CENGAGE | WEBASSIGN

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← Biostatistics 0301132Fall2023, section 54, Fall 2023

Assignment 2.1 (Homework)

Current Score	Due Date
QUESTION 1 2 3 4	**TUE, NOV 7, 2023** 11:59 PM GMT+3 Request Extension

Assignment Submission & Scoring

Assignment Submission

For this assignment, you submit answers by questions. You are required to use a new randomization after every 1 question submissions.

Assignment Scoring

Your best submission for each question part is used for your score.

1. DETAILS **ROSBIOSTAT8 2.E.001-007.S.** 2/3 Submissions Used MY NOTES ASK YOUR TEACHER

Infectious Disease

The data in the given dataset are a sample from a larger data set collected on people discharged from a selected Pennsylvania hospital as part of a retrospective chart review of antibiotic usage in hospitals.

Data Table

Id	Duration of Hospital Stay	Age	Sex	First Temperature Following Admission	First WBC (× 1,000) Following Admission	Received Antibiotic	Received Bacterial Culture	Service
1	4	30	2	99	8	No	No	med
2	11	73	2	98	5	No	Yes	med
3	7	40	2	99	12	No	No	surg
4	12	47	2	98.2	4	No	No	surg
5	6	25	2	98.5	11	No	No	surg
6	15	82	1	96.8	6	Yes	No	surg
7	29	60	1	99.5	8	Yes	Yes	med
8	10	56	2	98.6	7	No	No	med
9	16	43	2	98	7	No	No	med
10	2	50	1	98	12	No	Yes	surg
11	8	59	2	97.6	7	No	Yes	med
12	4	4	1	97.8	3	No	No	surg
13	7	22	2	99.5	11	Yes	No	surg
14	7	33	2	98.4	14	Yes	Yes	surg
15	6	20	2	98.4	11	No	Yes	surg
16	6	32	1	99	9	No	No	surg
17	6	36	1	99.2	6	Yes	No	surg
18	3	69	1	98	6	No	No	surg
19	2	47	1	97	5	Yes	No	med
20	6	22	1	98.2	6	No	No	surg

21	8	11	1	98.2	10	No	No	surg
22	12	19	1	98.6	14	Yes	No	surg
23	10	67	2	97.6	4	No	No	med
24	10	43	2	98.6	5	No	No	surg
25	3	41	2	98	5	No	No	med

USE SALT

(a) Compute the mean duration of hospitalization (in days) for the 25 patients.

8.40 days

Compute the median duration of hospitalization (in days) for the 25 patients.

7.00 days

(b) Compute the standard deviation for the duration of hospitalization (in days) for the 25 patients. (Round your answer to four decimal places.)

5.70 ! days

Compute the range for the duration of hospitalization (in days) for the 25 patients.

27.00 days

(c) It is of clinical interest to know if the duration of hospitalization is affected by whether a patient has received antibiotics. Answer this question descriptively using numeric methods. (Enter your answers in days. Round your answers to four decimal places.)

For patients who received antibiotics, the mean duration of hospitalization was 11.1400 ! days. For patients who did not receive antibiotics, the mean duration of hospitalization was 7.3330 ! days. However, there appears to be an outlier in the group of patients who received antibiotics. After removing the outlier, the mean duration of hospitalization for this group is 8.1700 ! days, so the mean durations of the two groups appear much closer once the outlier is removed .

Suppose the scale for a data set is changed by multiplying each observation by a positive constant.

(d) What is the effect on the median? (Use *c* for the constant and *med* for the old median.)

new median =
$$*cmed*

(e) What is the effect on the mode? (Use *c* for the constant and *m* for the old mode.)

new mode =
$$*cm*

(f) What is the effect on the geometric mean? (Use *c* for the constant and *g* for the old geometric mean.)

new geometric mean =
$$*cg*

(g) What is the effect on the range? (Use *c* for the constant and *r* for the old range.)

new range =
$$*cr*

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Health Promotion

A man runs 1 mile approximately once per weekend. He records his time over an 18-week period. The individual times and summary statistics are given in the following table.

