Batteries

Math 2 – Data and Statistics

MM2D1: Using sample data, students will make informal inferences about population means and standard deviations

a. Pose a question and collect sample data from at least two different populations.
b. Understand and calculate the means and standard deviations of sets of data
c. Use means and standard deviations to compare data sets
d. Compare the means and standard deviations of random samples with the corresponding population parameters, including those population parameters for normal distributions. Observe that the different sample means vary from one sample to the next. Observe that the distribution of the sample means has less variability than the population distribution.

Batteries

1. Assume for a few minutes that you need to by a battery for your car. You notice that on a consumer website they list the time in months that randomly selected automobile batteries will last.

Time battery	28	30	33	25	27	38	36	34	40	27	33
lasts in months	30	42	45	31	34	34	29	37	42	41	32

How long can you expect the battery to last? Use statistics to explain your answer.

2. Your English teach is thinking of buying a battery for her car and has asked for your advice. You see that two battery manufacturer list the life of randomly selected batteries on their information website. The data is listed below.

You notice that on a consumer website they list the time in months that randomly selected automobile batteries will last.

Everlaster	42	30	33	35	34	38	36	34	40	27	33
battery data	33	42	45	31	34	34	39	37	42	41	32

NeverDie	42	35	33	35	34	38	38	34	40	27	36
battery data	33	42	37	31	34	34	39	37	40	41	32

Explain in a note to your English teacher which battery she should choose so that she would get the best battery.

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Inferential Statistics for Math 2

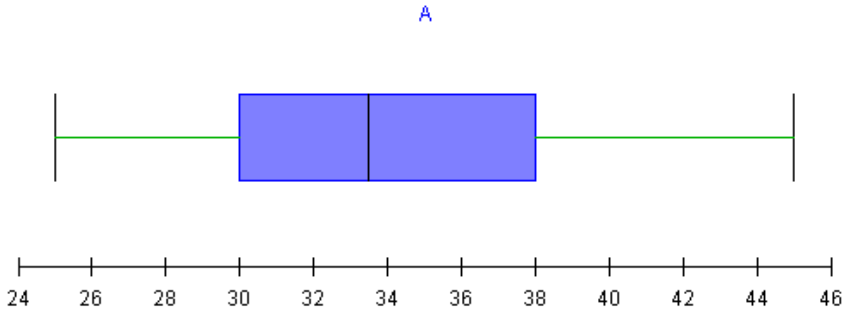
For each for the following questions consider your answer. If you calculate the mean or standard deviation you are doing good, but we are looking for something more here.

1. Assume for a few minutes that you need to by a battery for your car. You notice that on a consumer website they list the time in months that randomly selected automobile batteries will last.

Time battery lasts in months	28	30	33	25	27	38	36	34	40	27	33
	30	42	45	31	34	34	29	37	42	41	32

Battery	Statistics
n=	22
Sx=	5.6
Variance =	31.36
Mean= 34	
Min =	25
Q1 =	30
Median =	33.5
Q3 =	38
Max =	45

Data Sheet 1



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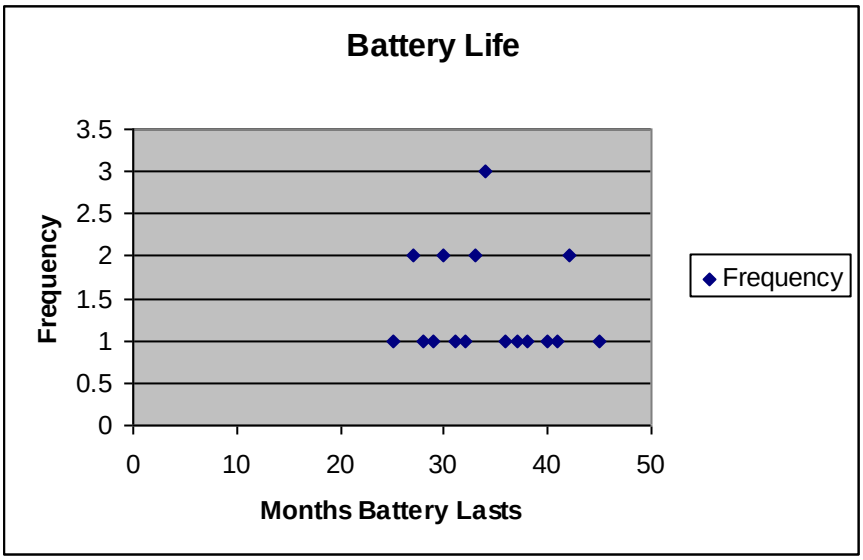
Draw a number line in the box below marking the months starting with the minimum value and increasing at a regular intervals of 5. Mark the mean and ± 2 standard deviations.

