

Introductory Statistics Homework Analysis

Overview

The file name with student responses and scores is Topic03.AB.csv. 50 students submitted the homework assignment.

Full credit for this homework assignment is 35. Each student was given 31 questions and this homework assignment contains a total of 86 questions.

The mean score of the 50 students who submitted the homework assignment is 8.33. The lowest and highest scores are 0 and 31, respectively.

The histogram and summary statistics for the scores are given by Figure ?? and Table ??.

Mean	Std.dev	Min	Q1	Median	Q3	Max
8.33	6.56	0.00	5.00	6.00	8.00	31.00

Table 1: Summary statistics of the scores

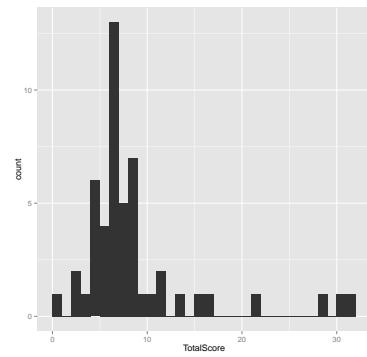


Figure 1: Histogram of scores.

Topic Learning Outcomes

- A. Identify a quantitative variable.
- B. Identify appropriate displays of a quantitative variable.
- C. Identify and interpret components of a histogram.
- D. Describe the shape of the distribution of a quantitative variable using a histogram or stem-and-leaf display.
- E. Identify important characteristics of the distribution of a quantitative variable using a histogram or stem-and-leaf display.
- F. Identify potential outliers in a distribution using a histogram or stem-and-leaf display.
- G. Report the 5-number summary for a quantitative variable.
- H. Calculate the 5-number summary for a quantitative variable.
- I. Describe the important characteristics of the 5-number summary.
- J. Report the values of the mean and standard deviation for a quantitative variable.
- K. Calculate the mean and standard deviation for a quantitative variable.
- L. Describe the important characteristics of the mean and standard deviation.
- M. Compare and contrast the median and the mean as numerical summaries of the center of the distribution of a quantitative variable.
- N. Compare and contrast the range, interquartile range and the standard deviation as numerical summaries of the variability of the distribution of a quantitative variable.
- O. Identify the most appropriate measures of center and variability to use for a particular quantitative variable.

Table ?? and Figure ?? show the summary of percentage scores by learning outcome. Among all learning outcomes, Outcome M has the highest correct percentage, while Outcome K has the lowest.

	Mean	Std.dev	Min	Median	Max
M	36.50	30.39	0.00	25.00	100.00
O	35.00	39.45	0.00	25.00	100.00
F	34.00	47.85	0.00	0.00	100.00
D	30.00	37.80	0.00	0.00	100.00
C	28.80	26.85	0.00	20.00	100.00
L	28.00	27.96	0.00	25.00	100.00
H	26.00	44.31	0.00	0.00	100.00
N	22.00	30.57	0.00	0.00	100.00
I	20.50	36.31	0.00	0.00	100.00
A	20.00	40.41	0.00	0.00	100.00
B	20.00	40.41	0.00	0.00	100.00
E	18.67	26.22	0.00	0.00	100.00
J	6.50	15.82	0.00	0.00	50.00
G	6.00	23.99	0.00	0.00	100.00
K	0.00	0.00	0.00	0.00	0.00

Table 2: Summary statistics of the student percentage correct scores on the topic learning outcomes. The table is sorted from the highest mean to the lowest.

To analyze the students' performance on different learning outcomes, we consider the generalized mixed effects model:

$$g(E[Y_{ij}|u_j]) = \tau_i + u_j$$

where $i = 1, \dots, 15$ learning outcomes; $j = 1, \dots, 50$ students. Y_{ij} is the score (scaled in $[0, 1]$) of the j th student in the i th learning outcome. τ_i is the fixed effect, which represents the actual level of the learning outcome i . u_j is the random effect from the students with $u_j \sim N(0, \sigma_u^2)$.

Since $Y_{ij} \in [0, 1]$, and most of y_{ij} take the value 1 (see Figure ??), it is not easy to find an appropriate model. Beta distribution is possible if 0 and 1 are not in the range of Y_{ij} . Binomial distribution is another possibility if we do not scale the scores. Hence we assume that Y is binomial with the logit link function, then the results are in Table ?? and Figure ??.

	est.	lower	upper
(Intercept)	-0.55	-1.05	-0.06
ObjectiveO	-0.07	-0.66	0.51

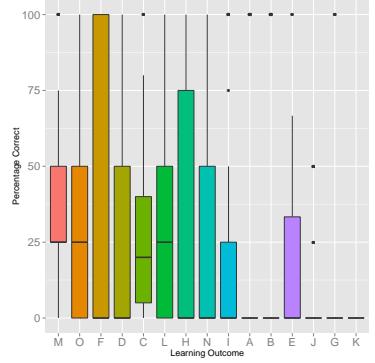


Figure 2: Side-by-side boxplots of the correct percentages by learning outcome.

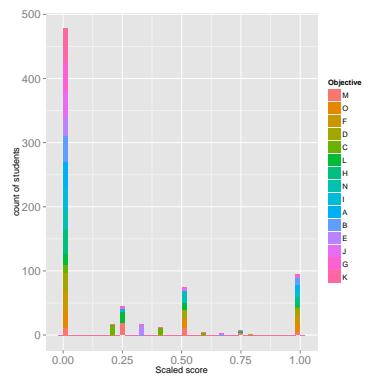


Figure 3: Histogram of the scaled scores by learning outcome.

ObjectiveF	-0.12	-0.71	0.46
ObjectiveD	-0.33	-0.93	0.26
ObjectiveC	-0.40	-1.00	0.20
ObjectiveL	-0.44	-1.05	0.16
ObjectiveH	-0.56	-1.17	0.05
ObjectiveN	-0.81	-1.44	-0.18
ObjectiveI	-0.91	-1.55	-0.27
ObjectiveA	-0.95	-1.59	-0.30
ObjectiveB	-0.95	-1.59	-0.30
ObjectiveE	-1.05	-1.70	-0.39
ObjectiveJ	-2.37	-3.25	-1.49
ObjectiveG	-2.46	-3.36	-1.56
ObjectiveK	-4.64	-6.58	-2.70

Table 3: 95% confidence intervals of the fixed effects

It shows that M is the best understood learning outcome. Outcomes K,G,J,E,B,A,I,N,M are significantly worse than M.

Nevertheless, the assumption is probably incorrect, as we could check the residuals in Figure ??.

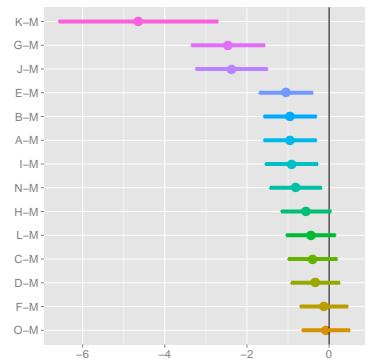
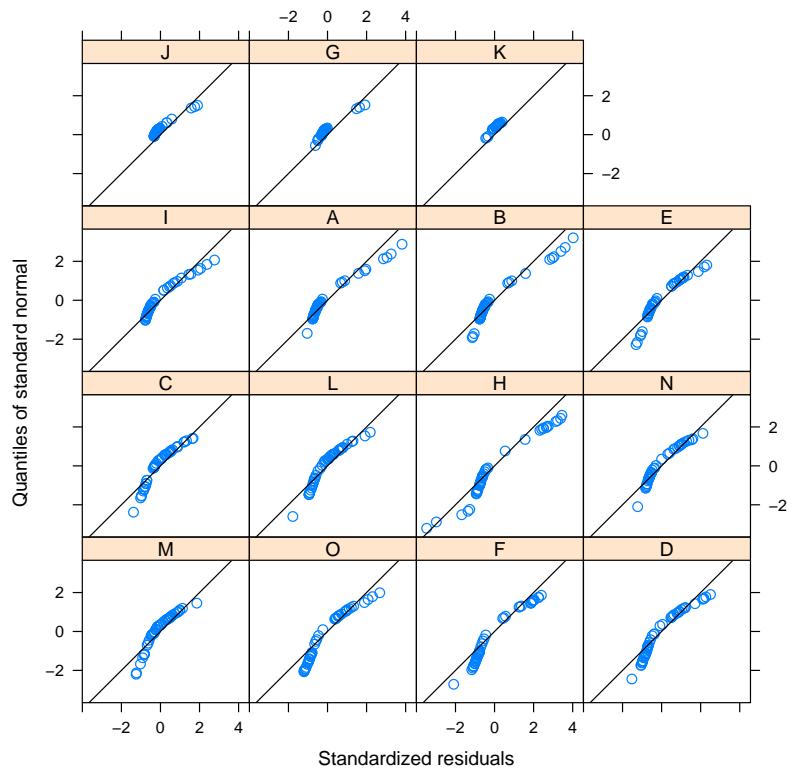


Figure 4: 95% confidence intervals of the fixed effects coefficients by the generalized mixed effects model

Question Sets

Table ?? and Figure ?? shows the summary statistics of the percentage correct score by question for each question set. Percentage correct scores for questions in the same question set should have small variability.

Qset	LO	#	Mean	Std.dev	Min	Median	Max
AA	O	2	41.23	21.63	25.93	41.23	56.52
L	H	4	28.87	17.83	7.14	29.16	50.00
B	B	2	21.27	14.93	10.71	21.27	31.82
J	F	4	34.04	14.71	15.38	35.38	50.00
U	M	2	42.45	14.40	32.26	42.45	52.63
C	C	3	37.87	13.09	29.41	31.25	52.94
AB	O	3	30.06	11.99	21.43	25.00	43.75
V	M	3	42.26	11.21	29.41	47.37	50.00
G	C	4	19.26	10.54	8.33	17.69	33.33
T	L	3	30.54	8.94	22.22	29.41	40.00
M	I	3	20.61	8.53	11.11	23.08	27.63
S	L	3	18.32	7.21	10.00	22.22	22.73
H	D	4	30.13	6.82	23.08	29.15	39.13
W	M	3	42.67	6.71	36.84	41.18	50.00
D	C	3	23.30	6.39	16.67	23.81	29.41
A	A	4	18.73	5.73	14.29	17.14	26.32
K	G	4	6.16	4.53	0.00	7.32	10.00
F	C	4	27.31	4.42	22.22	27.88	31.25
N	J	4	6.55	4.27	1.79	6.44	11.54
I	E	6	18.73	4.09	13.64	18.23	23.53
Z	N	3	26.02	3.35	22.22	27.27	28.57
E	C	3	34.12	1.37	33.33	33.33	35.71
O	K	4	0.00	0.00	0.00	0.00	0.00
P	K	4	0.00	0.00	0.00	0.00	0.00
Q	L	1	32.00	0.00	32.00	32.00	32.00
R	L	1	30.00	0.00	30.00	30.00	30.00
X	M	1	22.00	0.00	22.00	22.00	22.00
Y	N	1	18.00	0.00	18.00	18.00	18.00

Table 4: Summary statistics of the percentage correct score by question for each question sets. The table is sorted from the largest standard deviation to the smallest.

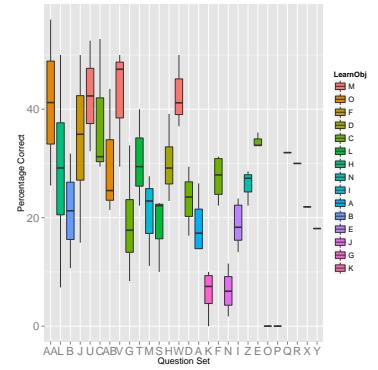


Figure 6: Side-by-side boxplots of the question correct percentage score for each question set

Questions

Table ?? compares the performance on each question.