One mile running time for an individual, over 18 weeks

Week	Time (min)(x_i)
1	12.80
2	12.19
3	12.27
4	12.17
5	11.52
6	12.48
7	12.28
8	12.07
9	11.71
10	11.56
11	11.74
12	12.66
13	11.91
14	11.65
15	11.78
16	12.31
17	12.53
18	11.82

USE SALT

(a) What is the mean 1 mile running time (in min) over 18 weeks? (Round your answer to four decimal places.)

12.072 min

(b) What is standard deviation of the 1 mile running time (in min) over 18 weeks? (Round your answer to three decimal places.)

0.438 min

Suppose we construct a new variable called time_100 = 100 × time (e.g., for week 1, time_100 = 1,280).

(c) What is the mean (in min) of time_100? (Round your answer to two decimal places.)

1207.20 min

What is the standard deviation (in min) of time_100? (Round your answer to one decimal place.)

43.8 min

(d) Construct a stem and leaf plot of time_100 using the first 3 most significant digits for the stem and the least significant digit for the leaf. So, for week 1, time_100 = 1,280 which has a stem = 128 and a leaf = 0. (Enter numbers from smallest to largest separated by spaces. Enter NONE for stems with no values.)

stem	leaf
115	*(No Response)*
116	*(No Response)*
117	*(No Response)*
118	*(No Response)*
119	*(No Response)*
120	*(No Response)*
121	*(No Response)*
122	*(No Response)*
123	*(No Response)*
124	*(No Response)*
125	*(No Response)*
126	*(No Response)*
127	*(No Response)*
128	*(No Response)*

(e) Suppose the man does not run for 6 months over the winter due to snow on the ground. He resumes running once a week in the spring and records a running time = 12.98 minutes in his first week of running in the spring.

Is this an outlying value relative to the distribution of running times recorded the previous year in the given table? Why or why not? (*Hint*: Construct a box plot based on the data in the table, and assess whether this new point is an outlier based on Definition 2.11.)

Since 12.98 is less than upper quartile + 1.5 × (upper quartile − lower quartile) , it is not an outlying value relative to the distribution of running times recorded the previous year.

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Cardiovascular Disease

The data given below are a sample of cholesterol levels taken from 24 hospital employees who were on a standard American diet and who agreed to adopt a vegetarian diet for 1 month. Serum-cholesterol measurements were made before adopting the diet and 1 month after.

Data Table

Subject	Before	After	Difference (Before - After)
1	195	147	48
2	145	154	−9
3	205	177	28
4	159	147	12
5	244	209	35
6	166	148	18
7	250	203	47
8	236	216	20
9	192	185	7
10	224	207	17
11	238	207	31
12	197	168	29
13	169	181	−12
14	158	128	30
15	151	150	1
16	197	179	18
17	180	160	20
18	222	186	36
19	168	177	−9
20	168	146	22
21	167	153	14
22	161	154	7

23	178	138	40
24	137	124	13

USE SALT

(a) Compute the mean change in cholesterol. (Round your answer to four decimal places.)

19.2900

See the rounding prompt for how many decimal places are needed.

(b) Compute the standard deviation of the change in cholesterol levels. (Round your answer to four decimal places.)

16.5800

See the rounding prompt for how many decimal places are needed.

