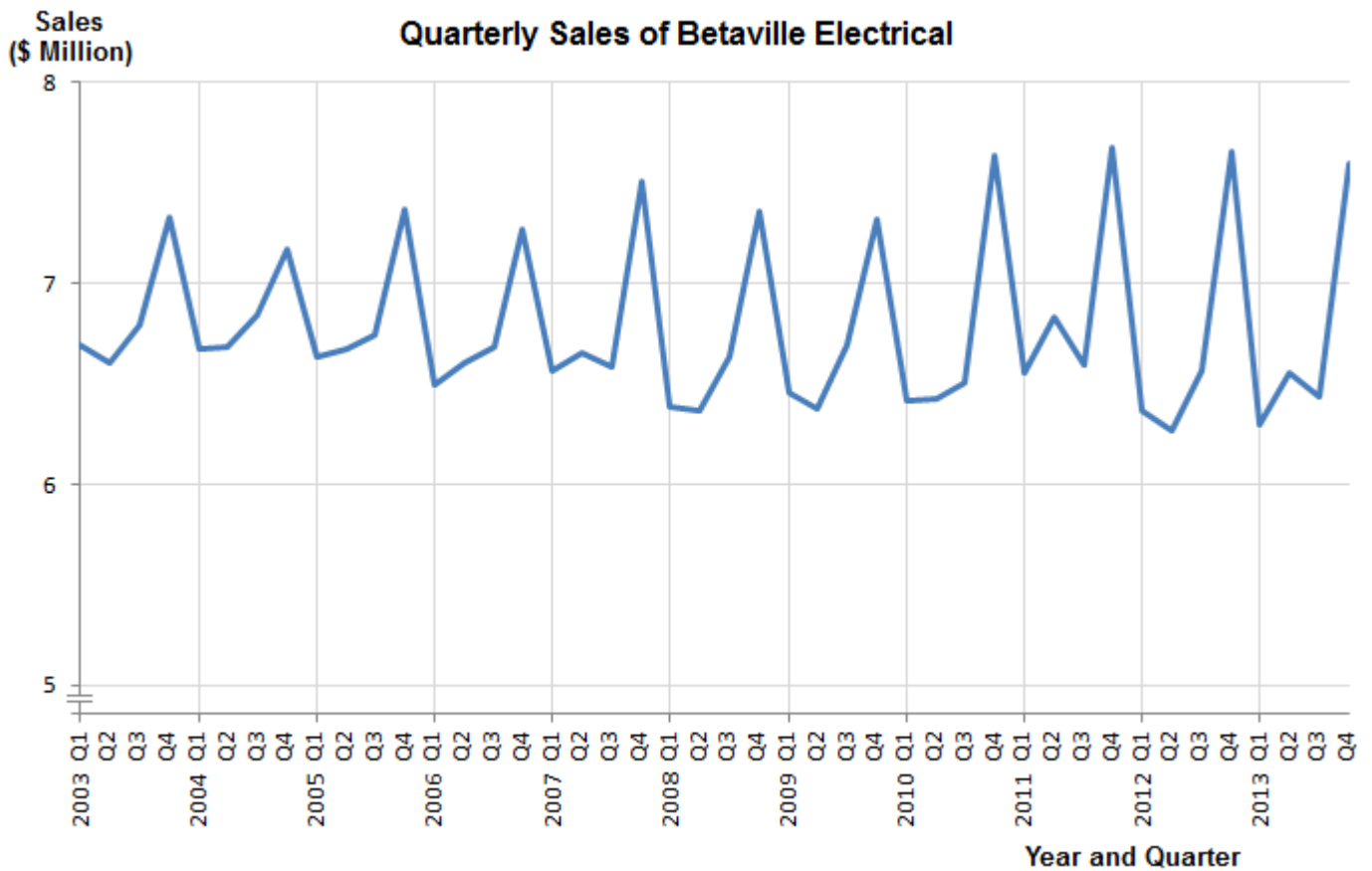


Level 1 Data Practice #6

The quarterly sales for Betaville Electrical are shown below: (It is common for accounting purposes to divide a year into four "quarters" of three months each.)



You have been asked by Alphaville Investments to report on the business, to see if they should buy the company.