ID	LO	Qset	Name	Type	FullPt	QinSet	N	CrtPct	Count	NA's	Mean	Std	Flag
1	A	A	1	MU	1	1	4	20.00	10	40	0.20	0.42	
2	A	A	2	MU	1	1	4	26.32	19	31	0.26	0.45	
3	A	A	3	MU	1	1	4	14.29	7	43	0.14	0.38	
4	A	A	4	MU	1	1	4	14.29	14	36	0.14	0.36	
5	B	B	salaries1	MC	1	1	2	31.82	22	28	0.32	0.48	*
6	B	B	salaries2	MC	1	1	2	10.71	28	22	0.11	0.31	*
7	C	C	horizontal	MC	1	1	3	29.41	17	33	0.29	0.47	*
8	C	C	horizontal2	MC	1	1	3	31.25	16	34	0.31	0.48	*
9	C	C	horizontal3	MC	1	1	3	52.94	17	33	0.53	0.51	*
10	C	D	vertical	MC	1	1	3	23.81	21	29	0.24	0.44	
11	C	D	vertical2	MC	1	1	3	29.41	17	33	0.29	0.47	
12	C	D	vertical3	MC	1	1	3	16.67	12	38	0.17	0.39	
13	C	E	tips	MC	1	1	3	35.71	14	36	0.36	0.50	
14	C	E	tips2	MC	1	1	3	33.33	15	35	0.33	0.49	
15	C	E	tips3	MC	1	1	3	33.33	21	29	0.33	0.48	
16	C	F	flights1	MC	1	1	4	31.25	16	34	0.31	0.48	
17	C	F	flights2	MC	1	1	4	30.77	13	37	0.31	0.48	
18	C	F	flights3	MC	1	1	4	22.22	9	41	0.22	0.44	
19	C	F	flights4	MC	1	1	4	25.00	12	38	0.25	0.45	
20	C	G	flights5	MC	1	1	4	15.38	13	37	0.15	0.38	*
21	C	G	flights6	MC	1	1	4	20.00	10	40	0.20	0.42	
22	C	G	flights7	MC	1	1	4	8.33	12	38	0.08	0.29	*
23	C	G	flights8	MC	1	1	4	33.33	15	35	0.33	0.49	*
24	D	H	random1	MC	1	2	4	31.03	29	21	0.31	0.47	
25	D	H	random2	MC	1	2	4	39.13	23	27	0.39	0.50	*
26	D	H	random3	MC	1	2	4	23.08	26	24	0.23	0.43	*
27	D	H	random4	MC	1	2	4	27.27	22	28	0.27	0.46	
28	E	I	blowhole	MC	1	3	6	13.64	22	28	0.14	0.35	
29	E	I	FEV	MC	1	3	6	19.23	26	24	0.19	0.40	
30	E	I	diamonds	MC	1	3	6	15.38	26	24	0.15	0.37	
31	E	I	amps	MC	1	3	6	23.33	30	20	0.23	0.43	
32	E	I	lowtemp	MC	1	3	6	17.24	29	21	0.17	0.38	
33	E	I	musicCDs	MC	1	3	6	23.53	17	33	0.24	0.44	

34	F	J	blowhole	MC	1	1	4	15.38	13	37	0.15	0.38	*
35	F	J	FEV	MC	1	1	4	30.77	13	37	0.31	0.48	*
36	F	J	amps	MC	1	1	4	50.00	14	36	0.50	0.52	*
37	F	J	random2	MC	1	1	4	40.00	10	40	0.40	0.52	*
38	G	K	1	MU	1	1	4	5.56	18	32	0.06	0.24	
39	G	K	2	MU	1	1	4	10.00	10	40	0.10	0.32	
40	G	K	3	MU	1	1	4	9.09	11	39	0.09	0.30	
41	G	K	4	MU	1	1	4	0.00	11	39	0.00	0.00	
42	H	L	birthwt	MC	1	1	4	7.14	14	36	0.07	0.27	*
43	H	L	heartrate	MC	1	1	4	25.00	16	34	0.25	0.45	*
44	H	L	babe	MC	1	1	4	50.00	8	42	0.50	0.53	*
45	H	L	hightemps	MC	1	1	4	33.33	12	38	0.33	0.49	*
46	I	M	five1	FB	4	1	3	23.08	13	37	0.92	1.75	
47	I	M	five2	FB	4	1	3	27.63	19	31	1.11	1.70	*
48	I	M	five3	FB	4	1	3	11.11	18	32	0.44	0.78	*
49	J	N	amps	FB	2	1	4	4.55	11	39	0.09	0.30	
50	J	N	FEV	FB	2	1	4	1.79	14	36	0.04	0.13	
51	J	N	birthwt	FB	2	1	4	8.33	12	38	0.17	0.39	
52	J	N	heartrate	FB	2	1	4	11.54	13	37	0.23	0.39	
53	K	O	mean1	FB	1	1	4	0.00	12	38	0.00	0.00	
54	K	O	mean2	FB	1	1	4	0.00	9	41	0.00	0.00	
55	K	O	mean3	FB	1	1	4	0.00	15	35	0.00	0.00	
56	K	O	mean4	FB	1	1	4	0.00	14	36	0.00	0.00	
57	K	P	sd1	FB	1	1	4	0.00	8	42	0.00	0.00	
58	K	P	sd2	FB	1	1	4	0.00	13	37	0.00	0.00	
59	K	P	sd3	FB	1	1	4	0.00	13	37	0.00	0.00	
60	K	P	sd4	FB	1	1	4	0.00	16	34	0.00	0.00	
61	L	Q	mean	MC	1	1	1	32.00	50	0	0.32	0.47	
62	L	R	stdev	MC	1	1	1	30.00	50	0	0.30	0.46	
63	L	S	height	MC	1	1	3	10.00	10	40	0.10	0.32	
64	L	S	weight	MC	1	1	3	22.22	18	32	0.22	0.43	
65	L	S	neck	MC	1	1	3	22.73	22	28	0.23	0.43	
66	L	T	grades	MC	1	1	3	40.00	15	35	0.40	0.51	*

67	L	T	distance	MC	1	1	3	29.41	17	33	0.29	0.47	
68	L	T	exercise	MC	1	1	3	22.22	18	32	0.22	0.43	*
69	M	U	lowtemp	MC	1	1	2	32.26	31	19	0.32	0.48	*
70	M	U	hist1	MC	1	1	2	52.63	19	31	0.53	0.51	*
71	M	V	FEV	MC	1	1	3	29.41	17	33	0.29	0.47	*
72	M	V	amps	MC	1	1	3	50.00	14	36	0.50	0.52	*
73	M	V	HW	MC	1	1	3	47.37	19	31	0.47	0.51	*
74	M	W	blowhole	MC	1	1	3	50.00	14	36	0.50	0.52	
75	M	W	CDs	MC	1	1	3	41.18	17	33	0.41	0.51	
76	M	W	HW	MC	1	1	3	36.84	19	31	0.37	0.50	
77	M	X	change	MC	1	1	1	22.00	50	0	0.22	0.42	
78	N	Y	add	MC	1	1	1	18.00	50	0	0.18	0.39	
79	N	Z	blowhole	MC	1	1	3	22.22	18	32	0.22	0.43	
80	N	Z	CDs	MC	1	1	3	28.57	21	29	0.29	0.46	
81	N	Z	HW	MC	1	1	3	27.27	11	39	0.27	0.47	
82	O	AA	lowtemp	MC	1	1	2	25.93	27	23	0.26	0.45	*
83	O	AA	random3	MC	1	1	2	56.52	23	27	0.57	0.51	*
84	O	AB	FEV	MC	1	1	3	25.00	20	30	0.25	0.44	*
85	O	AB	blowhole	MC	1	1	3	21.43	14	36	0.21	0.43	*
86	O	AB	random2	MC	1	1	3	43.75	16	34	0.44	0.51	*

Table 5: Summary statistics of each question

Students

The percentages correct by learning outcome and total for each student, sorted by the highest to lowest total are displayed in Table ???. And the ranks in percentage are given in Table ???. Figure ?? shows the percent rank of the students.

w.introstat69	17.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
w.introstat29	14.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
w.introstat32	14.29	0.00	0.00	0.00	33.33	0.00	0.00	0.00	50.00	0.00	0.00
w.introstat65	14.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
w.introstat68	14.29	0.00	0.00	0.00	33.33	0.00	100.00	0.00	0.00	0.00	0.00
w.introstat24	11.43	0.00	0.00	0.00	33.33	0.00	0.00	25.00	0.00	100.00	0.00
w.introstat26	11.43	0.00	0.00	0.00	33.33	0.00	0.00	0.00	0.00	0.00	0.00
w.introstat33	11.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
w.introstat35	11.43	0.00	0.00	0.00	33.33	0.00	0.00	0.00	0.00	100.00	0.00
w.introstat62	11.43	0.00	0.00	0.00	33.33	100.00	0.00	0.00	0.00	0.00	0.00
w.introstat67	11.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	100.00	0.00
w.introstat63	8.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	0.00	0.00
w.introstat27	5.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
w.introstat38	5.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
w.introstat64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6: Sorted learning outcomes sets and total correct percentages

	L	C	D	F	O	M
w.introstat40	100.00	100.00	100.00	100.00	100.00	100.00
w.introstat70	50.00	100.00	100.00	100.00	100.00	100.00
w.introstat49	100.00	80.00	100.00	100.00	100.00	100.00
w.introstat42	50.00	100.00	50.00	0.00	100.00	100.00
w.introstat41	75.00	20.00	0.00	100.00	50.00	75.00
w.introstat43	50.00	0.00	50.00	100.00	100.00	75.00
w.introstat44	25.00	40.00	50.00	100.00	100.00	50.00
w.introStat56	100.00	40.00	0.00	0.00	0.00	50.00
w.introstat60	50.00	0.00	0.00	100.00	0.00	75.00
w.introstat31	50.00	20.00	0.00	100.00	0.00	100.00
w.introstat46	25.00	60.00	0.00	0.00	0.00	25.00
w.introstat23	25.00	0.00	50.00	0.00	0.00	50.00
w.introstat30	50.00	40.00	0.00	0.00	100.00	50.00
w.introstat45	50.00	20.00	100.00	100.00	0.00	50.00
w.introstat48	25.00	20.00	0.00	0.00	50.00	50.00
w.introStat59	0.00	20.00	0.00	0.00	50.00	75.00
w.introstat61	50.00	40.00	50.00	100.00	0.00	0.00
w.introstat66	0.00	20.00	50.00	0.00	50.00	50.00
w.introstat21	25.00	20.00	0.00	0.00	50.00	25.00
w.introstat28	0.00	0.00	100.00	100.00	100.00	25.00
w.introstat36	25.00	0.00	0.00	100.00	0.00	25.00
w.introstat47	25.00	40.00	100.00	100.00	0.00	0.00

w.introStat52	0.00	20.00	100.00	100.00	50.00	25.00
w.introstat22	25.00	60.00	0.00	0.00	50.00	0.00
w.introstat25	25.00	40.00	100.00	100.00	0.00	0.00
w.introstat34	0.00	40.00	50.00	100.00	50.00	25.00
w.introstat37	50.00	20.00	0.00	0.00	50.00	25.00
w.introstat39	75.00	0.00	0.00	100.00	0.00	25.00
w.introStat50	0.00	20.00	0.00	0.00	50.00	25.00
w.introStat51	25.00	0.00	0.00	0.00	50.00	25.00
w.introStat53	0.00	60.00	50.00	0.00	0.00	25.00
w.introStat54	25.00	0.00	50.00	0.00	50.00	50.00
w.introStat55	0.00	20.00	0.00	0.00	100.00	25.00
w.introStat57	25.00	40.00	0.00	0.00	0.00	25.00
w.introStat58	25.00	40.00	0.00	0.00	50.00	50.00
w.introstat69	50.00	40.00	50.00	0.00	0.00	25.00
w.introstat29	0.00	20.00	0.00	0.00	100.00	50.00
w.introstat32	25.00	0.00	50.00	0.00	0.00	25.00
w.introstat65	0.00	60.00	50.00	0.00	50.00	0.00
w.introstat68	25.00	0.00	0.00	0.00	0.00	50.00
w.introstat24	0.00	0.00	50.00	0.00	0.00	0.00
w.introstat26	0.00	20.00	0.00	0.00	50.00	25.00
w.introstat33	0.00	40.00	0.00	0.00	0.00	25.00
w.introstat35	0.00	40.00	0.00	0.00	0.00	0.00
w.introstat62	25.00	0.00	0.00	0.00	0.00	25.00
w.introstat67	0.00	20.00	0.00	0.00	0.00	25.00
w.introstat63	25.00	20.00	0.00	0.00	0.00	0.00
w.introstat27	25.00	20.00	0.00	0.00	0.00	0.00
w.introstat38	0.00	20.00	50.00	0.00	0.00	0.00
w.introstat64	0.00	0.00	0.00	0.00	0.00	0.00