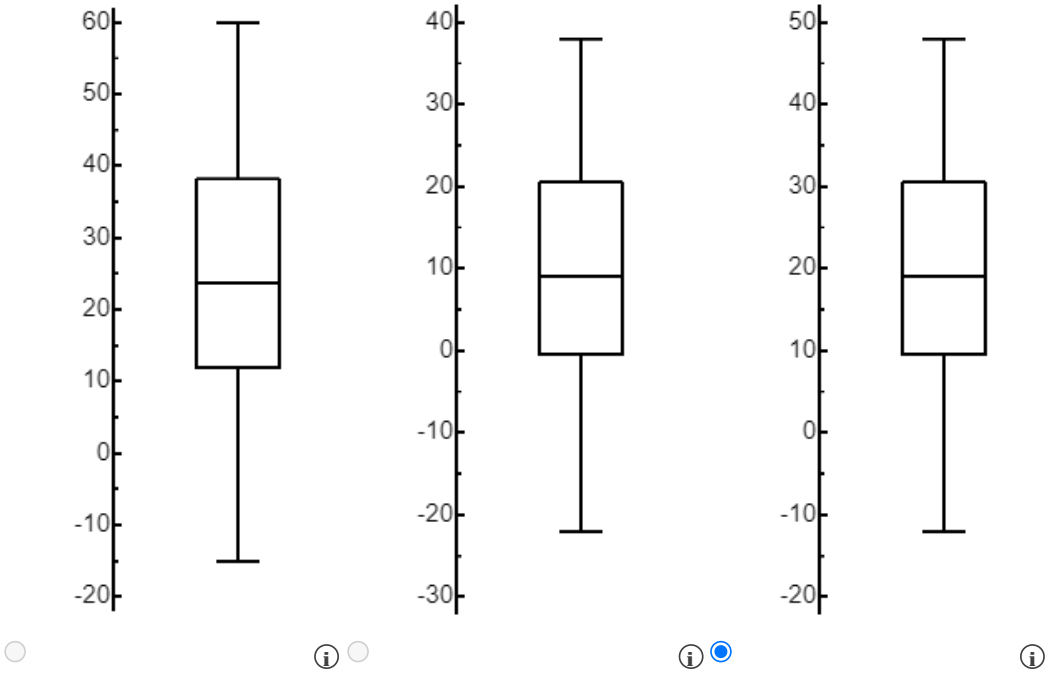
(c) Construct a stem-and-leaf plot of the cholesterol changes. (Enter numbers from smallest to largest separated by spaces. Enter NONE for stems with no values.)

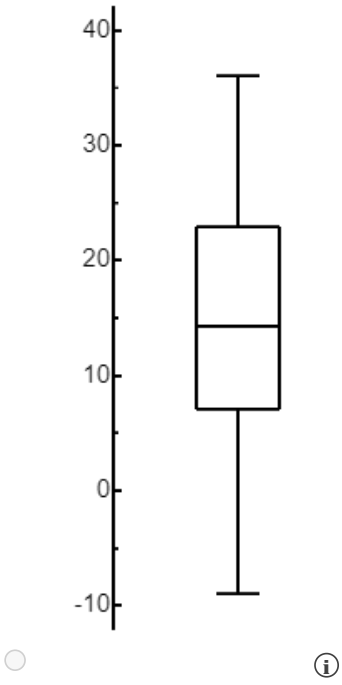
stem	leaf
+4	*(No Response)*
+3	*(No Response)*
+2	*(No Response)*
+1	*(No Response)*
+0	*(No Response)*
−0	*(No Response)*
−1	*(No Response)*

(d) Compute the median change in cholesterol.

19.00

(e) Construct a box plot of the cholesterol changes to the right of the stem-and-leaf plot.





(f) Some investigators believe that the effects of diet on cholesterol are more evident in people with high rather than low cholesterol levels. If you split the data in the table according to whether baseline cholesterol is above or below the median, can you comment descriptively on this issue? (Round your answers to four decimal places.)

The average difference among individuals with a baseline cholesterol below the median is 6.4200 . The average difference among individuals with a baseline cholesterol above the median is 32.1700 . We can see that, on average, individuals in the study with high baseline cholesterol levels experienced a greater change in cholesterol levels than individuals in the study with low baseline cholesterol levels.

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Hypertension

In an experiment that examined the effect of body position on blood pressure, 32 participants had their blood pressures measured while lying down with their arms at their sides and again standing with their arms supported at heart level.† The data are given in the following table.

Blood Pressure Data

Effect of position on blood pressure

Participant	Blood pressure (mm Hg)			
	Recumbent, arm at side		Standing, arm at heart level	
B.R.A.	98[a]	70[b]	104[a]	78[b]
J. A. B.	125	73	123	77
F. L. B.	109	71	101	67
V. P. B.	121	67	113	73
M. F. B.	105	65	97	63
E. H. B.	107	59	95	57
G. C.	115	69	107	69
M. M. C.	105	75	105	77
T. J. F.	119	81	119	89
R. R. F.	93	59	87	59
C. R. F.	109	77	101	79
E. W. G.	137	81	123	77
T. F. H.	121	71	117	83
E. J. H.	143	87	137	89
H. B. H.	119	59	93	59
R. T. K.	135	77	127	67
W. E. L.	117	73	109	67
R. L. L.	127	77	113	75
H. S. M.	109	77	95	69
V. J. M.	135	87	143	89
R. H. P.	111	77	99	65

