'BJsales' dataset

Тест, 12 вопроса

<table>
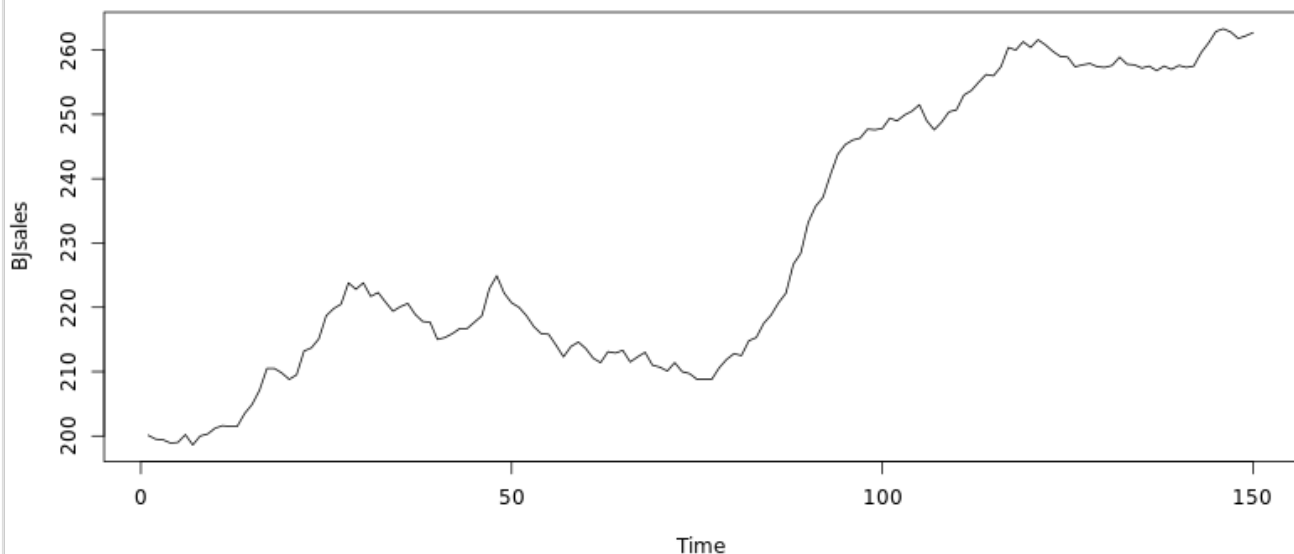<tr><td>1
Баллы</td></tr>
</table>

1.

This Quiz has several questions all of which are related and are steps toward modeling the time series titled 'BJsales' in 'datasets' package in R.

Plot the time series in the code block below.

```
1   # Plot time series 'BJsales'
2   plot.ts(BJsales)
```

Выполнить

Сбросить

Which one of the following is plausible?

- ☑ There are ups and downs with a general upward trend.

- ☐ There is no trend at all.

- ☑ Time series is not stationary.