	Total	K	G	J	E	B	A	I	N	H
w.introstat40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.00
w.introstat70	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
w.introstat49	4.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	26.00
w.introstat42	6.00	0.00	6.00	10.00	42.00	0.00	0.00	0.00	6.00	26.00
w.introstat41	8.00	0.00	6.00	0.00	42.00	20.00	0.00	0.00	6.00	26.00
w.introstat43	10.00	0.00	6.00	0.00	42.00	20.00	20.00	0.00	6.00	26.00
w.introstat44	12.00	0.00	6.00	10.00	42.00	20.00	0.00	16.00	38.00	0.00
w.introStat56	14.00	0.00	6.00	16.00	10.00	20.00	20.00	30.00	6.00	0.00
w.introstat60	14.00	0.00	6.00	16.00	42.00	20.00	20.00	0.00	6.00	26.00
w.introstat31	18.00	0.00	6.00	16.00	4.00	20.00	20.00	30.00	38.00	26.00
w.introstat46	20.00	0.00	6.00	10.00	42.00	20.00	20.00	14.00	6.00	26.00
w.introstat23	22.00	0.00	6.00	16.00	4.00	20.00	20.00	16.00	38.00	26.00
w.introstat30	22.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	26.00

	L	C	D	F	O	M				
w.introstat45	22.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	26.00
w.introstat48	22.00	0.00	6.00	16.00	10.00	20.00	20.00	30.00	6.00	0.00
w.introStat59	22.00	0.00	6.00	16.00	10.00	20.00	0.00	30.00	6.00	26.00
w.introstat61	22.00	0.00	6.00	16.00	10.00	0.00	20.00	30.00	38.00	26.00
w.introstat66	22.00	0.00	6.00	16.00	42.00	0.00	20.00	22.00	6.00	26.00
w.introstat21	36.00	0.00	6.00	16.00	10.00	20.00	20.00	22.00	6.00	26.00
w.introstat28	36.00	0.00	6.00	16.00	42.00	20.00	20.00	22.00	38.00	26.00
w.introstat36	36.00	0.00	6.00	16.00	42.00	20.00	20.00	16.00	6.00	0.00
w.introstat47	36.00	0.00	6.00	16.00	42.00	20.00	0.00	30.00	38.00	26.00
w.introStat52	36.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	6.00	26.00
w.introstat22	46.00	0.00	6.00	16.00	10.00	20.00	20.00	30.00	38.00	26.00
w.introstat25	46.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	26.00
w.introstat34	46.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	26.00
w.introstat37	46.00	0.00	6.00	16.00	10.00	20.00	20.00	30.00	38.00	26.00
w.introstat39	46.00	0.00	6.00	16.00	10.00	20.00	20.00	30.00	38.00	26.00
w.introStat50	46.00	0.00	6.00	16.00	10.00	0.00	20.00	30.00	38.00	0.00
w.introStat51	46.00	0.00	6.00	16.00	4.00	0.00	20.00	30.00	38.00	26.00
w.introStat53	46.00	0.00	6.00	16.00	42.00	0.00	20.00	30.00	38.00	26.00
w.introStat54	46.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	0.00
w.introStat55	46.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	6.00	0.00
w.introStat57	46.00	0.00	6.00	16.00	42.00	20.00	0.00	30.00	38.00	0.00
w.introStat58	46.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	26.00
w.introstat69	46.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	26.00
w.introstat29	72.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	26.00
w.introstat32	72.00	0.00	6.00	16.00	10.00	20.00	20.00	30.00	6.00	26.00
w.introstat65	72.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	26.00
w.introstat68	72.00	0.00	6.00	16.00	10.00	20.00	0.00	30.00	38.00	26.00
w.introstat24	80.00	0.00	6.00	16.00	10.00	20.00	20.00	22.00	38.00	0.00
w.introstat26	80.00	0.00	6.00	16.00	10.00	20.00	20.00	30.00	38.00	26.00
w.introstat33	80.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	0.00
w.introstat35	80.00	0.00	6.00	16.00	10.00	20.00	20.00	30.00	38.00	0.00
w.introstat62	80.00	0.00	6.00	16.00	10.00	0.00	20.00	30.00	38.00	26.00
w.introstat67	80.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	6.00	0.00
w.introstat63	92.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	6.00	26.00
w.introstat27	94.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	26.00
w.introstat38	94.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	26.00
w.introstat64	98.00	0.00	6.00	16.00	42.00	20.00	20.00	30.00	38.00	26.00

Table 8: Rank of the students by the total and learning outcome scores. The percentages are the proportion of students in this section who got a higher score in the corresponding column.

	L	C	D	F	O	M
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w.introstat40	0.00	0.00	0.00	0.00	0.00	0.00
w.introstat70	10.00	0.00	0.00	0.00	0.00	0.00
w.introstat49	0.00	6.00	0.00	0.00	0.00	0.00
w.introstat42	10.00	0.00	16.00	34.00	0.00	0.00
w.introstat41	6.00	40.00	44.00	0.00	20.00	10.00
w.introstat43	10.00	74.00	16.00	0.00	0.00	10.00
w.introstat44	30.00	16.00	16.00	0.00	0.00	18.00
w.introStat56	0.00	16.00	44.00	34.00	50.00	18.00
w.introstat60	10.00	74.00	44.00	0.00	50.00	10.00
w.introstat31	10.00	40.00	44.00	0.00	50.00	0.00
w.introstat46	30.00	8.00	44.00	34.00	50.00	40.00
w.introstat23	30.00	74.00	16.00	34.00	50.00	18.00
w.introstat30	10.00	16.00	44.00	34.00	0.00	18.00
w.introstat45	10.00	40.00	0.00	0.00	50.00	18.00
w.introstat48	30.00	40.00	44.00	34.00	20.00	18.00
w.introStat59	66.00	40.00	44.00	34.00	20.00	10.00
w.introstat61	10.00	16.00	16.00	0.00	50.00	78.00
w.introstat66	66.00	40.00	16.00	34.00	20.00	18.00
w.introstat21	30.00	40.00	44.00	34.00	20.00	40.00
w.introstat28	66.00	74.00	0.00	0.00	0.00	40.00
w.introstat36	30.00	74.00	44.00	0.00	50.00	40.00
w.introstat47	30.00	16.00	0.00	0.00	50.00	78.00
w.introStat52	66.00	40.00	0.00	0.00	20.00	40.00
w.introstat22	30.00	8.00	44.00	34.00	20.00	78.00
w.introstat25	30.00	16.00	0.00	0.00	50.00	78.00
w.introstat34	66.00	16.00	16.00	0.00	20.00	40.00
w.introstat37	10.00	40.00	44.00	34.00	20.00	40.00
w.introstat39	6.00	74.00	44.00	0.00	50.00	40.00
w.introStat50	66.00	40.00	44.00	34.00	20.00	40.00
w.introStat51	30.00	74.00	44.00	34.00	20.00	40.00
w.introStat53	66.00	8.00	16.00	34.00	50.00	40.00
w.introStat54	30.00	74.00	16.00	34.00	20.00	18.00
w.introStat55	66.00	40.00	44.00	34.00	0.00	40.00
w.introStat57	30.00	16.00	44.00	34.00	50.00	40.00
w.introStat58	30.00	16.00	44.00	34.00	20.00	18.00
w.introstat69	10.00	16.00	16.00	34.00	50.00	40.00
w.introstat29	66.00	40.00	44.00	34.00	0.00	18.00
w.introstat32	30.00	74.00	16.00	34.00	50.00	40.00
w.introstat65	66.00	8.00	16.00	34.00	20.00	78.00
w.introstat68	30.00	74.00	44.00	34.00	50.00	18.00
w.introstat24	66.00	74.00	16.00	34.00	50.00	78.00
w.introstat26	66.00	40.00	44.00	34.00	20.00	40.00
w.introstat33	66.00	16.00	44.00	34.00	50.00	40.00

w.introstat35	66.00	16.00	44.00	34.00	50.00	78.00
w.introstat62	30.00	74.00	44.00	34.00	50.00	40.00
w.introstat67	66.00	40.00	44.00	34.00	50.00	40.00
w.introstat63	30.00	40.00	44.00	34.00	50.00	78.00
w.introstat27	30.00	40.00	44.00	34.00	50.00	78.00
w.introstat38	66.00	40.00	16.00	34.00	50.00	78.00
w.introstat64	66.00	74.00	44.00	34.00	50.00	78.00

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## Warning: Non Lab interpolation is deprecated
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Figure 7: Heat map of the student ranks. Blue represents the top rank, while yellow means the bottom.

Summary of Questions

(1) Question "To3.A.A.04.1.1.MU.1" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 10 out of the total of 50 students. The average score was 0.2 out of 1.

(Back to the question summary Table ??.)

Which of the following characteristics of pie is/are quantitative variables?
CHOOSE ALL THAT APPLY.

- *a. Calorie count
- *b. Number of cups of flour used
- c. Type of pie (pecan, blueberry, etc.)
- d. Brand of sugar used

Answer	Count	Summary	Value
a,b	2	Mean	0.20
a	1	Std.dev	0.42
a,b,c,d	1	Min	0.00
a,c	1	Median	0.00
b	1	Max	1.00
b,c	1		
c	1		
c,d	1		
d	1		

(2) Question "To3.A.A.04.1.1.MU.2" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 19 out of the total of 50 students. The average score was 0.26 out of 1.

(Back to the question summary Table ??.)

Which of the following characteristics of a book is/are quantitative variables?
CHOOSE ALL THAT APPLY.

- *a. Number of pages
- *b. Price in dollars
- c. Title
- d. Language the book is written in

Answer	Count		
		Summary	Value
a,b	5	Mean	0.26
a	3	Std.dev	0.45
a,d	3	Min	0.00
b	2	Median	0.00
c	2	Max	1.00
a,b,c	1		
a,b,c,d	1		
a,c	1		
b,c	1		

(3) Question "To3.A.A.04.1.1.MU.3" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 7 out of the total of 50 students. The average score was 0.14 out of 1.

(Back to the question summary Table ??.)

Which of the following characteristics of a cell phone is/are quantitative variables? CHOOSE ALL THAT APPLY.

- *a. Number of minutes used
- *b. Cost of roaming in dollars
- c. Provider (Sprint, Verizon, etc.)
- d. Brand (Samsung, LG, etc.)

