

Math 191: Probability & Statistics Homework #2 Version A

Title: Calculating Measures of Central Tendency & Variation

Objectives:

- To calculate descriptive summary measures using Excel functions and formulas.
- To understand the effects of extreme values (outliers) in statistical data analysis.
- To understand the statistical implications of skewness of data.

Instructions:¹

- You will need the following Excel functions to complete this assignment : AVERAGE, MEDIAN, MAX, MIN, and SMALL. to help you complete the calculations in this lab.
- The data supplied on this sheet is available at the course web-site.
- Supply all of your answers to this lab on an Excel spreadsheet that includes your name, course number and section, and data set letter.

A manufacturer of flashlight batteries took a sample² of 400 from a day's production and burned them continuously until they failed. Examining 40 of the batteries, the number of hours that they burned were

Battery Life (Data Set A)

583	227	292	1291	562	234	619	590	413	471
720	942	655	328	343	222	255	456	208	749
412	204	268	762	491	298	211	245	284	313
446	315	306	407	326	278	449	310	597	328

- a. Based upon the supplied data, compute the mean (\bar{X}), median (\tilde{X}), midrange, quartile values (Q_1 and Q_3) and the midhinge.
- b. Also calculate the range (R), interquartile range (IQR), variance (S^2), standard deviation (S) and coefficient of variation.
- c. Looking at the distribution of times, which measure(s) of central tendency seem best and which seem worst? Why?
- d. Comment on the shape of the data set. Is it symmetrical or noticeably skewed?
- e. An additional battery is tested and lasts for only 24 hours. Repeat the instructions of step 1 with this new data. How are your values affected?
- f. The following measures characterizes the *entire* set of 400 data values. How do your results compare with these?

<u>Battery Life</u>	
Mean	481
Median	401
Midrange	973
Q1	289
Q3	572
Midhinge	431

¹Consult Chapter 3 in your textbook, Middleton Ch.4 and Johnson & Kubly Ch.2 (and CD) for tips on completing this lab.

²The data was assumed to be exponentially distributed with $\lambda = \frac{1}{300}$ and a lower limit of 200.

Math 191: Probability & Statistics Homework #2 Version B

Title: Calculating Measures of Central Tendency & Variation

Objectives:

- To calculate descriptive summary measures using Excel functions and formulas.
- To understand the effects of extreme values (outliers) in statistical data analysis.
- To understand the statistical implications of skewness of data.

Instructions:¹

- You will need the following Excel functions to complete this assignment : AVERAGE, MEDIAN, MAX, MIN, and SMALL. to help you complete the calculations in this lab.
- The data supplied on this sheet is available at the course web-site.
- Supply all of your answers to this lab on an Excel spreadsheet that includes your name, course number and section, and data set letter.

A manufacturer of flashlight batteries took a sample² of 400 from a day's production and burned them continuously until they failed. Examining 40 of the batteries, the number of hours that they burned were

Battery Life (Data Set B)

277	476	593	526	316	636	1366	310	336	289
626	389	220	675	236	357	367	383	244	382
238	949	410	722	492	454	248	254	289	1161
361	463	293	426	375	256	668	218	317	249

- a. Based upon the supplied data, compute the mean (\bar{X}), median (\tilde{X}), midrange, quartile values (Q_1 and Q_3) and the midhinge.
- b. Also calculate the range (R), interquartile range (IQR), variance (S^2), standard deviation (S) and coefficient of variation.
- c. Looking at the distribution of times, which measure(s) of central tendency seem best and which seem worst? Why?
- d. Comment on the shape of the data set. Is it symmetrical or noticeably skewed?
- e. An additional battery is tested and lasts for only 24 hours. Repeat the instructions of step 1 with this new data. How are your values affected?
- f. The following measures characterizes the *entire* set of 400 data values. How do your results compare with these?

Battery Life

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Median	401
Midrange	973
Q1	289
Q3	572
Midhinge	431

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Math 191: Probability & Statistics Homework #2 Version C

Title: Calculating Measures of Central Tendency & Variation

Objectives:

- To calculate descriptive summary measures using Excel functions and formulas.
- To understand the effects of extreme values (outliers) in statistical data analysis.
- To understand the statistical implications of skewness of data.

Instructions:¹

- You will need the following Excel functions to complete this assignment : AVERAGE, MEDIAN, MAX, MIN, and SMALL. to help you complete the calculations in this lab.
- The data supplied on this sheet is available at the course web-site.
- Supply all of your answers to this lab on an Excel spreadsheet that includes your name, course number and section, and data set letter.

