Homework Assignment 2

Candidate	Net worth	$x_i - \bar{x}$	$\lvert x_i - \bar{x}\rvert$	$(x_i - \bar{x})^2$
Sanders	0.7	-391.9	391.9	153585.61
Paul	2	-390.6	390.6	152568.36
Christie	3	-389.6	389.6	151788.16
Cruz	3.5	-389.1	389.1	151398.81
Huckabee	9	-383.6	383.6	147148.96
Kasich	10	-382.6	382.6	146382.76
Bush	22	-370.6	370.6	137344.36
Carson	26	-366.6	366.6	134395.56
Chafee	32	-360.6	360.6	130032.36
Clinton	45	-347.6	347.6	120825.76
Fiorina	58	-334.6	334.6	111957.16
Trump	4500	4107.4	4107.4	16870734.76
	$\sum_{i=1}^{12} x_i =$ 4711.2	$\sum_{i=1}^{12}(x_i - \bar{x}) =$ 0	$\sum_{i=1}^{12} \lvert x_i - \bar{x}\rvert =$ 8214.8	$\sum_{i=1}^{12}(x_i - \bar{x})^2 =$ 18408162.62

- Mean: $\bar{x} = \frac{\sum_{i=1}^{12} x_i}{12} = 392.6$
- Median: $\frac{10+22}{2} = 16$
- Mode: All observation occur once. So, each is a mode.
- Range: $4500 - 0.7 = 4499.3$
- Quartiles: The number of observations is even, so we will need to interpolate.
  - ⋆ $Q_1 = \frac{12+1}{4} = 3.25$. So, Q_1 is between the 3^{rd} and 4^{th} candidate. Since there is no 3.25^{th} candidate, we need to go 0.25 of the way between the 3^{rd} and 4^{th} candidates to find Q_1. That is, $Q_1 = 3 + 0.25 \times (3.5 - 3) = 3.125$
  - ⋆ $Q_2 = \frac{2(12+1)}{4} = 6.5$. So, Q_2 is between the 6^{th} and 7^{th} candidate. Since there is no 6.5^{th} candidate, we need to go 0.5 of the way between the 6^{th} and 7^{th} candidates

to find Q_2. That is, $Q_2 = 10 + 0.5 \times (22 - 10) = 16$. Q_2 is also the median.

$\star$ $Q_3 = \frac{3(12+1)}{4} = 9.75$. So, Q_3 is between the 9^{th} and 10^{th} candidate. Since there is no 9.75^{th} candidate, we need to go 0.75 of the way between the 9^{th} and 10^{th} candidates to find Q_3. That is, $Q_3 = 32 + 0.75 \times (45 - 32) = 41.75$.

- Mean Absolute Deviation: $MAD = \frac{\sum_{i=1}^{12} |x_i - \bar{x}|}{12} = 684.567$
- Variance: $\sigma^2 = \frac{\sum_{i=1}^{12} (x_i - \bar{x})^2}{12-1} = \frac{18408162.62}{11} = 1673469.329$
- Standard Deviation: $s = \sqrt{\sigma^2} = \sqrt{1673469.329} = 1293.626$