Answer	Count	Summary	Value
d	2	Mean	0.14
a,b	1	Std.dev	0.38
a,b,c	1	Min	0.00
a,b,c,d	1	Median	0.00
b	1	Max	1.00
b,d	1		

(4) Question "To3.A.A.04.1.1.MU.4" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 14 out of the total of 50 students. The average score was 0.14 out of 1.

(Back to the question summary Table ??.)

Which of the following characteristics of diamonds is/are quantitative variables? CHOOSE ALL THAT APPLY.

- *a. Cost in dollars
- *b. Weight in carats
- c. Cut (Princess, Round, etc.)
- d. Color

Answer	Count		Summary	Value
b,c	3		Mean	0.14
a	2		Std.dev	0.36
a,b	2		Min	0.00
a,b,c,d	2		Median	0.00
c	2		Max	1.00
a,d	1			
b,d	1			
Unanswered	1			

(5) Question "To3.B.B.02.1.1.MC.salaries1" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 22 out of the total of 50 students. The average score was 0.32 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
d	7	Mean	0.32
e	5	Std.dev	0.48
b	4	Min	0.00
a	3	Median	0.00
c	2	Max	1.00
Unanswered	1		

Which of the following is/are appropriate displays for the distribution of salaries at a small company with 75 employees?

I. Bar Graph II. Histogram III. Stem-and-leaf Plot

- a. I only
- b. II only
- c. I and II only
- *d. II and III only
- e. I, II and III

(6) Question "To3.B.B.02.1.1.MC.salaries2" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 28 out of the total of 50 students. The average score was 0.11 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	9	Mean	0.11
c	6	Std.dev	0.31
a	5	Min	0.00
e	5	Median	0.00
d	3	Max	1.00

Which of the following is/are appropriate displays for the distribution of salaries at a small company with 75 employees?

I. Pie Graph II. Histogram III. Stem-and-leaf Plot

- a. I only
- b. II only
- c. I and II only
- *d. II and III only
- e. I, II and III

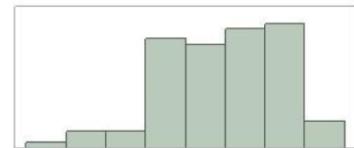
(7) Question "To3.C.C.03.1.1.MC.horizontal" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 17 out of the total of 50 students. The average score was 0.29 out of 1.

(Back to the question summary Table ??.)

Answer	Count
d	7
b	5
a	4
c	1

Summary	Value
Mean	0.29
Std.dev	0.47
Min	0.00
Median	0.00
Max	1.00

A histogram for the sale price of 100 cars is pictured below.



The values on the horizontal axis are:

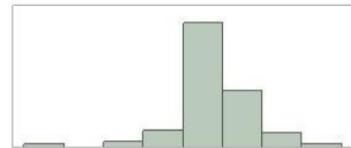
- a. The number of cars.
- *b. The sale prices.
- c. The mean sales price for each bin.
- d. The mean number of cars for each bin.

(8) Question "To3.C.C.03.1.1.MC.horizontal2" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 16 out of the total of 50 students. The average score was 0.31 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	5	Mean	0.31
c	4	Std.dev	0.48
d	4	Min	0.00
a	2	Median	0.00
Unanswered	1	Max	1.00

A histogram for the birth weight (in oz.) of a sample of 100 general introductory statistics students is pictured below.



The values on the horizontal axis are:

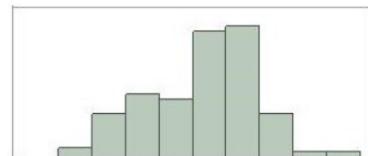
- a. The number of students.
- *b. The birth weights.
- c. The mean birth weight for each bin.
- d. The mean number of students for each bin.

(9) Question "To3.C.C.03.1.1.MC.horizontal3" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 17 out of the total of 50 students. The average score was 0.53 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	9	Mean	0.53
c	4	Std.dev	0.51
a	2	Min	0.00
d	2	Median	1.00
		Max	1.00

A histogram for the number of semester credits hours for a sample of 100 general introductory statistics students is pictured below.



The values on the horizontal axis are:

- a. The number of students.
- *b. The number of semester credit hours.
- c. The mean number of semester credit hours for each bin.
- d. The mean number of students for each bin.

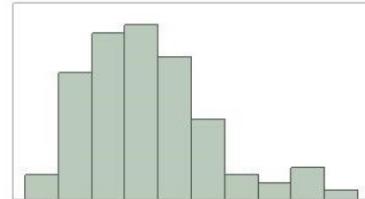
(10) Question "To3.C.D.03.1.1.MC.vertical" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 21 out of the total of 50 students. The average score was 0.24 out of 1.

(Back to the question summary Table ??.)

Answer	Count
c	8
a	5
b	4
d	4

Summary	Value
Mean	0.24
Std.dev	0.44
Min	0.00
Median	0.00
Max	1.00

A histogram for the number of states in the United States visited by a random sample of 100 general introductory statistics students is pictured below.



The values on the vertical axis are:

- *a. The number of students.
- b. The number of states.
- c. The mean number of students for each bin.
- d. The mean number of states for each bin.

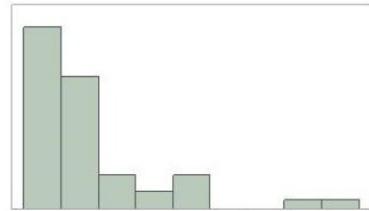
(11) Question "To3.C.D.03.1.1.MC.vertical2" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 17 out of the total of 50 students. The average score was 0.29 out of 1.

(Back to the question summary Table ??.)

Answer	Count
c	7
a	5
b	2
d	2
Unanswered	1

Summary	Value
Mean	0.29
Std.dev	0.47
Min	0.00
Median	0.00
Max	1.00

A histogram for the population of the 50 states in 1975 is pictured below.



The values on the vertical axis are:

- *a. The number of states.
- b. The state population.
- c. The mean number of states for each bin.
- d. The mean state population for each bin.

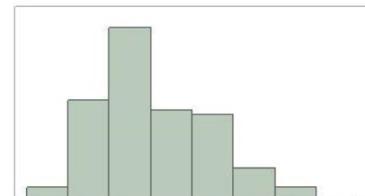
(12) Question "To3.C.D.03.1.1.MC.vertical3" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 12 out of the total of 50 students. The average score was 0.17 out of 1.

(Back to the question summary Table ??.)

Answer	Count
c	7
a	2
d	2
b	1

Summary	Value
Mean	0.17
Std.dev	0.39
Min	0.00
Median	0.00
Max	1.00

A histogram for the arrival times at the theater before the start of a new movie for 100 people is pictured below.



The values on the vertical axis are:

- *a. The number of people.
- b. The arrival times.
- c. The mean number of people for each bin.
- d. The mean arrival times for each bin.

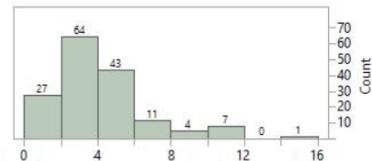
(13) Question "To3.C.E.03.1.1.MC.tips" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 14 out of the total of 50 students. The average score was 0.36 out of 1.

(Back to the question summary Table ??.)

Answer	Count
d	5
a	3
c	3
b	2
Unanswered	1

Summary	Value
Mean	0.36
Std.dev	0.50
Min	0.00
Median	0.00
Max	1.00

Below is a histogram of the tips (in dollars) received by a server at a restaurant over a one-week period.



The tallest bin has a count of 64. This indicates:

- a. There were 64 two dollar tips.
- b. There were 64 three dollar tips.
- c. There were 64 four dollar tips.
- *d. There were 64 tips between two and four dollars.

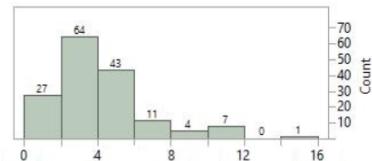
(14) Question "To3.C.E.03.1.1.MC.tips2" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 15 out of the total of 50 students. The average score was 0.33 out of 1.

(Back to the question summary Table ??.)

Answer	Count
d	5
a	4
c	4
b	2

Summary	Value
Mean	0.33
Std.dev	0.49
Min	0.00
Median	0.00
Max	1.00

Below is a histogram of the tips (in dollars) received by a server at a restaurant over a one-week period.



The second tallest bin has a count of 43. This indicates:

- a. There were 43 four dollar tips.
- b. There were 43 five dollar tips.
- c. There were 43 six dollar tips.
- *d. There were 43 tips between four and six dollars.

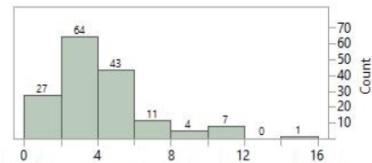
(15) Question "To3.C.E.03.1.1.MC.tips3" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 21 out of the total of 50 students. The average score was 0.33 out of 1.

(Back to the question summary Table ??.)

Answer	Count
d	7
a	6
c	6
b	2

Summary	Value
Mean	0.33
Std.dev	0.48
Min	0.00
Median	0.00
Max	1.00

Below is a histogram of the tips (in dollars) received by a server at a restaurant over a one-week period.



The fourth tallest bin has a count of 11. This indicates:

- a. There were 11 six dollar tips.
- b. There were 11 seven dollar tips.
- c. There were 11 eight dollar tips.
- *d. There were 11 tips between six and eight dollars.

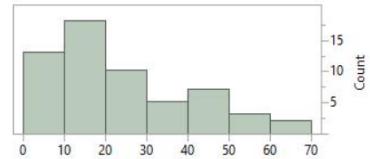
(16) Question "To3.C.F04.1.1.MC.flights1" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 16 out of the total of 50 students. The average score was 0.31 out of 1.

(Back to the question summary Table ??.)

Answer	Count
b	6
c	5
d	3
a	2

Summary	Value
Mean	0.31
Std.dev	0.48
Min	0.00
Median	0.00
Max	1.00

Below is a histogram for arrival delays of flights for an airline.



How many flights were delayed between 20 and 30 minutes?

- a. 18
- b. 13
- *c. 10
- d. 5

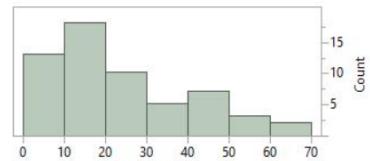
(17) Question "To3.C.F04.1.1.MC.flights2" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 13 out of the total of 50 students. The average score was 0.31 out of 1.

(Back to the question summary Table ??.)

Answer	Count
d	6
a	4
b	2
c	1

Summary	Value
Mean	0.31
Std.dev	0.48
Min	0.00
Median	0.00
Max	1.00

Below is a histogram for arrival delays of flights for an airline.



How many flights were delayed between 10 and 20 minutes?

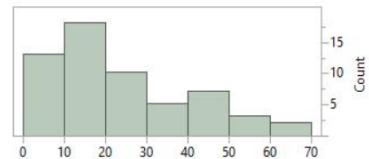
- *a. 18
- b. 13
- c. 10
- d. 5

(18) Question "To3.C.F04.1.1.MC.flights3" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 9 out of the total of 50 students. The average score was 0.22 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
a	3	Mean	0.22
c	2	Std.dev	0.44
d	2	Min	0.00
b	1	Median	0.00
Unanswered	1	Max	1.00

Below is a histogram for arrival delays of flights for an airline.



How many flights were delayed between 30 and 40 minutes?

- a. 18
- b. 13
- c. 10
- *d. 5

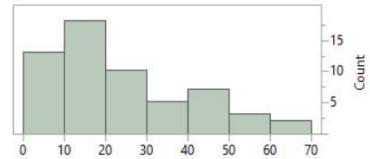
(19) Question "To3.C.F04.1.1.MC.flights4" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 12 out of the total of 50 students. The average score was 0.25 out of 1.

