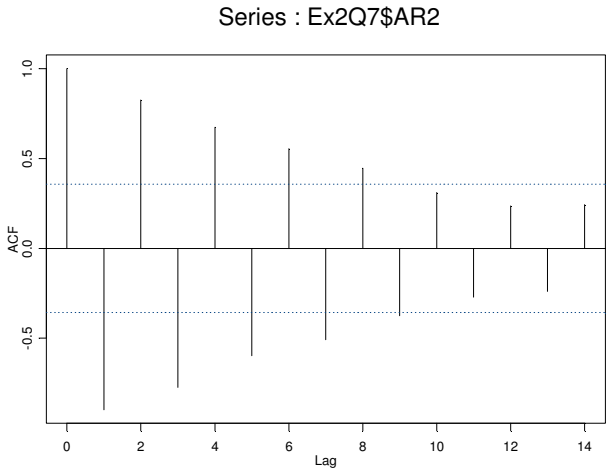


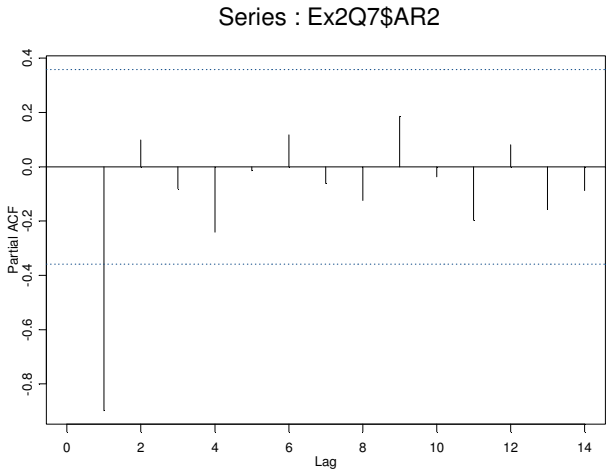




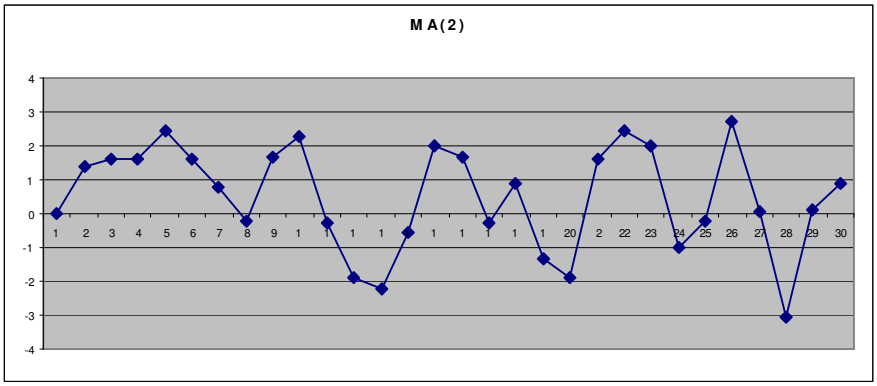
The acf cuts off after lag 1 and the pacf after lag 2, indicating an MA(1) model

