Writing a Time Series Report

Title
The title should be informative and give or hint at the results of the analysis. Write it last. Do NOT call your time series analysis “Time Series Analysis”.

Introduction
In about three sentences summarise the findings.

Background
- Tell what the series is about.
- Explain the units, and time frame.
- Give the source of the data.
- Use some background research.
- Explain why someone would want to do this analysis.

Components
For each of the following you need to include evidence from the graphs or output. Apply to the real world context and purpose of the investigation.

Trend
Describe the shape of the trend. Does it mostly go up or down or does it change direction? How strong is the trend? What is the overall trend for the series? How does this relate to the context? What implications are there for the purpose of the investigation?

Seasonality
- Regularity –
  o Is it pretty much the same over the life of the series or does it change?
  o How does this relate to the context and purpose of the investigation?
- Shape
  o Where are the peaks and troughs?
  o How does this relate to the context and purpose of the investigation?
- Additive? (Merit or Excellence)
  o Does the seasonal pattern increase with an upward trend. If this is the case a multiplicative model could be more appropriate.

Variation or residuals
This is the “unexplained” part of the series, or the part the model does not explain. Look at the scale – perhaps give the variation as a percentage of the actual values to give an idea of relative size. How does this relate to the context and purpose of the investigation?
Relative contribution of components
Look at the scales of the graphs for this. Which is more important out of seasonality and trend? Do they account for most of the variation or is there still a lot of residual variation? How does this relate to the context and purpose of the investigation?

Irregularities and outliers
Are there any obviously unusual values in the series? Can these be accounted for by some real-world phenomenon? (For example there might have been a volcanic ash cloud preventing air travel or a change in the rate of sales tax.)

Other aspects

Predictions
Give the predictions for a sensible number of future periods. One or two years is the most you should use. Give the prediction intervals. Round the values sensibly. Explain why the intervals increase for later values.

Limitations
Explain how time series use only the values in the series to predict. If there is a change in circumstances, this cannot be predicted. Relate to the context and purpose of the investigation.

Comparing two series
The analysis is pretty much the same as for one series, but there are opportunities to compare and contrast the different statistics, graphs and features. Remember to relate to the context and purpose of the investigation.

Conclusions
In one or two sentences summarise the findings.

Be careful
- Copy and paste in graphs and output for evidence.
- Make sure you use correct and appropriate rounding.
- Use the appropriate technical terms correctly.
- Be clear, so that a non-expert could understand what you have written.

Optional Extras - possibly for merit or excellence
- Take out a holdout sample of the last few data values. Then use your model to forecast them. Compare the forecasts with the actual values.
- If you think the series has changed at some point you may be justified to use only the later values in a series. You would need to provide evidence as to why this is a good idea.
- Sometimes the number of days in the month affects the series, particularly for February. You could do corrections and see what difference it makes.