(Back to the question summary Table ??.)

Answer	Count
c	4
b	3
d	3
a	2

Summary	Value
Mean	0.25
Std.dev	0.45
Min	0.00
Median	0.00
Max	1.00

Below is a histogram for arrival delays of flights for an airline.



How many flights were delayed between 0 and 10 minutes?

- a. 18
- *b. 13
- c. 10
- d. 5

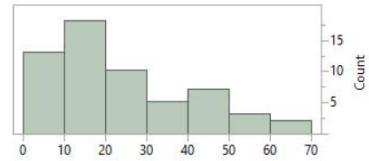
(20) Question "To3.C.G.04.1.1.MC.flights5" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 13 out of the total of 50 students. The average score was 0.15 out of 1.

(Back to the question summary Table ??.)

Answer	Count
c	4
d	4
b	3
a	2

Summary	Value
Mean	0.15
Std.dev	0.38
Min	0.00
Median	0.00
Max	1.00

Below is a histogram for arrival delays of flights for an airline.



How many flights were delayed between 0 and 20 minutes?

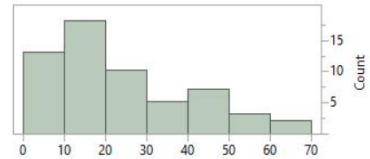
- *a. 31
- b. 28
- c. 15
- d. 12

(21) Question "To3.C.G.04.1.1.MC.flights6" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 10 out of the total of 50 students. The average score was 0.2 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
a	3	Mean	0.20
c	3	Std.dev	0.42
b	2	Min	0.00
d	1	Median	0.00
Unanswered	1	Max	1.00

Below is a histogram for arrival delays of flights for an airline.



How many flights were delayed between 10 and 30 minutes?

- a. 31
- *b. 28
- c. 15
- d. 12

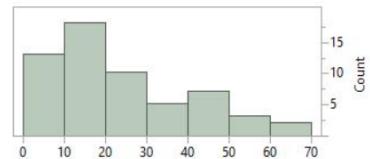
(22) Question "To3.C.G.04.1.1.MC.flights7" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 12 out of the total of 50 students. The average score was 0.08 out of 1.

(Back to the question summary Table ??.)

Answer	Count
b	5
a	4
d	2
c	1

Summary	Value
Mean	0.08
Std.dev	0.29
Min	0.00
Median	0.00
Max	1.00

Below is a histogram for arrival delays of flights for an airline.



How many flights were delayed between 20 and 40 minutes?

- a. 31
- b. 28
- *c. 15
- d. 12

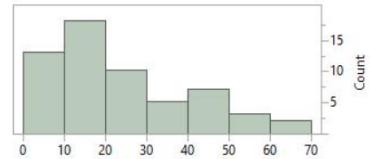
(23) Question "To3.C.G.04.1.1.MC.flights8" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 15 out of the total of 50 students. The average score was 0.33 out of 1.

(Back to the question summary Table ??.)

Answer	Count
a	5
d	5
b	4
c	1

Summary	Value
Mean	0.33
Std.dev	0.49
Min	0.00
Median	0.00
Max	1.00

Below is a histogram for arrival delays of flights for an airline.



How many flights were delayed between 30 and 50 minutes?

- a. 31
- b. 28
- c. 15
- *d. 12

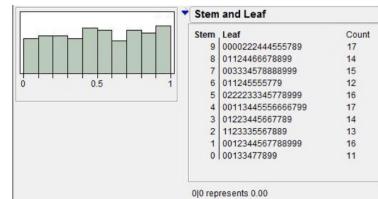
(24) Question "To3.D.H.04.2.1.MC.random1" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 29 out of the total of 50 students. The average score was 0.31 out of 1.

(Back to the question summary Table ??.)

Answer	Count
a	9
e	6
c	4
f	4
b	3
d	2
Unanswered	1

Summary	Value
Mean	0.31
Std.dev	0.47
Min	0.00
Median	0.00
Max	1.00

Which of the following best describes the shape of the distribution pictured below?



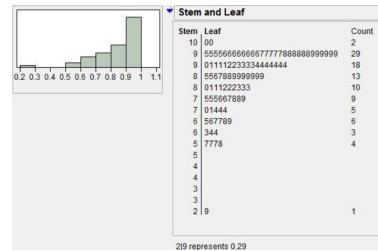
- *a. Uniform
- b. Symmetric and unimodal
- c. Skewed left and unimodal
- d. Skewed left and bimodal
- e. Skewed right and unimodal
- f. Skewed right and bimodal

(25) Question "To3.D.H.04.2.1.MC.random2" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 23 out of the total of 50 students. The average score was 0.39 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
c	9	Mean	0.39
a	4	Std.dev	0.50
d	4	Min	0.00
b	3	Median	0.00
e	2	Max	1.00
f	1		

Which of the following best describes the shape of the distribution pictured below?



- a. Uniform
 - b. Symmetric and unimodal
 - *c. Skewed left and unimodal
 - d. Skewed left and bimodal
 - e. Skewed right and unimodal
 - f. Skewed right and bimodal

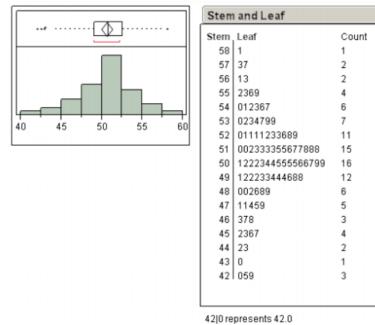
(26) Question "To3.D.H.04.2.1.MC.random3" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 26 out of the total of 50 students. The average score was 0.23 out of 1.

(Back to the question summary Table ??.)

Answer	Count
b	6
e	6
d	4
f	4
a	3
c	2
Unanswered	1

Summary	Value
Mean	0.23
Std.dev	0.43
Min	0.00
Median	0.00
Max	1.00

Which of the following best describes the shape of the distribution pictured below?

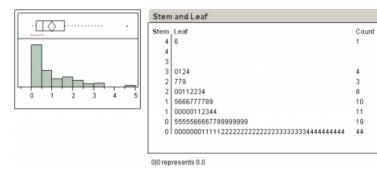


- a. Uniform
- *b. Symmetric and unimodal
- c. Skewed left and unimodal
- d. Skewed left and bimodal
- e. Skewed right and unimodal
- f. Skewed right and bimodal

(27) Question "To3.D.H.04.2.1.MC.random4" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 22 out of the total of 50 students. The average score was 0.27 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	7	Mean	0.27
e	6	Std.dev	0.46
d	3	Min	0.00
f	3	Median	0.00
c	2	Max	1.00
a	1		



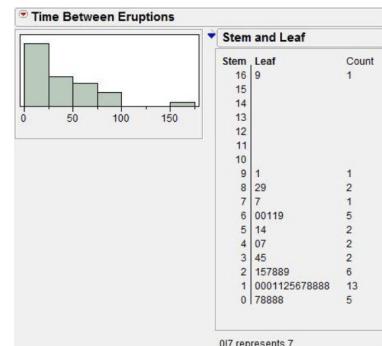
- a. Uniform
- b. Symmetric and unimodal
- c. Skewed left and unimodal
- d. Skewed left and bimodal
- *e. Skewed right and unimodal
- f. Skewed right and bimodal

(28) Question "To3.E.I.06.3.1.MC.blowhole" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 22 out of the total of 50 students. The average score was 0.14 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
d	6	Mean	0.14
a	5	Std.dev	0.35
b	5	Min	0.00
c	3	Median	0.00
e	3	Max	1.00

A blowhole is a hole in a cliff that produces eruptions of water when the ocean swell hits the cliff. Below is the histogram and stem-and-leaf plot for 40 times (in seconds) between eruptions for the Kiama blowhole in Australia.



Which of the following statements does NOT describe the distribution of time between eruptions?

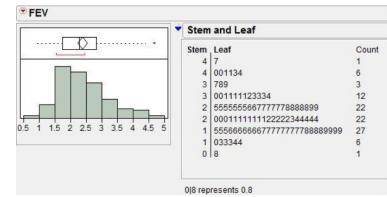
- a. There are 24 observations where the time between eruptions is less than 30 seconds.
- b. The distribution of the times between eruptions is skewed to the right.
- c. The mean time between eruptions is greater than the median time between eruptions.
- d. The minimum time between eruptions is 7 seconds.
- *e. The median time between eruptions is less than 20 seconds.

(29) Question "To3.E.I.06.3.1.MC.FEV" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 26 out of the total of 50 students. The average score was 0.19 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	8	Mean	0.19
d	5	Std.dev	0.40
e	5	Min	0.00
a	4	Median	0.00
c	4	Max	1.00

Data are obtained on the forced expiratory volume (FEV) of youths in East Boston in the late 1970s. Forced expiratory volume (FEV) is a measure of lung capacity, in liters. The initial measurements in the 1970s provide a baseline value to study the impact of smoking on lung function. The data for this problem are a random sample of 100 FEV values.



Which of the following statements does NOT describe the distribution of FEV values?

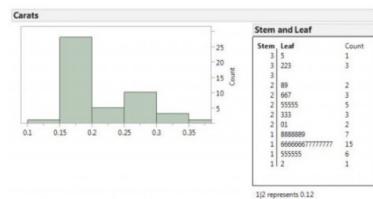
- a. The distribution of FEV values is slightly skewed to the right.
- b. The distribution of FEV values is unimodal.
- c. The center of the FEV values is between 2.0 and 2.5.
- d. The range of the FEV values is from 0.8 to 4.7.
- *e. The mean FEV value will be less than the median FEV value.

(30) Question "To3.E.I.06.3.1.MC.diamonds" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 26 out of the total of 50 students. The average score was 0.15 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	8	Mean	0.15
c	8	Std.dev	0.37
a	4	Min	0.00
e	4	Median	0.00
d	2	Max	1.00

The sizes of diamonds (in carats) in 48 ladies diamond rings were recorded and the data are shown below.



Which of the following statements does NOT describe the distribution of diamond size?

- a. The distribution of diamond size is skewed to the right.
 - b. The mean diamond size will be greater than the median diamond size.
 - c. The distribution of diamond size is bimodal with the larger mode between 0.15 to 0.2 carats and a smaller mode between 0.25 and 0.3 carats.
 - d. There are 29 diamonds smaller than 0.2 carats in size.

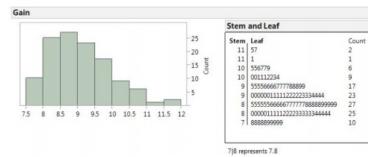
*e. The distribution of diamond size is unimodal with one mode between 0.15 and 0.2 carats.

(31) Question "To3.E.I.06.3.1.MC.amps" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 30 out of the total of 50 students. The average score was 0.23 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	8	Mean	0.23
a	7	Std.dev	0.43
d	5	Min	0.00
e	5	Median	0.00
c	4	Max	1.00
Unanswered	1		

A telecommunications equipment manufacturer was receiving complaints about low volume on long distance calls. Amplifiers are used to boost the signal at various points in the long distance lines. The boosting ability of the amplifiers is called gain. Amplifiers are designed to have a gain of 10 decibels (dB). This means that a 1 dB input signal would be boosted to a 10 dB output signal. A sample of 120 amplifiers is tested for gain.



Which of the following statements does NOT describe the distribution of gain values?

- a. The distribution of amplifier gain values is skewed to the left.
 - b. The center of amplifier gain values is around 9 dB.
 - c. The range of amplifier gain values is from 7.8 dB to 11.7 dB.
 - d. The mean amplifier gain value will be greater than the median amplifier gain value.
 - e. The distribution of amplifier gain values is unimodal with the mode between 8.5 dB and 9.0 dB.