- ☐ Time series is stationary.
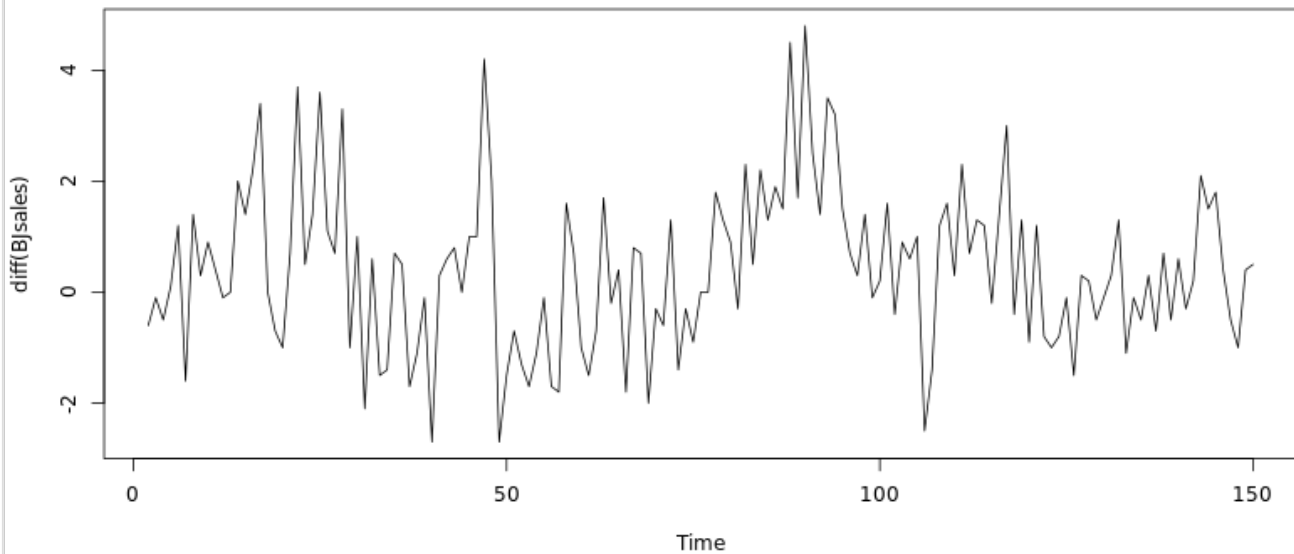
'BJsales' dataset

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Тест, 12 вопроса

2.

Plot the differenced data below. Does it seem stationary?

```
1   plot(diff(BJsales))
```

Выполнить

Сбросить

○ It does not seem to be stationary since there are still upward or downward trends in different parts of the time plot.

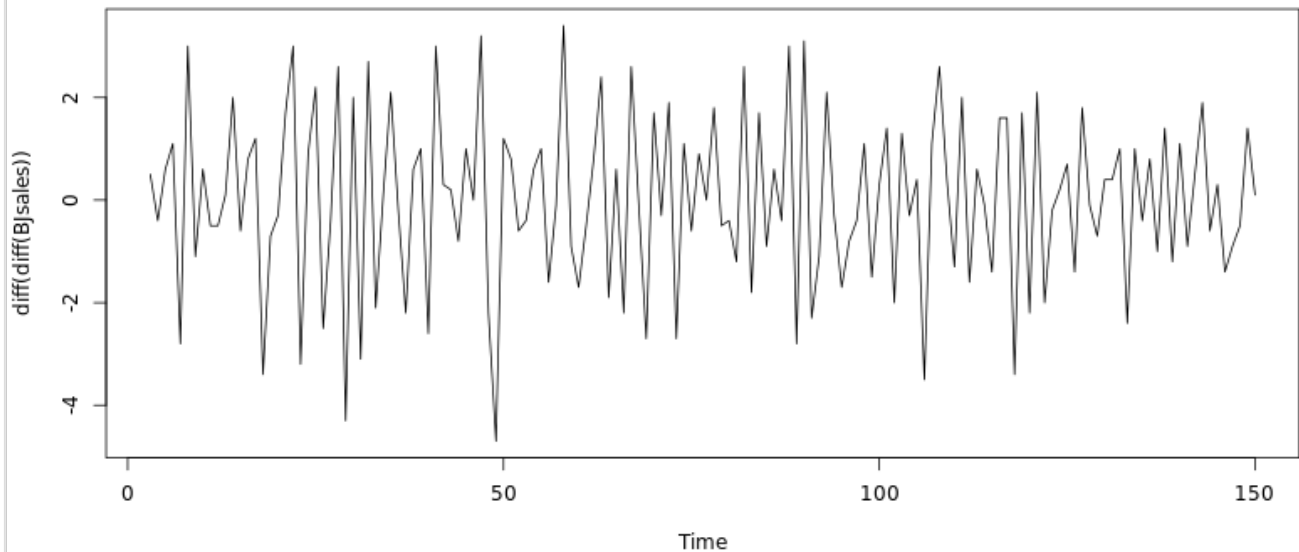○ It does seem stationary since there is no general upward or downward trend.