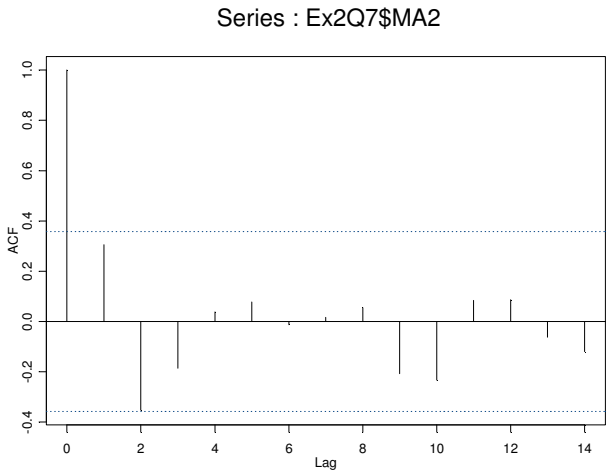


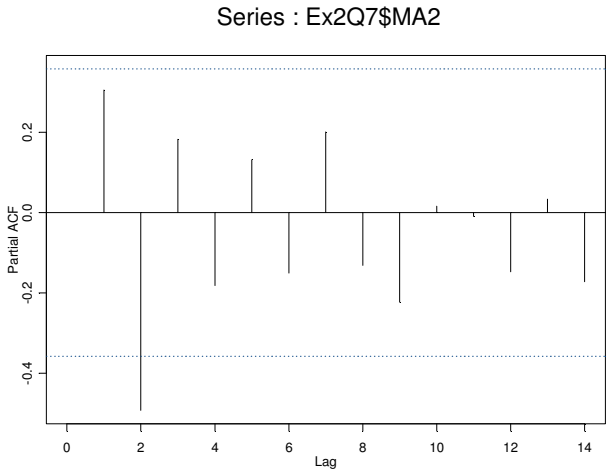




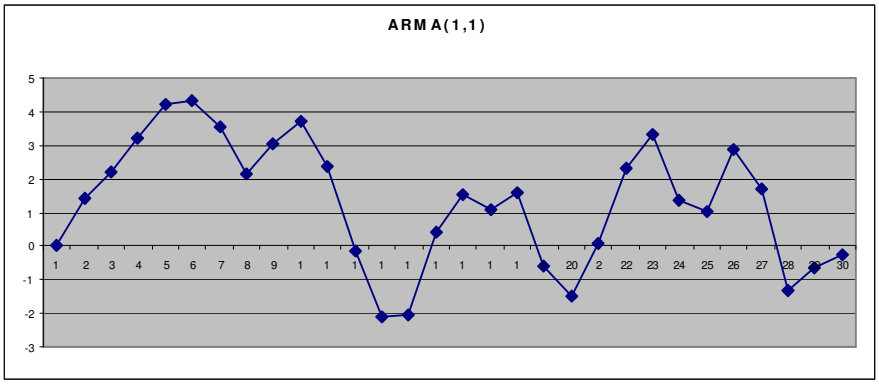
This is actually a non-stationary series, which is why the acf decays so slowly. Note the alternating behaviour caused by -0.8 X_{t-1} term. We expect the pacf to cut off after 2 lags. It actually cuts off after just one lag, indicating that the +0.3 X_{t-2} term is not having much effect.

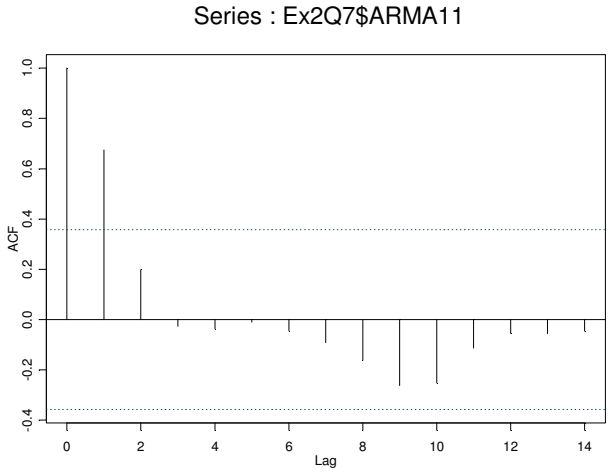


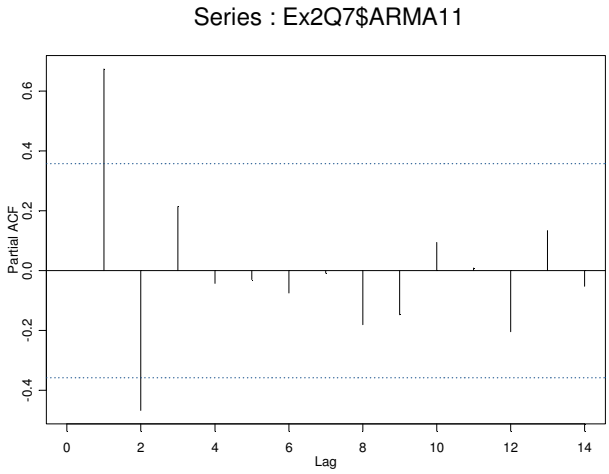




The acf seems to have no significant lags but the pacf has something significant at lag 2. The definite pattern in the pacf tells us that the series is not random, and that an MA model is more likely than an AR. Given that the acf nearly has a significant value at lag 2, an MA(2) model is not unreasonable.







The acf cuts off after lag 1 and the pacf after lag 2. Given this, one would consider an MA(1) model. Looking at the residuals of the fitted model might then indicate that the model wasn't quite right.