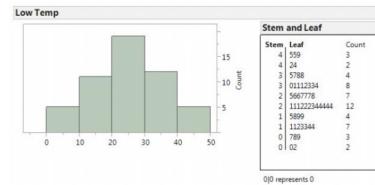
(32) Question "To3.E.I.06.3.1.MC.lowtemp" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 29 out of the total of 50 students. The average score was 0.17 out of 1.

(Back to the question summary Table ??.)

Answer	Count
a	6
d	6
b	5
c	5
e	5
Unanswered	2

Summary	Value
Mean	0.17
Std.dev	0.38
Min	0.00
Median	0.00
Max	1.00

Below is the distribution of low temperatures (in degrees F) for 52 cities in the U.S.



Which of the following statements does NOT describe the distribution of low temperatures?

- a. The distribution of low temperatures is roughly symmetric.
- b. The distribution of low temperatures is unimodal with the mode between 20 and 30 degrees F.
- c. The mean low temperature and the median low temperature are approximately equal.
- d. There are five cities with low temperatures between 0 and 10 degrees F.
- *e. Less than 10 cities have low temperatures between 30 and 40 degrees F.

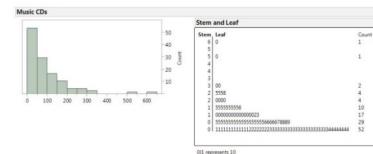
(33) Question "To3.E.I.06.3.1.MC.musicCDs" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 17 out of the total of 50 students. The average score was 0.24 out of 1.

(Back to the question summary Table ??.)

Answer	Count
b	5
e	4
a	3
c	2
d	2
Unanswered	1

Summary	Value
Mean	0.24
Std.dev	0.44
Min	0.00
Median	0.00
Max	1.00

A random sample of 120 students was selected from those students who completed a survey in a general introductory statistics course. The survey asked the number of music CDs owned by each of these students. The histogram of the number of music CDs owned by the students is shown below.



Which of the following statements does NOT describe the distribution of number of music CDs owned?

- a. There are 98 students who own less than 150 music CDs.
- b. The mean number of music CDs owned is greater than the median number of music CDs owned.
- c. The distribution of music CDs is unimodal with mode between 0 and 50 music CDs.
- d. The maximum number of CDs owned is between 600 and 650.
- *e. The distribution of music CDs owned is skewed to the left.

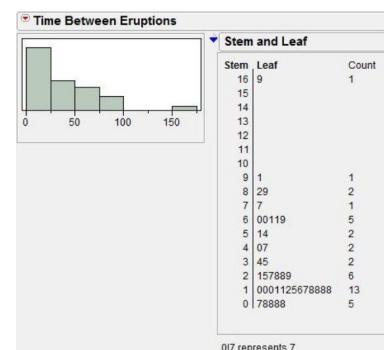
(34) Question "To3.FJ.04.1.1.MC.blowhole" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 13 out of the total of 50 students. The average score was 0.15 out of 1.

(Back to the question summary Table ??.)

Answer	Count
b	6
c	3
a	2
d	2

Summary	Value
Mean	0.15
Std.dev	0.38
Min	0.00
Median	0.00
Max	1.00

A blowhole is a hole in a cliff that produces eruptions of water when the ocean swell hits the cliff. Below are 40 times (in seconds) between eruptions for the Kiama blowhole in Australia.



Based on the graphs, are there any apparent outliers in this distribution?

- *a. There is one apparent outlier.
- b. There are two apparent outliers.
- c. There are three apparent outliers.
- d. There are no apparent outliers.

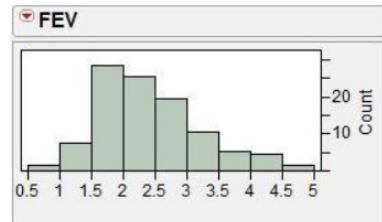
(35) Question "To3.FJ.04.1.1.MC.FEV" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 13 out of the total of 50 students. The average score was 0.31 out of 1.

(Back to the question summary Table ??.)

Answer	Count
a	4
c	4
d	4
b	1

Summary	Value
Mean	0.31
Std.dev	0.48
Min	0.00
Median	0.00
Max	1.00

Data are obtained on the forced expiratory volume (FEV) of youths in East Boston in the late 1970s. Forced expiratory volume (FEV) is a measure of lung capacity, in liters. The initial measurements in the 1970s provide a baseline value to study the impact of smoking on lung function. The data for this problem are a random sample of 100 FEV values.



Based on the histogram, are there any apparent outliers in the distribution?

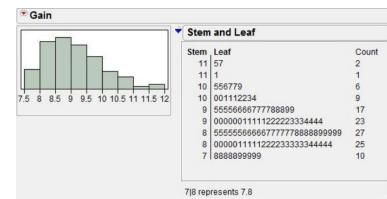
- a. There is one apparent outlier.
- b. There are two apparent outliers.
- c. There are three apparent outliers.
- *d. There are no apparent outliers.

(36) Question "To3.FJ.04.1.1.MC.amps" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 14 out of the total of 50 students. The average score was 0.5 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
d	7	Mean	0.50
c	4	Std.dev	0.52
a	1	Min	0.00
b	1	Median	0.50
Unanswered	1	Max	1.00

A telecommunications equipment manufacturer was getting complaints about low volume on long distance calls. Amplifiers are used to boost the signal at various points in the long distance lines. The boosting ability of the amplifiers is called gain. Amplifiers are designed to have a gain of 10 decibels (dB). This means that a 1 dB input signal would be boosted to a 10 dB output signal. 120 amplifiers were randomly chosen and tested for gain.



Based on the graphs, are there any apparent outliers?

- a. There is one apparent outlier.
- b. There are two apparent outliers.
- c. There are three apparent outliers.
- *d. There are no apparent outliers.

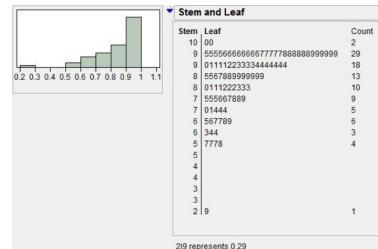
(37) Question "To3.FJ.04.1.1.MC.random2" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 10 out of the total of 50 students. The average score was 0.4 out of 1.

(Back to the question summary Table ??.)

Answer	Count
a	4
d	3
c	2
b	1

Summary	Value
Mean	0.40
Std.dev	0.52
Min	0.00
Median	0.00
Max	1.00

Based on the graphs below, are there any apparent outliers in this distribution?



- *a. There is one apparent outlier.
 - b. There are two apparent outliers.
 - c. There are three apparent outliers.
 - d. There are no apparent outliers.

(38) Question "To3.G.K.04.1.1.MU.1" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 18 out of the total of 50 students. The average score was 0.06 out of 1.

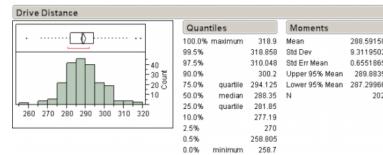
(Back to the question summary Table ??.)

Glossary for question To3.G.K.04.1.1.MU.1 .

- (1) "a,,,,": a,b,c,d,e,f,g,h,i,j; (2) "a,b,,f": a,b,e,f,j; (3) "a,b,c,,": a,b,c,d,e;
- (4) "a,c,,": a,c,d,f,g; (5) "a,f,,": a,f,g,h,i; (6) "a,f": a,f; (7) "b,c,,": b,c,g,i,j;
- (8) "b,d,,": b,d,e,f,h; (9) "c": c; (10) "d,,g,,": d,e,g,h,j; (11) "d,,h,,": d,e,h,i,j; (12) "e": e; (13) "f": f; (14) "g,h": g,h; (15) "h": h; (16) "i": i;
- (17) "Unns": Unanswered

Answer	Count		Summary	Value
a,,,,"	2		Mean	0.06
a,b,,f,	1		Std.dev	0.24
a,b,c,,	1		Min	0.00
a,c,,	1		Median	0.00
a,f	1		Max	1.00
a,f,,	1			
b,c,,	1			
b,d,,	1			
c	1			
d,,g,,	1			
d,,h,,	1			
e	1			
f	1			
g,h	1			
h	1			
i	1			
Unns	1			

Using the summary statistics below, which of the following numbers belong in the five number summary? CHOOSE ALL THAT APPLY.



- *a. 258.7
- *b. 281.85
- *c. 288.35
- *d. 294.125
- *e. 318.9
- f. 288.59158
- g. 9.3119502
- h. 277.19
- i. 300.2
- j. 318.858

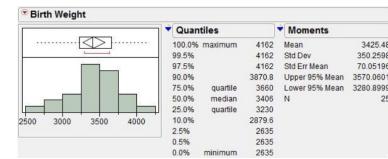
(39) Question "To3.G.K.04.1.1.MU.2" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 10 out of the total of 50 students. The average score was 0.1 out of 1.

(Back to the question summary Table ??.)

Answer	Count
b,f	2
a,b,c,d,e	1
a,g,i	1
b,c,d,f,h	1
b,c,d,g,j	1
c,e,f,g,j	1
h	1
j	1
Unanswered	1

Summary	Value
Mean	0.10
Std.dev	0.32
Min	0.00
Median	0.00
Max	1.00

Using the summary statistics below, which of the following numbers belong in the five number summary? CHOOSE ALL THAT APPLY.



- *a. 2635
- *b. 3230
- *c. 3406
- *d. 3660
- *e. 4162
- f. 3870.8
- g. 2879.6
- h. 3425.48
- i. 430
- j. 1527

(40) Question "To3.G.K.04.1.1.MU.3" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 11 out of the total of 50 students. The average score was 0.09 out of 1.

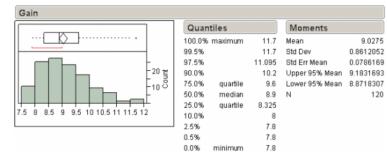
(Back to the question summary Table ??.)

Glossary for question To3.G.K.04.1.1.MU.3 .

- (1) "a,,,": a,b,c,d,e,f,g,h,i,j; (2) "a,b,,,": a,b,c,d,e,f,h,i,j; (3) "a,b,c,d,: a,b,c,d,e; (4) "a,b,c,e": a,b,c,e,i; (5) "a,d,,": a,d,f,h,i; (6) "b,,f,,": b,e,f,h,j; (7) "b,c,,f": b,c,e,f,h; (8) "b,c,g,,": b,c,g,h,i; (9) "c,,,": c,e,g,h,i; (10) "e": e; (11) "j": j

Answer	Count		Summary	Value
a,,,"	1		Mean	0.09
a,b,,,"	1		Std.dev	0.30
a,b,c,d,	1		Min	0.00
a,b,c,e,	1		Median	0.00
a,d,,	1		Max	1.00
b,,f,,	1			
b,c,,f,	1			
b,c,g,,	1			
c,,,	1			
e	1			
j	1			

Using the summary statistics below, which of the following numbers belong in the five number summary? CHOOSE ALL THAT APPLY.



- *a. 7.8
- *b. 8.325
- *c. 8.9
- *d. 9.6
- *e. 11.7
- f. 3.9
- g. 1.275
- h. 9.0275
- i. 0.8612052
- j. 8

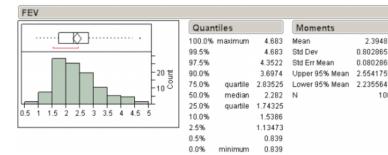
(41) Question "To3.G.K.04.1.1.MU.4" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 11 out of the total of 50 students. The average score was 0 out of 1.

(Back to the question summary Table ??.)