1

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3.

To get rid of a still remaining trend, we apply one more differencing. Plot the twice differenced time series in
'BJsales' dataset. the code block below.

Тест, 12 вопроса

```
1  plot(diff(diff(BJsales)))
```

Выполнить

Сбросить

Which one or more of the following are plausible?

- ☑ Variance towards the end of the series seems to be different from the variance in the other parts of the plot.

- ☐ Mean level seems to be changing.
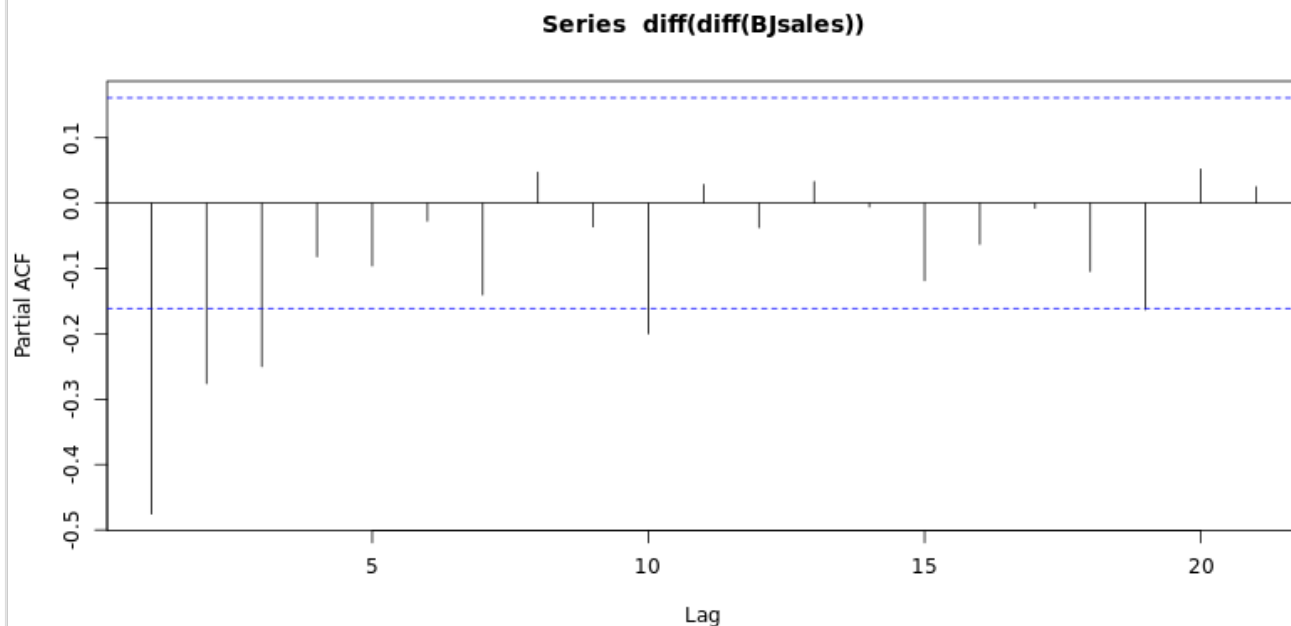
- ☑ There is no systematic change in mean.

1
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4.

Find the PACF of diff(diff(BJsales)) in the code block below. Which lags are significant?

'BJsales' dataset

```
pacf(diff(diff(BJsales)))
```

Выполнить

Сбросить

Series diff(diff(BJsales))

- ◯ Lag 1, Lag 8, Lag 11

- ◯ Lag 1, Lag 2, Lag 3

- ⦿ Lag 1, Lag 2, Lag 3, Lag 10, Lag 19

1
Баллы

5.

