Assignment 10

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Given a list of numbers: [9, 7, 3.5, -13, 2, 2, 5, 6.6, -1, 0, 88.1, -5, 33]:

1. use 3σ rule to identify which values are outliers (1.5 points)
2. use IQR with factor 1.5 to identify which values are outliers (1.5 points)

Please write down the steps of calculations.

1. First let's grab the Mean and Standard Deviation:

Mean (μ) = (9 + 7 + 3.5 + (-13) + 2 + 2 + 5 + 6.6 + (-1) + 0 + 88.1 + (-5) + 33) / 13 = 10.554

Standard Deviation:

σ2 =

(9 – 10.554)2 + (7 – 10.554)2 + (3.5 – 10.554)2 + (-13 – 10.554)2 + (2 – 10.554)2 + (2 – 10.554)2 + (5 –10.554)2 + (6.6 – 10.554)2 + (-1 – 10.554)2 + (0 – 10.554)2 + (88.1 – 10.554)2 + (-5 – 10.554)2 + (33 –10.554)2

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13

σ = √601.264

σ = 24.521

3σ Rule: Values that fall outside the range of μ ± 3σ are considered outliers:

Lower Limit = μ − 3σ = 10.554 − (3 × 24.521) = −63.009

Upper Limit = μ + 3σ = 10.554 + (3 × 24.521) = 84.117

Values that fall outside this range are considered outliers. In this case, 88.1 is considered an outlier.

1. First let's organize the numbers:  
   [−13, −5, −1, 0, 2, 2, 3.5, 5, 6.6, 7, 9, 33, 88.1]

Lets split it in two ignoring the middle number (3.5) because of oddity:

[−13, −5, −1, 0, 2, 2] and [5, 6.6, 7, 9, 33, 88.1]

Median of Q1 = (-1 + 0) / 2 = -0.5

Median of Q3 = (7 + 9) / 2 = 8

IQR = 8 - (-0.5) = 8.5

Median of List = 3.5

Lower Limit = (-0.5 - 1.5 \* 8.5) = -13.25

Upper Limit = (8 + 1.5 \* 8.5) = 20.75

The outliers in this case are 33 and 88.1