R. C. R.	119	75	105	69
J. A. R.	107	75	95	73
A. K. R.	131	91	127	87
T. H. S.	101	67	95	63
O. E. S.	119	71	103	67
R. E. S.	115	77	89	61
E. C. T.	117	79	101	83
J. H. T.	109	75	95	69
F. P. V.	121	71	119	79
P. F. W.	107	61	93	57
W. J. W.	147	91	139	93

USE SALT

(a) Compute the arithmetic mean and median for the difference in systolic and diastolic blood pressure, respectively, taken in different positions (recumbent minus standing). (Round your means to two decimal places.)

	systolic (mm Hg)	diastolic (mm Hg)
arithmetic mean	8.88	1.13
median	8.00	2.00

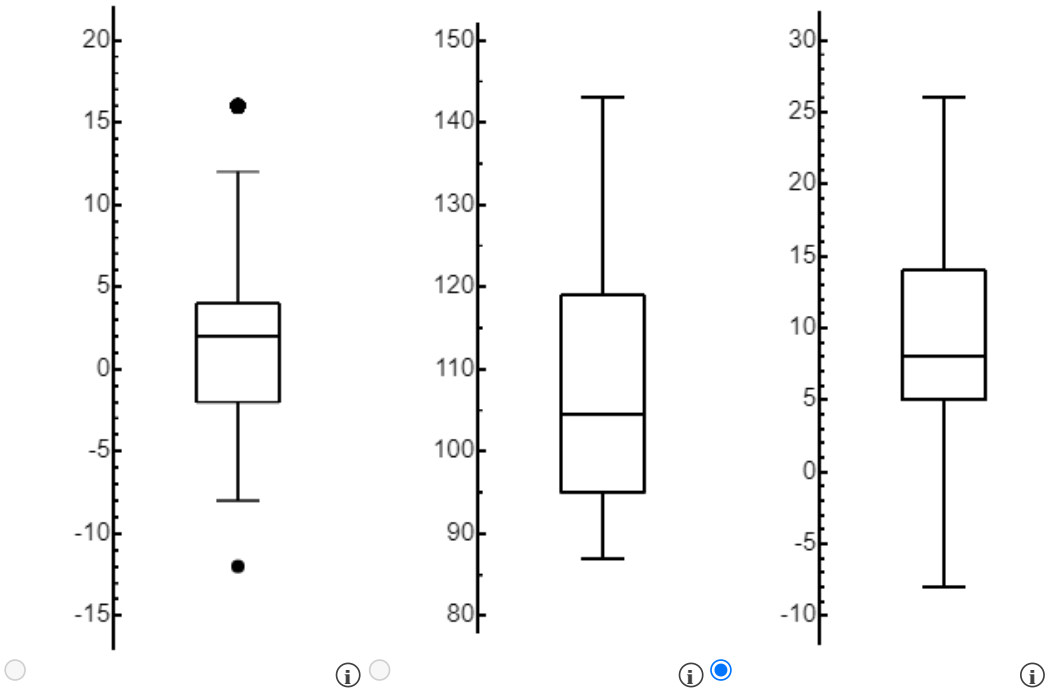
(b) Construct a stem-and-leaf plot for the difference scores for systolic blood pressure. (Enter numbers from smallest to largest separated by spaces. Enter NONE for stems with no values.)

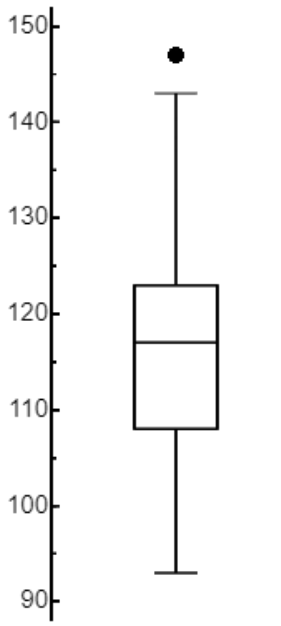
stem	leaf
+2	*(No Response)*
+1	*(No Response)*
+0	*(No Response)*
−0	*(No Response)*

Construct a stem-and-leaf plot for the difference scores for diastolic blood pressure. (Enter numbers from smallest to largest separated by spaces. Enter NONE for stems with no values.)