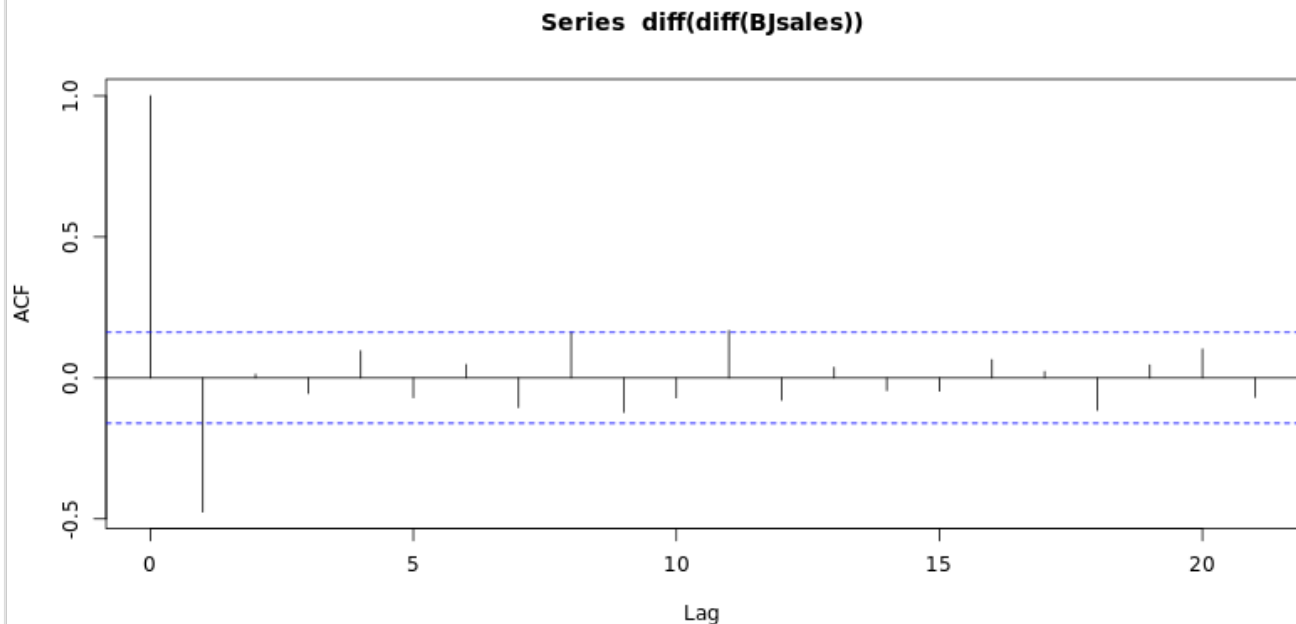Find the ACF of diff(diff(BJsales)) in the code block below. Which lags are significant?

'BJsales' dataset

```
acf(diff(diff(BJsales)))
```

Выполнить

Сбросить

Series diff(diff(BJsales))

⦿ Lag 1, Lag 8, Lag 11

◯ Lag 1

◯ Lag 1, Lag 2, Lag 3, Lag 10, Lag 19

1
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6.

What does ACF suggest?

▣ Keeping parsimony principle in mind, the order of MA term can be 0 or 1.

☐ Keeping parsimony principle in mind, AR term has order of 0 or 1.

▣ If we ignore barely significant lags, the order of MA term can be 0 or 1.

1

'BJsales' dataset

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Тест, 12·вопроса

What does PACF suggest?

☐ If we ignore barely significant lags, the order of MA terms can be 0, 1,2 or 3.

☑ Keeping parsimony principle in mind, the order of AR terms can be 0,1,2 or 3.

1

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8.

