



Statistics

Exercises 5

1. The following table, giving the Democracy ratings of the Middle Eastern countries, comes from the 2015 Democracy Index which rates the state of democracy in 167 countries numerically between 0 and 10 and classifies them as one of four regime types full democracies (ratings > 8), flawed democracies (6-8], hybrid regimes (4-6] and authoritarian regimes [0-4].

Country	2015 Democracy Rating	Position	Classification
Israel	7.77	34	Flawed democracy
Cyprus	7.53	39	Flawed democracy
Turkey	5.12	97	Hybrid regime
Lebanon	4.86	102	Hybrid regime
Palestinian Authority	4.57	110	Hybrid regime
Iraq	4.08	115	Hybrid regime
Jordan	3.86	120	Authoritarian regime
Kuwait	3.85	121	Authoritarian regime
Egypt	3.18	134	Authoritarian regime
Qatar	3.18	134	Authoritarian regime
Oman	3.04	142	Authoritarian regime
Bahrain	2.79	146	Authoritarian regime
United Arab Emirates	2.75	148	Authoritarian regime
Yemen	2.24	154	Authoritarian regime
Iran	2.16	156	Authoritarian regime
Saudi Arabia	1.93	160	Authoritarian regime
Syria	1.43	166	Authoritarian regime

- a) What is the range of the democracy ratings?
- b) Calculate the IQR of the democracy ratings.
- c) Calculate the standard deviation of the democracy ratings.
- d) Calculate the coefficient of variation of the democracy ratings.

2. The following table shows the value of the Happy Planet Index of 2016 for North African and Middle Eastern countries. What is the interquartile range?

Country	Happy Planet Index
Palestine	34.5
Algeria	33.3
Morocco	32.7
Israel	28.8
Iraq	26.5
Turkey	26.4
Tunisia	26.2
Iran	24
Egypt	23.8
Yemen	22.8
Lebanon	21.9
Oman	21.1
Afghanistan	20.2
Syria	19.1

3. Draw a box and whisker chart for these data. Are there any obvious outliers?
4. The following table, (taken from Transparency International), shows the values of the 2016 Economic Freedom Index of the first eight countries for which values are available.

Country	Albania	Algeria	Angola	Argentina	Armenia	Australia	Austria	Azerbaijan
EFI	65.9	50.1	48.9	43.8	67	80.3	71.7	60.2

In this case:

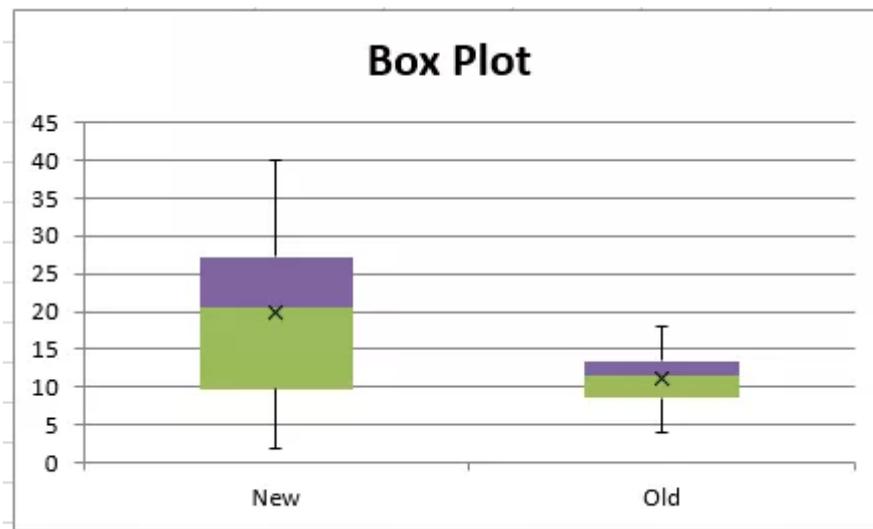
- The mean is 63.5000 and the first quartile is 49.2000.
 - The mean is 60.9875 and the third quartile is 70.5250.
 - The mode is 63.5000 and the minimum is 34.5000.
 - None of the above.
5. Rice (1926)¹ provided data on the variation in percentage vote for candidate "Fighting Bob" LaFollete in the 1924 US elections. In particular, he calculated that the coefficient of variation in the percentage LaFollette vote was equal to 19.1% (0.191) over the state of Wisconsin and 57.7% (0.577) over the state of Maine.

Mark the correct answer from the following:

- The standard deviation of the percentage vote in Maine is just over three times that in Wisconsin.
 - The variance of the percentage vote in Wisconsin is just under a third of the variance in Maine.
 - The mean of the percentage vote in Maine is just over three times that in Wisconsin.
 - None of the above.
6. In the previous question, the mean percentage vote in Wisconsin was 54.3%. What was the standard deviation?

¹ S.A. Rice (1926). Applications of Statistical Method to Political Research, *The American Political Science Review*, **20**, 313-329.

7. The following graph shows box and whisker plots of the time spent (minutes) in the town hall for consultations under the new and old systems.



For these data:

- The standard deviation under the new system is equal to the standard deviation under the old system.
- The standard deviation under the new system is greater than 40 minutes.
- The variance under the Old system is smaller than the variance under the new system.
- None of the above.