Question 2

Correct

8.00 points out of 8.00

Select which could be used to prepare the data for ARIMA modeling

Differencing could make ts stationary	TRUE ✔
Differencing could stabilize the mean	TRUE ✔
Differencing could eliminate/reduce the trend	TRUE ✔
Transformations such as logarithmic could reduce the variance	TRUE ✔
Differencing could eliminate/reduce the seasonality	TRUE ✔
The unit root test could be used to determine if the differencing is needed and to what degree.	TRUE ✔
The test that the data is the white-noise should be applied before building the ARIMA model on this time series.	FALSE ✔
The test that the residuals of the ARIMA model are the white-noise should be applied to conclude that the model is proper.	TRUE ✔

Your answer is correct.

The correct answer is: Differencing could make ts stationary → TRUE, Differencing could stabilize the mean → TRUE, Differencing could eliminate/reduce the trend → TRUE, Transformations such as logarithmic could reduce the variance → TRUE, Differencing could eliminate/reduce the seasonality → TRUE, The unit root test could be used to determine if the differencing is needed and to what degree. → TRUE, The test that the data is the white-noise should be applied before building the ARIMA model on this time series. → FALSE, The test that the residuals of the ARIMA model are the white-noise should be applied to conclude that the model is proper. → TRUE

Question 3

Correct

4.00 points out of 4.00

Match the equivalent statements about the ARIMA (p, d, q) model:

White noise	ARIMA (0, 0, 0) ✔
Autoregression	ARIMA (p, 0, 0) ✔
Moving average	ARIMA (0, 0, q) ✔
Random walk (rwf)	ARIMA (0, 1, 0) ✔

Your answer is correct.

The correct answer is: White noise → ARIMA (0, 0, 0), Autoregression → ARIMA (p, 0, 0), Moving average → ARIMA (0, 0, q), Random walk (rwf) → ARIMA (0, 1, 0)

Question 4

Correct

6.00 points out of 6.00

Select the proper matches for the ARIMA model.

The AR part of the ARIMA model uses	the lagged values of \(y_t \)
The MA part of the ARIMA model uses	the lagged values of \(e_t \)
The I part of the ARIMA model uses	differencing
While exponential smoothing aims to capture the trend and seasonality, the ARIMA model is complementary because it captures	the autocorrelations in the data
The MA submodel in the ARIMA aims to describe	the autocorrelations in the residuals
The AR submodel in the ARIMA aims to describe	the autocorrelations in the predictors

Your answer is correct.

The correct answer is: **The AR part of the ARIMA model uses** → the lagged values of \(y_t \), **The MA part of the ARIMA model uses** → the lagged values of \(e_t \), **The I part of the ARIMA model uses** → differencing, **While exponential smoothing aims to capture the trend and seasonality, the ARIMA model is complementary because it captures** → the autocorrelations in the data, **The MA submodel in the ARIMA aims to describe** → the autocorrelations in the residuals, **The AR submodel in the ARIMA aims to describe** → the autocorrelations in the predictors

Question 5

Correct

3.00 points out of 3.00

The output from the auto.arima() on the quarterly percentage changes in US consumption expenditures looks as the figure below. Select the proper equation for the predictive model.

```
> auto.arima(usconsumption[,1], seasonal=FALSE)
Series: usconsumption[, 1]
ARIMA(0,0,3) with non-zero mean

Coefficients:
         ma1     ma2     ma3  intercept
      0.2542  0.2260  0.2695     0.7562
s.e.  0.0767  0.0779  0.0692     0.0844

sigma^2 estimated as 0.3856:  log likelihood=-154.73
AIC=319.46   AICc=319.84   BIC=334.96
```

Select one:

a. $y_t = 0.756 + e_t + 0.254e_{t-1} + 0.226e_{t-2} + 0.269e_{t-3}$

b. $y_t = 0.756 + e_t + 0.254y_{t-1} + 0.226y_{t-2} + 0.269y_{t-3}$

c. $y_t = 0.756 + 0.254e_t + 0.226e_{t-1} + 0.269e_{t-2}$

Your answer is correct.

The correct answer is: $y_t = 0.756 + e_t + 0.254e_{t-1} + 0.226e_{t-2} + 0.269e_{t-3}$

Question 6

Correct

9.00 points out of 9.00

Plot each of the following data sets (data(package="fma")) and select the ones that are stationary, and hence are suitable for building the ARIMA model:

(a) dj; (b) diff(dj); (c) strikes; (d) hsales; (e) eggs; (f) pigs; (g) lynx; (h) beer; (i) elec

Select one or more:

- [ ] a. dj
- [x] b. diff(dj) ✔
- [ ] c. strikes
- [ ] d. hsales
- [ ] e. eggs
- [ ] f. piggs
- [x] g. lynx ✔
- [ ] h. beer
- [ ] i. elec

Seasonality rules out: d, h, and i
Trend rules out: a, c, e, f, i

Increasing variance rules out: f

On a surface, (g) seems like seasonal but it is actually cyclic with hard to predict (aperiodic) cycles. In the long-term, the timing of these cycles are hard to predict, hence the series is stationary.

The correct answers are: **diff(dj)**, lynx

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