Now we try few different models and compare their AIC values.

```
1   d=2
2   for(p in 1:4){
3     for(q in 1:2){
4           if(p+d+q<=6){
5               model<-arima(x=BJsales, order = c((p-1),d,(q-1)))
6               pval<-Box.test(model$residuals, lag=log(length(model$residuals)))
7               sse<-sum(model$residuals^2)
8               cat(p-1,d,q-1, 'AIC=', model$aic, ' SSE=',sse,' p-VALUE=', pval$p
                   .value,'\n')
9           }
10        }
11  }
```

Выполнить

Сбросить

```
0 2 0 AIC= 577.6777  SSE= 423.7908  p-VALUE= 7.610494e-07
0 2 1 AIC= 517.1371  SSE= 276.2293  p-VALUE= 0.9632467
1 2 0 AIC= 541.9646  SSE= 327.92   p-VALUE= 0.003606979
1 2 1 AIC= 518.9734  SSE= 275.8554  p-VALUE= 0.941776
2 2 0 AIC= 532.2986  SSE= 302.7467  p-VALUE= 0.05824473
```

Which model has the smallest AIC value?

◉ ARIMA(0,2,1)

◯ ARIMA(1,2,1)

◯ ARIMA(3,2,1)

1

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9.

'BJsales' dataset

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```
 1   d=2
 2   for(p in 1:4){
 3       for(q in 1:2){
 4           if(p+d+q<=8){
 5               model<-arima(x=BJsales, order = c((p-1),d,(q-1)))
 6               pval<-Box.test(model$residuals, lag=log(length(model$residuals)))
 7               sse<-sum(model$residuals^2)
 8               cat(p-1,d,q-1, 'AIC=', model$aic, ' SSE=',sse,' p-VALUE=', pval$p
                    .value,'\n')
 9           }
10       }
11   }
```

[Выполнить]

[Сбросить]

Which model has the smallest SSE (sum of squared errors) value?

- ⦿ ARIMA(3,2,1)
- ◯ ARIMA(1,2,0)
- ◯ ARIMA(0,2,1)

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10.

We fit ARIMA(0,2,1), and look at the time plot, ACF and PACF of the residuals.

```
1   model<-arima(BJsales, order=c(0,2,1))
2
3   par(mfrow=c(2,2))
4
5   plot(model$residuals)
6   acf(model$residuals)
7   pacf(model$residuals)
8   qqnorm(model$residuals)
```

[Выполнить]

[Сбросить]

Is there compelling evidence against the whiteness of the residuals?

- ☐ No, since QQ-plot seems linear.
- ☐ No, since ACF nad PACF has no significant lags.

1
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11.

Let X_t=BJsales and $Y_t = diff(diff(BJsales))$. What is the fitted model for Y_t?

- ☐ $Y_t = (1 - 0.7480B)Z_t$ and $\sigma_Z = 1.866$.
- ☐

$Y_t = Z_t - 0.7480Z_{t-1}$ and $\sigma_Z = 1.866$.

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$Y_t = Z_t - 0.7480Z_{t-1}$ and $\sigma_Z^2 = 1.866$.

☐ $Y_t = (1 - 0.7480B)Z_t$ and $\sigma_Z^2 = 1.866$.

1
Баллы

12.

Let X_t=BJsales and $Y_t = diff(diff(BJsales))$. What is the fitted model for X_t?

☑ $\nabla^2 X_t = Z_t - 0.7480Z_{t-1}$ and $\sigma_Z^2 = 1.866$.

☑ $(1 - 2B + B^2)X_t = (1 - 0.7480B)Z_t$ and $\sigma_Z^2 = 1.866$.

☑ $X_t = 2X_{t-1} - X_{t-2} + Z_t - 0.7480Z_{t-1}$ and $\sigma_Z^2 = 1.866$.

☑ $(1 - B)^2 X_t = Z_t - 0.7480Z_{t-1}$ and $\sigma_Z^2 = 1.866$.

☐   Я понимаю, что отправка работы, выполненной не мной, может привести к тому, что курс не будет засчитан, а аккаунт Coursera заблокирован.

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