A manufacturer of flashlight batteries took a sample² of 400 from a day's production and burned them continuously until they failed. Examining 40 of the batteries, the number of hours that they burned were

Battery Life (Data Set C)

238	875	295	237	487	544	695	337	389	329
767	509	248	236	948	677	454	255	201	547
262	487	986	309	235	244	868	274	367	545
316	378	218	201	655	881	347	252	302	774

- a. Based upon the supplied data, compute the mean (\bar{X}), median (\tilde{X}), midrange, quartile values (Q_1 and Q_3) and the midhinge.
- b. Also calculate the range (R), interquartile range (IQR), variance (S^2), standard deviation (S) and coefficient of variation.
- c. Looking at the distribution of times, which measure(s) of central tendency seem best and which seem worst? Why?
- d. Comment on the shape of the data set. Is it symmetrical or noticeably skewed?
- e. An additional battery is tested and lasts for only 24 hours. Repeat the instructions of step 1 with this new data. How are your values affected?
- f. The following measures characterizes the *entire* set of 400 data values. How do your results compare with these?

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Math 191: Probability & Statistics Homework #2 Version D

Title: Calculating Measures of Central Tendency & Variation

Objectives:

- To calculate descriptive summary measures using Excel functions and formulas.
- To understand the effects of extreme values (outliers) in statistical data analysis.
- To understand the statistical implications of skewness of data.

Instructions:¹

- You will need the following Excel functions to complete this assignment : AVERAGE, MEDIAN, MAX, MIN, and SMALL. to help you complete the calculations in this lab.
- The data supplied on this sheet is available at the course web-site.
- Supply all of your answers to this lab on an Excel spreadsheet that includes your name, course number and section, and data set letter.

A manufacturer of flashlight batteries took a sample² of 400 from a day's production and burned them continuously until they failed. Examining 40 of the batteries, the number of hours that they burned were

Battery Life (Data Set D)

363	597	382	1744	216	301	436	470	266	210
219	289	497	596	314	561	479	1006	390	741
259	327	634	223	465	466	682	733	901	401
317	364	331	323	735	890	706	1559	346	1338

- a. Based upon the supplied data, compute the mean (\bar{X}), median (\tilde{X}), midrange, quartile values (Q_1 and Q_3) and the midhinge.
- b. Also calculate the range (R), interquartile range (IQR), variance (S^2), standard deviation (S) and coefficient of variation.
- c. Looking at the distribution of times, which measure(s) of central tendency seem best and which seem worst? Why?
- d. Comment on the shape of the data set. Is it symmetrical or noticeably skewed?
- e. An additional battery is tested and lasts for only 24 hours. Repeat the instructions of step 1 with this new data. How are your values affected?
- f. The following measures characterizes the *entire* set of 400 data values. How do your results compare with these?

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Math 191: Probability & Statistics Homework #2 Version E

Title: Calculating Measures of Central Tendency & Variation

Objectives:

- To calculate descriptive summary measures using Excel functions and formulas.
- To understand the effects of extreme values (outliers) in statistical data analysis.
- To understand the statistical implications of skewness of data.

Instructions:¹

- You will need the following Excel functions to complete this assignment : AVERAGE, MEDIAN, MAX, MIN, and SMALL. to help you complete the calculations in this lab.
- The data supplied on this sheet is available at the course web-site.
- Supply all of your answers to this lab on an Excel spreadsheet that includes your name, course number and section, and data set letter.

A manufacturer of flashlight batteries took a sample² of 400 from a day's production and burned them continuously until they failed. Examining 40 of the batteries, the number of hours that they burned were

Battery Life (Data Set E)

755	314	247	430	375	528	224	216	220	551
1675	430	213	383	292	777	411	759	667	218
390	313	246	276	325	504	635	317	608	329
202	282	366	207	402	499	289	463	450	411

- a. Based upon the supplied data, compute the mean (\bar{X}), median (\tilde{X}), midrange, quartile values (Q_1 and Q_3) and the midhinge.
- b. Also calculate the range (R), interquartile range (IQR), variance (S^2), standard deviation (S) and coefficient of variation.
- c. Looking at the distribution of times, which measure(s) of central tendency seem best and which seem worst? Why?
- d. Comment on the shape of the data set. Is it symmetrical or noticeably skewed?
- e. An additional battery is tested and lasts for only 24 hours. Repeat the instructions of step 1 with this new data. How are your values affected?
- f. The following measures characterizes the *entire* set of 400 data values. How do your results compare with these?

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Median	401
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Math 191: Probability & Statistics Homework #2 Version F

Title: Calculating Measures of Central Tendency & Variation

Objectives:

- To calculate descriptive summary measures using Excel functions and formulas.
- To understand the effects of extreme values (outliers) in statistical data analysis.
- To understand the statistical implications of skewness of data.

Instructions:¹

- You will need the following Excel functions to complete this assignment : AVERAGE, MEDIAN, MAX, MIN, and SMALL. to help you complete the calculations in this lab.
- The data supplied on this sheet is available at the course web-site.
- Supply all of your answers to this lab on an Excel spreadsheet that includes your name, course number and section, and data set letter.

