

# What are the definitions and examples of upper and lower fences?

Authored by  
**stats writer**

April 25, 2024

## RECOMMENDED CITATION

stats writer (2024). *What are the definitions and examples of upper and lower fences?*. PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=139041>

Upper and lower fences are statistical measures used to identify extreme values in a dataset. The upper fence is the highest value that is considered reasonable or acceptable, while the lower fence is the lowest value that is considered reasonable or acceptable. These fences are typically used in conjunction with the interquartile range (IQR) to identify outliers in a dataset.

For example, if a dataset has an upper fence of 100 and a lower fence of 20, any values above 100 or below 20 would be considered extreme and potentially removed from the dataset. This can be useful in identifying data points that may be errors or do not fit with the rest of the data.

In summary, upper and lower fences are useful tools in statistical analysis for identifying extreme values and maintaining the integrity of a dataset.

## Upper and Lower Fences: Definition & Example

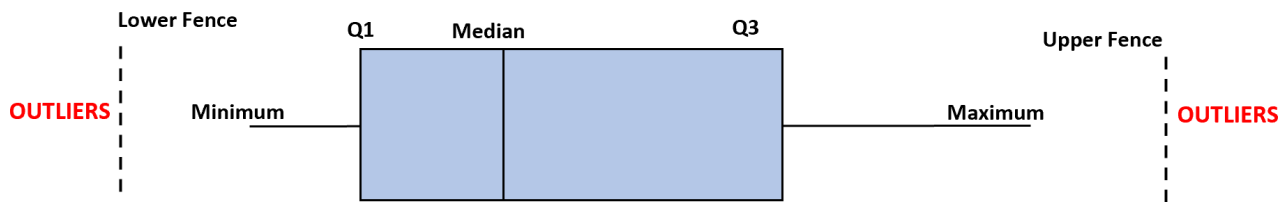
**In statistics, the upper and lower fences represent the cut-off values for upper and lower outliers in a dataset.**

**They are calculated as:**

**Lower fence =  $Q1 - (1.5 * IQR)$  Upper fence =  $Q3 + (1.5 * IQR)$**

**where IQR stands for "interquartile range" which represents the difference between the 75th percentile (Q3) and 25th percentile (Q1) in a dataset.**

**An that lies above the upper fence or below the lower fence is often considered to be an outlier.**



**Example: Calculating the Upper and Lower Fence**

**Suppose we have the following dataset:**

**Dataset: 11, 13, 14, 14, 15, 16, 18, 22, 24, 27, 34, 36, 38, 41, 45**

**We can use the following steps to calculate the upper and lower fence of the dataset:**

**Step 1: Find Q1 and Q3.**

**Q1 represents the 25th percentile of the dataset and Q3 represents the 75th percentile. According to the Interquartile Range Calculator, Q1 and Q3 for this dataset are as follows:**

**Q1: 14 Q3: 36**

**Step 2: Find the IQR (Interquartile Range).**

**The interquartile range represents the difference**

between Q3 and Q1, which is calculated as:

Interquartile Range:  $Q3 - Q1 = 36 - 14 = 22$

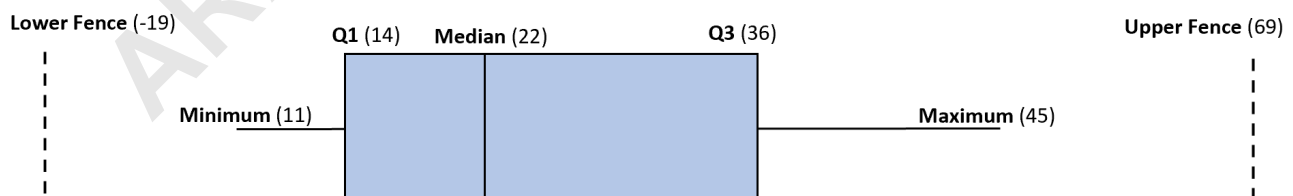
**Step 3: Find the Upper and Lower Fence**

We can use the following formulas to calculate the upper and lower fences:

Lower fence:  $Q1 - (1.5 \cdot IQR) = 14 - (1.5 \cdot 22) = -19$   
Upper fence:  $Q3 + (1.5 \cdot IQR) = 36 + (1.5 \cdot 22) = 69$

Since none of the observations in our dataset lie below the lower fence or above the upper fence, none of the observations would be considered outliers.

We can also create a to visualize our distribution of data values along with the upper and lower fences:



**Bonus: Upper and Lower Fence Calculator**

Instead of calculating the upper and lower fence of a

**dataset by hand, feel free to use the :**

11, 13, 14, 14, 15, 16, 18, 22, 24, 27, 34, 36,  
38, 41, 45

CALCULATE

Q1 (First Quartile) = 14.00

Q3 (Third Quartile) = 36.00

IQR (Interquartile Range) = 22.00

Lower Fence =  $14.00 - (1.5 \times 22.00) = -19.00$

Upper Fence =  $36.00 + (1.5 \times 22.00) = 69.00$

**You can find more helpful statistics calculators on .**