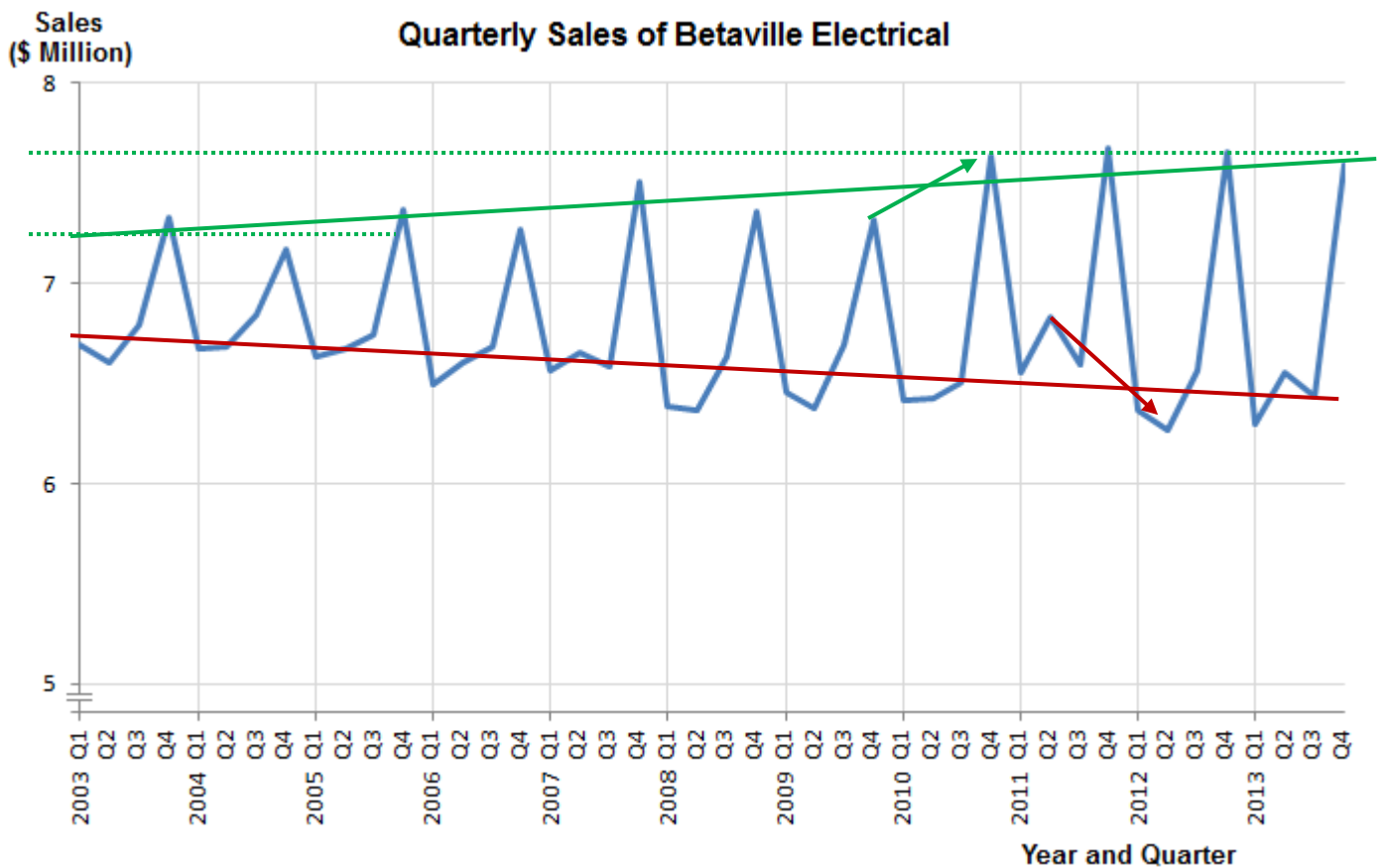
1. Describe any patterns or trends in the sales data.
2. Do you think that the company's **yearly** sales have gone up or down over the years shown? (A year is from Q1 to Q4.)

Explain your answer fully, using correct statistical language.

3. Predict the sales for each of the four quarters of 2014.

How reliable do you believe your predictions are?

Answers: Level 1 Data Practice #6



Numbers will vary a little bit depending on how students measure. It is wise to draw the appropriate lines on the graph to show the marker where your numbers come from.

- There is a seasonal pattern of increased sales in Q4 for each year (*Christmas sales?*).
 - There is a long term trend for the Q4 sales to go up over time (solid green line) and a long term trend for the other quarters to go down (red line).
 - There seems to be a pattern of increasing variation in sales over time. Q4 has lots of jumps up and down anyway, but the other quarters start following close to the red trend line, but then start to move around from it further and further.
- The yearly sales are dropping quite steadily – although the Q4 peak trend is upwards, it does not cancel three times as many quarters with a downwards trend in the troughs.

The upwards Q4 trend is about 0.4M\$ over 11 years (dotted green lines) so 0.036M\$ per year. The downwards trend for the others is 0.3M\$ over 11 years, so 0.027M\$ per year.

$$3 \times -0.027 + 0.036 = \text{about } -0.046\text{M\$ per year. (Mind you this is much less than 1\% drop on sales, so really sales are close to steady. The scale not starting at zero exaggerates greatly the apparent trends.)}$$
- I predict by extrapolating the red and green long-term trend lines. Q1 predict about \$6.3M. Q2 predict about \$6.3M. Q3 predict about \$6.2M. Q4 predict about \$7.7M.

The predictions are likely to be reasonable for Q1 and Q3 unless something drastic changes – the greatest year on year variation was the big drop in 2008 for Q1, of about 0.2 from trend. Q2 is very unpredictable – between 2011 and 2012 the Q2 sales fell by half a million dollars! (arrowed red line). Q4 has a trend that is steady recently, but there was a big jump in 2010 (green arrow) so there is a chance it will vary greatly again.

Terms to use – seasonal patterns vs short and long-term trends. Variation. Peaks and troughs.