Month	Frequency
25	1
27	2
28	1
29	1
30	2
31	1
32	1
33	2
34	3
36	1
37	1
38	1
40	1
41	1
42	2
45	1



+++If you were to choose a battery at random, how long would you expect you battery to last? (*Support your answer with statistics that you calculate to receive full credit*.)+++

The battery should last between 22.8 months and 45.2 months. This is + and – 2 standard deviations from the mean. This gives a reasonable estimate of the life of the battery since the distribution is not known

For each for the following questions consider your answer. If you calculate the mean or standard deviation you are doing good, but we are looking for something more here.. Answer in complete sentences. Make the statistics work for you. If you have read this part write the word standard deviation in the lower left hand corner of this page.

2. You are thinking of buying a battery for you car again. You see that two battery manufacturer list the life of randomly selected batteries on their information website. The data is listed below.

Assume for a few minutes that you need to by a battery for your car. You notice that on a consumer website they list the time in months that randomly selected automobile batteries will last.

Everlaster	42	30	33	35	34	38	36	34	40	27	33
battery data	33	42	45	31	34	34	39	37	42	41	32

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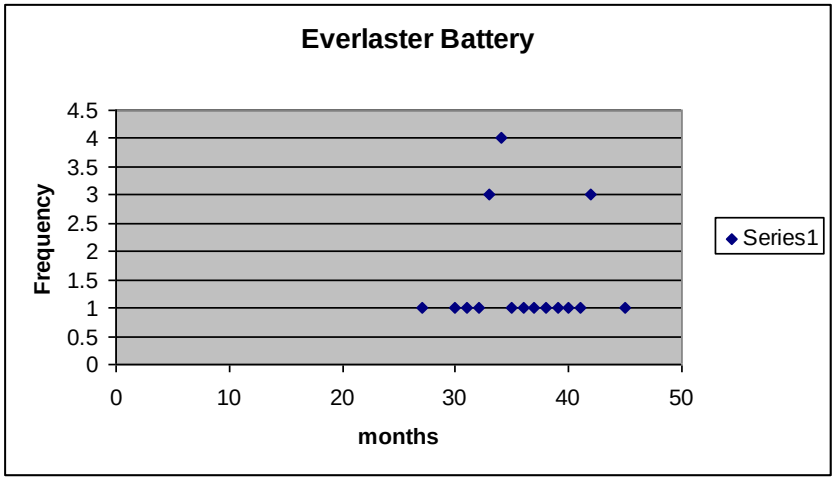
months	frequency
27	1
30	1
31	1
32	1
33	3
34	4
35	1
36	1
37	1
38	1
39	1
40	1
41	1
42	3
45	1
average	36
st.dev	4.6
Var	21.16
N	22



Months	Freq
27	1
31	1
32	1
33	2
34	4
35	2
36	1
37	2
38	2
39	1
40	2
41	1
42	2
Average	36
St Dev	3.8
Variance	14.44
N	22

NeverDie	42	35	33	35	34	38	38	34	40	27	36
battery data	33	42	37	31	34	34	39	37	40	41	32

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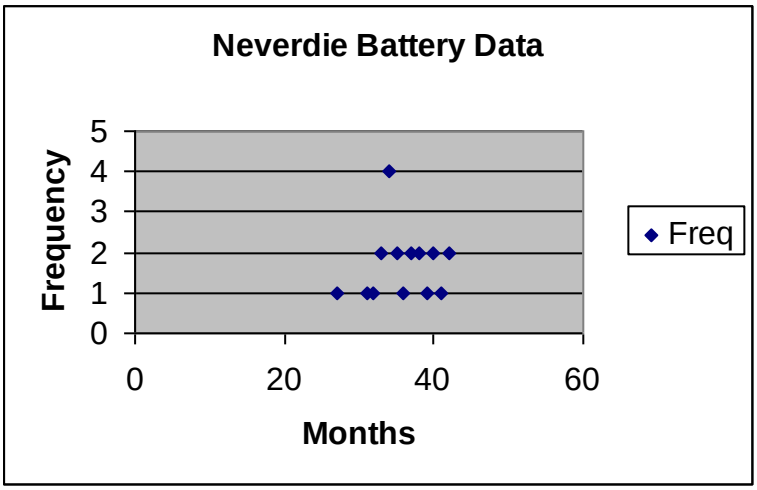

Explain in a note to your English teacher which battery you would choose so that you would get the best battery.

The preferred battery should reflect the statistics collected.

Dear English teacher,

I think that the Everlaster might be the better purchase because the mean is 36 but the Standard deviation is smaller meaning that the battery quality is more consistent.

Thanks,
Favorite Student

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