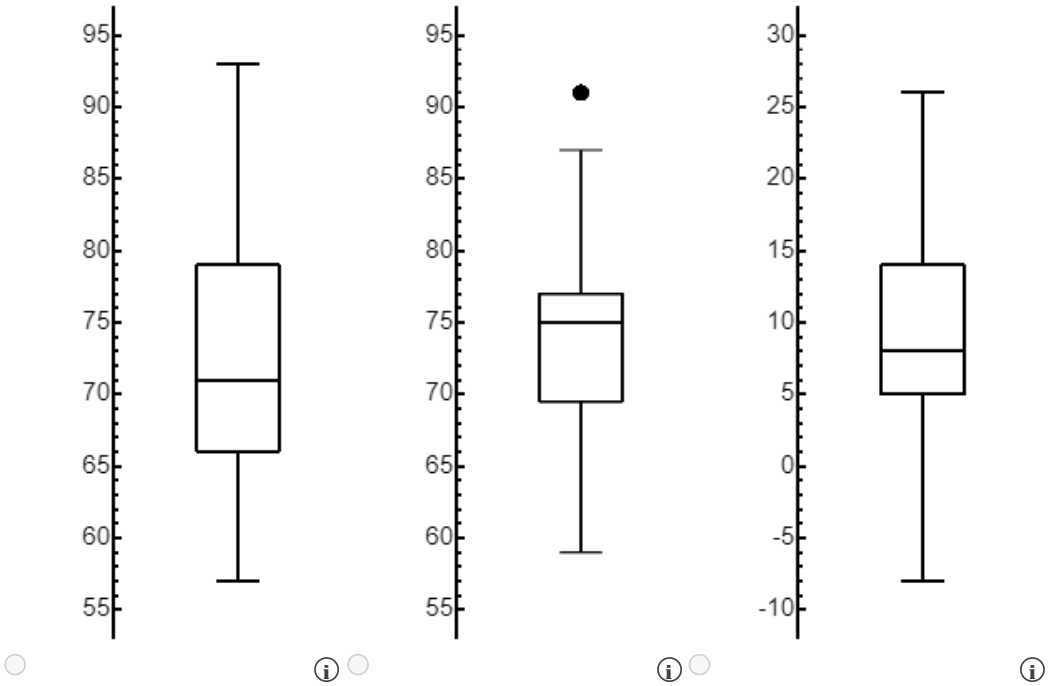
stem	leaf
+1	*(No Response)*
+0	*(No Response)*
−0	*(No Response)*
−1	*(No Response)*

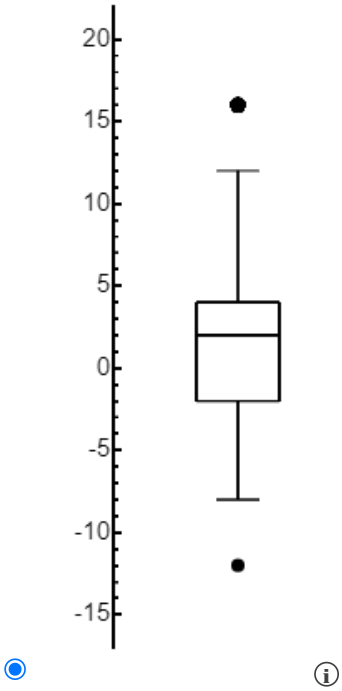
Construct a box plot for the difference scores for systolic blood pressure.





Construct a box plot for the difference scores for diastolic blood pressure.





(c) Based on your answers in parts (a) and (b), comment on the effect of body position on the levels of systolic and diastolic blood pressure.

Systolic blood pressure seems to be [much higher lying down than standing] . Diastolic blood pressure seems to be [about the same in the two positions] . The distributions are both [reasonably symmetric] .

(d) Orthostatic hypertension is sometimes defined based on an unusual change in blood pressure after changing position. Suppose we define a normal range for change in systolic blood pressure (SBP) based on change in SBP from the recumbent to the standing position in the table that is between the upper and lower decile. What should the normal range be (in mm Hg)?

[6] mm Hg ≤ x ≤ [16] mm Hg

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Question 1 of 4 View Next Question

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