**Project: using linear regression and adjusted trend for prediction of the future.**

The Excel file includes beer retail sales data (Qc) over 52 weeks from January 1, 2015, to December 24, 2015. The variable Qc represents the total unit sales of the beer (six-packs, in cans, 72oz) across many U.S. retailers. The objective is to forecast future sales. The following questions are answered.

1. Report the sales data's mean, median, mode, range, standard deviation, and sample variance (Sheet: S1).
2. Plot the sales data over time (week numbers), fit a linear trend line to these data, and display the regression equation and the R2 for the trend line (Sheet: S2).
3. Using the regression model above, predict the sales for the next period (next 52 weeks). (Report the sale in a new column as "Trend forecast" (Sheet: S2)).
4. Because the above prediction does not account for seasonal fluctuations, the forecasting error may be significant (notice that sales are high in summer). Therefore, using the ratio-to-trend method, seasonal fluctuations can be adjusted. To do this, the following procedures are done:
   1. Predict the sales for the past weeks (Week 1 to 52) using the trend line in part 1.
   2. Compute the actual to predicted sales ratio for all past weeks by dividing the given Qc by the predicted values for the same week. Report the ratio in a new column as "Differential ratio."
   3. Calculate the quarterly average differential ratio (the first 13 weeks comprise the first quarter). This is the ratio-to-trend adjustment. Include one data entry for each quarter in a new column with these findings (i.e., four data entries in total).
   4. To get the adjusted forecast, multiply the trend forecast for the first and the second 52 weeks by a corresponding quarterly ratio. Report the results in a new column as "Adjusted trend forecast."
   5. Plot the adjusted trend forecast on the chart over time.