A manufacturer of flashlight batteries took a sample² of 400 from a day's production and burned them continuously until they failed. Examining 40 of the batteries, the number of hours that they burned were

Battery Life (Data Set F)

247	1258	266	465	273	308	404	271	282	1024
312	276	1123	442	505	915	529	402	417	235
373	203	611	279	1546	241	1047	432	412	677
394	415	1415	255	530	523	203	550	496	428

- a. Based upon the supplied data, compute the mean (\bar{X}), median (\tilde{X}), midrange, quartile values (Q_1 and Q_3) and the midhinge.
- b. Also calculate the range (R), interquartile range (IQR), variance (S^2), standard deviation (S) and coefficient of variation.
- c. Looking at the distribution of times, which measure(s) of central tendency seem best and which seem worst? Why?
- d. Comment on the shape of the data set. Is it symmetrical or noticeably skewed?
- e. An additional battery is tested and lasts for only 24 hours. Repeat the instructions of step 1 with this new data. How are your values affected?
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Math 191: Probability & Statistics Homework #2 Version G

Title: Calculating Measures of Central Tendency & Variation

Objectives:

- To calculate descriptive summary measures using Excel functions and formulas.
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- To understand the statistical implications of skewness of data.

Instructions:¹

- You will need the following Excel functions to complete this assignment : AVERAGE, MEDIAN, MAX, MIN, and SMALL. to help you complete the calculations in this lab.
- The data supplied on this sheet is available at the course web-site.
- Supply all of your answers to this lab on an Excel spreadsheet that includes your name, course number and section, and data set letter.

A manufacturer of flashlight batteries took a sample² of 400 from a day's production and burned them continuously until they failed. Examining 40 of the batteries, the number of hours that they burned were

Battery Life (Data Set G)

354	376	239	396	690	689	211	512	293	1424
217	523	294	1295	455	208	251	327	274	340
207	565	261	383	431	426	276	574	520	542
664	282	507	211	505	561	508	533	384	362

- a. Based upon the supplied data, compute the mean (\bar{X}), median (\tilde{X}), midrange, quartile values (Q_1 and Q_3) and the midhinge.
- b. Also calculate the range (R), interquartile range (IQR), variance (S^2), standard deviation (S) and coefficient of variation.
- c. Looking at the distribution of times, which measure(s) of central tendency seem best and which seem worst? Why?
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Math 191: Probability & Statistics Homework #2 Version H

Title: Calculating Measures of Central Tendency & Variation

Objectives:

- To calculate descriptive summary measures using Excel functions and formulas.
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Instructions:¹

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- Supply all of your answers to this lab on an Excel spreadsheet that includes your name, course number and section, and data set letter.

A manufacturer of flashlight batteries took a sample² of 400 from a day's production and burned them continuously until they failed. Examining 40 of the batteries, the number of hours that they burned were

Battery Life (Data Set H)

735	1525	279	336	220	512	480	217	215	361
537	304	264	341	391	696	546	279	514	534
514	598	387	263	406	207	1023	225	516	586
314	736	205	758	502	264	571	705	503	389

- a. Based upon the supplied data, compute the mean (\bar{X}), median (\tilde{X}), midrange, quartile values (Q_1 and Q_3) and the midhinge.
- b. Also calculate the range (R), interquartile range (IQR), variance (S^2), standard deviation (S) and coefficient of variation.
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Math 191: Probability & Statistics Homework #2 Version I

Title: Calculating Measures of Central Tendency & Variation

Objectives:

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- Supply all of your answers to this lab on an Excel spreadsheet that includes your name, course number and section, and data set letter.

A manufacturer of flashlight batteries took a sample² of 400 from a day's production and burned them continuously until they failed. Examining 40 of the batteries, the number of hours that they burned were

Battery Life (Data Set I)

351	551	455	262	290	352	364	235	371	742
263	1552	290	1198	548	352	203	385	778	520
305	1092	212	565	952	645	257	757	412	341
998	289	1090	264	845	471	516	352	588	471

- a. Based upon the supplied data, compute the mean (\bar{X}), median (\tilde{X}), midrange, quartile values (Q_1 and Q_3) and the midhinge.
- b. Also calculate the range (R), interquartile range (IQR), variance (S^2), standard deviation (S) and coefficient of variation.
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Math 191: Probability & Statistics Homework #2 Version J

Title: Calculating Measures of Central Tendency & Variation

Objectives:

- To calculate descriptive summary measures using Excel functions and formulas.
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Instructions:¹

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- The data supplied on this sheet is available at the course web-site.
- Supply all of your answers to this lab on an Excel spreadsheet that includes your name, course number and section, and data set letter.

A manufacturer of flashlight batteries took a sample² of 400 from a day's production and burned them continuously until they failed. Examining 40 of the batteries, the number of hours that they burned were

Battery Life (Data Set J)

373	373	309	782	371	427	595	325	644	537
408	314	330	1118	455	620	597	643	336	508
1034	395	258	667	404	390	460	873	400	249
484	561	755	572	614	312	934	234	320	201

- a. Based upon the supplied data, compute the mean (\bar{X}), median (\tilde{X}), midrange, quartile values (Q_1 and Q_3) and the midhinge.
- b. Also calculate the range (R), interquartile range (IQR), variance (S^2), standard deviation (S) and coefficient of variation.
- c. Looking at the distribution of times, which measure(s) of central tendency seem best and which seem worst? Why?
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