Answer	Count
c	2
a,b,g,h,i	1
a,c,d,g,j	1
a,d,f,h,j	1
a,e,h,i,j	1
a,f	1
b,c,d,e,f	1
d	1
e	1
j	1

Summary	Value
Mean	0.00
Std.dev	0.00
Min	0.00
Median	0.00
Max	0.00

Using the summary statistics below, which of the following numbers belong in the five number summary? CHOOSE ALL THAT APPLY.



- *a. 0.839
- *b. 1.74325
- *c. 2.282
- *d. 2.83525
- *e. 4.683
- f. 2.39487
- g. 0.8028653
- h. 3.844
- i. 1.092
- j. 3.6974

(42) Question "To3.H.L.04.1.1.MC.birthwt" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 14 out of the total of 50 students. The average score was 0.07 out of 1.

(Back to the question summary Table ??.)

Answer	Count
d	7
c	5
a	1
Unanswered	1

Summary	Value
Mean	0.07
Std.dev	0.27
Min	0.00
Median	0.00
Max	1.00

The birth weights (in grams) for each of 18 newborn girls born at a Brisbane, Australia hospital are recorded in the table below.

3,837	3,334	2,208	2,576	3,208	3,746	3,523	3,430	3,480
3,116	3,428	2,184	2,383	3,500	3,866	3,542	3,278	1,745

Select the correct five number summary of the birth weights.

- *a. 1745, 2576, 3381, 3523, 3866
- b. 1745, 2576, 3334, 3511.5, 3866
- c. 1745, 2846, 3428, 3523, 3866
- d. 1745, 2670.2, 3132.4, 3594.7, 3866

(43) Question "To3.H.L.04.1.1.MC.heartrate" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 16 out of the total of 50 students. The average score was 0.25 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
c	5	Mean	0.25
a	4	Std.dev	0.45
d	4	Min	0.00
b	3	Median	0.00
		Max	1.00

As part of a physiology study, participants had their heart rate (in beats per minute) taken by a trained nurse practitioner. Below are heart rates for a sample of 20 males.

70	71	74	80	73	75	82	64	69	70
68	72	78	70	75	74	69	73	77	64

Select the correct five number summary of the heart rates.

- *a. 64, 69.5, 72.5, 75, 82
- b. 64, 69, 72, 75, 82
- c. 64, 70, 73, 77, 82
- d. 64, 69, 72.5, 74, 82

(44) Question "To3.H.L.04.1.1.MC.babe" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 8 out of the total of 50 students. The average score was 0.5 out of 1.

(Back to the question summary Table ??.)

Answer	Count
a	4
d	2
b	1
c	1

Summary	Value
Mean	0.50
Std.dev	0.53
Min	0.00
Median	0.50
Max	1.00

Babe Ruth is arguably the best player to have ever played Major League Baseball. In his 22 seasons, he broke numerous records both for pitching (which he did early in his career) and for hitting. Below are the number of home runs Babe Ruth hit in his 22 seasons in the league from 1914 - 1935.

0	4	3	2	11	29	54	59	35	41	46
25	47	60	54	46	49	46	41	34	22	6

Select the correct five number summary for the number of home runs Babe Ruth hit per season.

- *a. 0, 11, 38, 47, 60
- b. 0, 8.5, 35, 46, 60
- c. 0, 11, 41, 48, 60
- d. 0, 8.5, 38, 46.5, 60

(45) Question "To3.H.L.04.1.1.MC.hightemps" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 12 out of the total of 50 students. The average score was 0.33 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
a	4	Mean	0.33
d	3	Std.dev	0.49
b	2	Min	0.00
Unanswered	2	Median	0.00
c	1	Max	1.00

Below are the high temperatures recorded at an airport in a medium-sized city in the United States for the first 20 days of the month of January 2004.

52	60	34	21	11	16	26	31	26	31
49	45	35	40	38	34	34	27	16	23

Select the correct five number summary of the high temperatures.

- *a. 11, 24.5, 32.5, 39, 60
- b. 11, 23, 31, 40, 60
- c. 11, 26, 34, 45, 60
- d. 11, 24.5, 34, 39, 60

(46) Question "To3.I.M.03.1.4.FB.five1" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 13 out of the total of 50 students. The average score was 0.92 out of 4.

(Back to the question summary Table ??.)

Glossary for question To3.I.M.03.1.4.FB.five1 .

(1) "1,2,": 1,2,3,4; (2) "1,4,": 1,4,1,4; (3) "23,5": 23,56,45,67; (4) "2345": 2345'43,345,45,34; (5) "28,6": 28,61,60,61; (6) "34,2": 34,2,324,45; (7) "35,3": 35,36,25,46; (8) "361,": 361,36,64,56; (9) "37,6": 37,60,43,60; (10) "5,6,": 5,6,9,10; (11) "Unns": Unanswered

Answer	Count	Summary	Value
37,6	3	Mean	0.92
1,2,	1	Std.dev	1.75
1,4,	1	Min	0.00
23,5	1	Median	0.00
2345	1	Max	4.00
28,6	1		
34,2	1		
35,3	1		
361,	1		
5,6,	1		
Unns	1		

Fill in the blanks with the correct values: The five number summary for a particular quantitative variable is

Min = 28; Q1 = 37; Median = 43; Q3 = 60; Max = 61 The middle 50% of observations are between ____ and _____. 50% of observations are less than _____. The largest 25% of observations are greater than _____.

Answers:

- a. 37
- b. 60
- c. 43
- d. 60

(47) Question "To3.I.M.03.1.4.FB.five2" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 19 out of the total of 50 students. The average score was 1.11 out of 4.

(Back to the question summary Table ??.)

Glossary for question To3.I.M.03.1.4.FB.five2 .

Answer	Count		
33,45	4		
Unns	2		
-5,-	1		
0%93	1		
2,4,	1		
23,1	1		
33,48	1		
34,2	1		
34,34	1		
34,35	1		
34,4	1		
36,4	1		
4,4,	1		
4,9,	1		
I,,,	1		

Summary	Value
Mean	1.11
Std.dev	1.70
Min	0.00
Median	0.00
Max	4.00

Fill in the blanks with the correct values: The five number summary for a particular quantitative variable is Min = 32; Q₁ = 33; Median = 34; Q₃ = 45; Max = 48. The middle 50% of observations are between _____ and _____. 50% of observations are less than _____. The largest 25% of observations are greater than _____.

Answers:

- a. 33
b. 45
~~c. 34~~
d. 45

(48) Question "To3.I.M.03.1.4.FB.five3" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 18 out of the total of 50 students. The average score was 0.44 out of 4.

(Back to the question summary Table ??.)

Glossary for question To3.I.M.03.1.4.FB.five3 .

(1) "1000": 1000,2000,1500,1750; (2) "2,5,": 2,5,6,9; (3) "20,3": 20,30,30,20; (4) "24,3": 24,34,123,34; (5) "3,4,": 3,4,23,45; (6) "3,6,": 3,6,9,1; (7) "32,3": 32,35,31,35; (8) "34,34,34,3": 34,34,34,34; (9) "34,34,34,4": 34,34,34,43; (10) "34,5": 34,5,23,2,34,235,3,21; (11) "35,4": 35,45,36,4; (12) "4,8,1": 4,8,1,2; (13) "4,8,6": 4,8,6,1; (14) "4,9,": 4,9,1,9; (15) "40,4": 40,40,40,40; (16) "9,20": 9,20,30,56; (17) "Q1,Q": Q1,Q3,Median,Q3; (18) "U,99": Unanswered,999999999999,AAA,

5

Answer	Count		Summary	Value
1000	1		Mean	0.44
2,5,	1		Std.dev	0.78
20,3	1		Min	0.00
24,3	1		Median	0.00
3,4,	1		Max	2.00
3,6,	1			
32,3	1			
34,34,34,3	1			
34,34,34,4	1			
34,5	1			
35,4	1			
4,8,1	1			
4,8,6	1			
4,9,	1			
40,4	1			
9,20	1			
Q1,Q	1			
U,99	1			

Fill in the blanks with the correct values: The five number summary for a particular quantitative variable is

Min = 9; Q1 = 20; Median = 30; Q3 = 34; Max = 40 The middle 50% of observations are between ____ and _____. 50% of observations are less than _____. The largest 25% of observations are greater than _____.

Answers:

- a. 20
- b. 34
- c. 30
- d. 34

(49) Question "To3.J.N.04.1.2.FB.amps" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 11 out of the total of 50 students. The average score was 0.09 out of 2.

(Back to the question summary Table ??.)

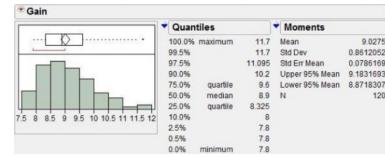
Glossary for question To3.J.N.04.1.2.FB.amps .

- (1) "32,3": 32,3.232; (2) "34.2": 34.25,11.25; (3) "34.5": 34.56%,21.345%;
- (4) "4.34": 4.34; (5) "45.7": 45.77,3.34; (6) "8,8": 8,8; (7) "9.03": 9.03,0.86;
- (8) "ns,k": not sure,don't know; (9) "Unns": Unanswered

Answer	Count		
		Summary	Value
Unns	3		
32,3	1	Mean	0.09
34.2	1	Std.dev	0.30
34.5	1	Min	0.00
4.34	1	Median	0.00
45.7	1	Max	1.00
8,8	1		
9.03	1		
ns,k	1		

A telecommunications equipment manufacturer was getting complaints about low volume on long distance calls. Amplifiers are used to boost the signal at various points in the long distance lines. The boosting ability of the amplifiers is called gain. Amplifiers are designed to have a gain of 10 decibels (dB). This means that a 1 dB input signal would be boosted to a 10 dB output signal. A sample of 120 amplifiers is tested for gain. The JMP output for the distribution gain for the 120 amplifiers is given below.

The sample mean amplifier gain, rounded to 2 decimal places, is ____ dB. The sample standard deviation of the amplifier gains, rounded to 2 decimal places, is ____ dB.



Answers:

- a. 9.03
- b. 0.86, .86

(50) Question "To3.J.N.04.1.2.FB.FEV" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 14 out of the total of 50 students. The average score was 0.04 out of 2.

(Back to the question summary Table ??.)

Answer	Count
1,2	1
2.39,0.80	1
2.39,0.803	1
2.5,324.1	1
23,1	1
3,0	1
3,4	1
3.55	1
3.25,3.21	1
3.3452,32.3	1
3.4%,2.1%	1
34.34	1
455,464	1
Unanswered	1

Summary	Value
Mean	0.04
Std.dev	0.13
Min	0.00
Median	0.00
Max	0.50

Data are obtained on the forced expiratory volume (FEV) of youths in East Boston in the late 1970s. Forced expiratory volume (FEV) is a measure of lung capacity, in liters. The initial measurements in the 1970s provide a baseline value to study the impact of smoking on lung function. The data for this problem are a random sample of 100 FEV values. Below is JMP output for the data.

The sample mean FEV value, rounded to 3 decimal places, is _____. The sample standard deviation of the FEV values, rounded to 3 decimal places, is _____.



Answers:

- a. 2.395
- b. 0.803, .803

(51) Question "To3.J.N.04.1.2.FB.birthwt" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 12 out of the total of 50 students. The average score was 0.17 out of 2.

(Back to the question summary Table ??.)

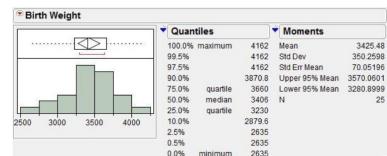
Glossary for question To3.J.N.04.1.2.FB.birthwt .

