

### 3.3.8: Extrapolation

When using the model to make predictions, care must be taken to only choose values of  $X$  that are in the range of  $X$  values of the data. In the rainfall/sales example, the values of  $X$  range from 10 to 40 inches of rainfall. Choosing a value of  $X$  outside this range is called extrapolation and could lead to invalid results. For example, if we use the model to predict sales for a city with 80 inches of rainfall, we get an impossible negative result for sales:

$$\hat{Y} = 45.647 - .767X$$

$$\hat{Y}_{80} = 45.647 - .767(80) = -15.7$$

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