- (1) "2,4": 2,4; (2) "3000": 3000.94,60.34; (3) "3425,": 3425,350; (4) "3425.": 3425.48,350.26; (5) "4,4": 4,4; (6) "4,5": 4,5; (7) "4.56": 4.56,1.45; (8) "8,9": 8,9; (9) "Unns": Unanswered

Answer	Count	Summary	Value
Unns	3		
3425.	2	Mean	0.17
2,4	1	Std.dev	0.39
3000	1	Min	0.00
3425,	1	Median	0.00
4,4	1	Max	1.00
4,5	1		
4.56	1		
8,9	1		

The following shows JMP output for the birth weight of male babies (in grams).

The sample mean birth weight for boys, rounded to 2 decimal places, is ____ g. The sample standard deviation of the birth weights for boys, rounded to 2 decimal places, is ____ g.



Answers:

- a. 3425.48
- b. 350.26

(52) Question "To3.J.N.04.1.2.FB.heartrate" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 13 out of the total of 50 students. The average score was 0.23 out of 2.

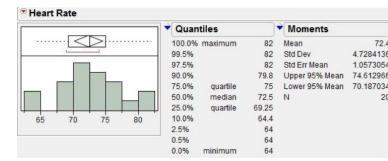
(Back to the question summary Table ??.)

Answer	Count
4.9	2
72.4,4.7	2
3,7	1
5,2	1
5,4	1
67,67	1
72.3,4.6	1
72.4,4.73	1
72.4,4.8	1
76,567	1
Unanswered	1

Summary	Value
Mean	0.23
Std.dev	0.39
Min	0.00
Median	0.00
Max	1.00

As part of a physiology study, participants had their heart rates (in beats per minute) taken by a trained nurse practitioner.

The sample mean heart rate, rounded to 1 decimal place, is _____ beats per minute. The sample standard deviation of the heart rates, rounded to 1 decimal place, is _____ beats per minute.



Answers:

- a. 72.4
- b. 4.7

(53) Question "To3.K.O.04.1.1.FB.mean1" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 12 out of the total of 50 students. The average score was 0 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
13	2	Mean	0.00
4	2	Std.dev	0.00
12.4	1	Min	0.00
13.7	1	Median	0.00
20.3	1	Max	0.00
23	1		
26.5 miles	1		
3.5	1		
45.3	1		
b4sfdsdf	1		

The data below represent measurements on city gas mileage of medium-sized sedans as analyzed by the Environmental Protection Agency. 15, 21, 13, 48, 22, 17, 20, 13, 26, 18 Calculate the mean for the EPA mileage. Round your answer to 1 decimal place. DO NOT include units in your answer.

Correct Answer(s):

a. 21.3

(54) Question "To3.K.O.04.1.1.FB.mean2" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 9 out of the total of 50 students. The average score was 0 out of 1.

(Back to the question summary Table ??.)

Answer	Count
34	2
Unanswered	2
21	1
23	1
36	1
5.6	1
8	1

Summary	Value
Mean	0.00
Std.dev	0.00
Min	0.00
Median	0.00
Max	0.00

The data below represent measurements on city gas mileage of medium-sized sedans as analyzed by the Environmental Protection Agency. 17, 23, 19, 35, 15, 15, 25, 14, 22, 23 Calculate the mean for the EPA mileage. Round your answer to 1 decimal place. DO NOT include units in your answer.

Correct Answer(s):

a. 20.8

(55) Question "To3.K.O.04.1.1.FB.mean3" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 15 out of the total of 50 students. The average score was 0 out of 1.

(Back to the question summary Table ??.)

Answer	Count		
12	2		
.	1		
14.3	1		
2.5	1	Summary	Value
21	1	Mean	0.00
24	1	Std.dev	0.00
25.5	1	Min	0.00
25.7	1	Median	0.00
254	1	Max	0.00
32	1		
34	1		
39	1		
56	1		
Unanswered	1		

The data below represent measurements on city gas mileage of medium-sized sedans as analyzed by the Environmental Protection Agency. 17, 14, 23, 39, 26, 12, 16, 22, 26, 21 Calculate the mean for the EPA mileage. Round your answer to 1 decimal place. DO NOT include units in your answer.

Correct Answer(s):

a. 21.6

(56) Question "To3.K.O.04.1.1.FB.mean4" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 14 out of the total of 50 students. The average score was 0 out of 1.

(Back to the question summary Table ??.)

Answer	Count
22	3
12	2
Unanswered	2
10	1
16.2	1
18.5	1
20.2	1
34	1
45	1
5	1

Summary	Value
Mean	0.00
Std.dev	0.00
Min	0.00
Median	0.00
Max	0.00

The data below represent measurements on city gas mileage of medium-sized sedans as analyzed by the Environmental Protection Agency. 15, 20, 28, 16, 22, 20, 16, 14, 12, 18 Calculate the mean for the EPA mileage. Round your answer to 1 decimal place. DO NOT include units in your answer.

Correct Answer(s):

a. 18.1

(57) Question "To3.K.P.04.1.1.FB.sd1" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 8 out of the total of 50 students. The average score was 0 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
34	2	Mean	0.00
2.44	1	Std.dev	0.00
22	1	Min	0.00
24.56	1	Median	0.00
25	1	Max	0.00
4.25	1		
99	1		

The data below represent measurements on city gas mileage for large sized sedans as analyzed by the Environmental Protection Agency. 10, 14, 8, 26, 11, 10, 12, 8, 17, 11

The mean of these EPA mileage values is 12.7. Compute the standard deviation for the EPA mileage. Round your final answer to 2 decimal places. DO NOT round any intermediate values and DO NOT include units in your answer.

Correct Answer(s):

- a. 5.40
- b. 5.39
- c. 5.41

(58) Question "To3.K.P.04.1.1.FB.sd2" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 13 out of the total of 50 students. The average score was 0 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
3	2	Mean	0.00
8	2	Std.dev	0.00
'4	1	Min	0.00
11 miles	1	Median	0.00
12	1	Max	0.00
13	1		
14	1		
16	1		
19	1		
27.43	1		
Unanswered	1		

The data below represent measurements on city gas mileage for large sized sedans as analyzed by the Environmental Protection Agency. 12, 11, 13, 11, 24, 17, 17, 14, 9, 13 The mean of these EPA mileage values is 14.1. Compute the standard deviation for the EPA mileage. Round your final answer to 2 decimal places. DO NOT round any intermediate values and DO NOT include units in your answer.

Correct Answer(s):

- a. 4.31
- b. 4.32
- c. 4.30

(59) Question "To3.K.P.04.1.1.FB.sd3" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 13 out of the total of 50 students. The average score was 0 out of 1.

(Back to the question summary Table ??.)

Glossary for question To3.K.P.04.1.1.FB.sd3 .

(1) "11.43": 11.43; (2) "14.3524 miles": 14.3524 miles; (3) "15": 15; (4) "2.35": 2.35; (5) "21": 21; (6) "23": 23; (7) "4.3": 4.3; (8) "4.32": 4.32; (9) "4.33": 4.33; (10) "45": 45; (11) "Unanswered": Unanswered

Answer	Count	Summary	Value
45	2	Mean	0.00
Unanswered	2	Std.dev	0.00
11.43	1	Min	0.00
14.3524 miles	1	Median	0.00
15	1	Max	0.00
2.35	1		
21	1		
23	1		
4.3	1		
4.32	1		
4.33	1		

The data below represent measurements on city gas mileage for large sized sedans as analyzed by the Environmental Protection Agency. 14, 13, 14, 26, 15, 9, 11, 13, 15, 17 The mean of these EPA mileage values is 14.7. Compute the standard deviation for the EPA mileage. Round your final answer to 2 decimal places. DO NOT round any intermediate values and DO NOT include units in your answer.

Correct Answer(s):

- a. 4.55
- b. 4.56
- c. 4.54

(60) Question "To3.K.P.04.1.1.FB.sd4" is given on the right. This question was selected from the question set with a frequency of 0.25. The question was administered to 16 out of the total of 50 students. The average score was 0 out of 1.

(Back to the question summary Table ??.)

Answer	Count		
14	3		
~#%&^	1		
17.45	1		
18	1		
19	1	Summary	Value
2	1	Mean	0.00
2.34	1	Std.dev	0.00
2.35	1	Min	0.00
23	1	Median	0.00
23.00	1	Max	0.00
25	1		
35	1		
36	1		
45.56	1		

The data below represent measurements on city gas mileage for large sized sedans as analyzed by the Environmental Protection Agency. 12, 17, 13, 12, 9, 14, 15, 10, 20, 15 The mean of these EPA mileage values is 13.7. Compute the standard deviation for the EPA mileage. Round your final answer to 2 decimal places. DO NOT round any intermediate values and DO NOT include units in your answer.

Correct Answer(s):

- a. 3.27
- b. 3.28
- c. 3.26

(61) Question "To3.L.Q.01.1.1.MC.mean" is given on the right. This question was selected from the question set with a frequency of 1. The question was administered to 50 out of the total of 50 students. The average score was 0.32 out of 1.

(Back to the question summary Table ??.)

The mean of a quantitative variable
a. measures the 50th percentile of the values of the variable.

*b. measures the balancing point of the values of the variable.

c. is equal to the value of the variable that occurs most often.

Answer	Count	Summary	Value
c	17	Mean	0.32
a	16	Std.dev	0.47
b	16	Min	0.00
Unanswered	1	Median	0.00
		Max	1.00

(62) Question "To3.L.R.01.1.1.MC.stdev" is given on the right. This question was selected from the question set with a frequency of 1. The question was administered to 50 out of the total of 50 students. The average score was 0.3 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
d	16	Mean	0.30
c	15	Std.dev	0.46
b	10	Min	0.00
a	8	Median	0.00
Unanswered	1	Max	1.00

The standard deviation of a quantitative variable

a. measures the variability between the minimum and maximum values of the variable.

b. measures the variability of the middle 50% of the values of the variable.

*c. measures the variability of the observations around the mean value.

d. measures the variability of the observations around the median value.

(63) Question "To3.LS.03.1.1.MC.height" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 10 out of the total of 30 students. The average score was 0.1 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	3	Mean	0.10
c	3	Std.dev	0.32
d	3	Min	0.00
a	1	Median	0.00
		Max	1.00

The distribution of the heights of female students in a general introductory statistics course is unimodal with a mean of 65.03 inches and a standard deviation of 2.76 inches. Based on this information, the distribution of heights of these female students is most likely

- *a. Symmetric
- b. Skewed Left
- c. Skewed Right
- d. We don't have enough information to answer the question.

(64) Question "To3.LS.03.1.1.MC.weight" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 18 out of the total of 50 students. The average score was 0.22 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	5	Mean	0.22
d	5	Std.dev	0.43
a	4	Min	0.00
c	3	Median	0.00
Unanswered	1	Max	1.00

The distribution of the weight of female babies born in a particular hospital over the course of a year is unimodal with a mean of 7.15 pounds and a standard deviation of 0.95 pounds. Based on this information, the distribution of the weight of female babies born in this particular hospital during the course of a year is most likely

- *a. Symmetric
- b. Skewed Left
- c. Skewed Right
- d. We don't have enough information to answer the question.

(65) Question "To3.L.S.03.1.1.MC.neck" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 22 out of the total of 50 students. The average score was 0.23 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
c	6	Mean	0.23
d	6	Std.dev	0.43
a	5	Min	0.00
b	5	Median	0.00
		Max	1.00

The distribution of the neck size of 250 men is unimodal with a mean of 14.85 inches and a standard deviation of 0.68 inches. Based on this information, the distribution of the neck size of these men is most likely

- *a. Symmetric
- b. Skewed Left
- c. Skewed Right
- d. We don't have enough information to answer the question.

(66) Question "To3.L.T.03.1.1.MC.grades" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 15 out of the total of 50 students. The average score was 0.4 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	6	Mean	0.40
c	5	Std.dev	0.51
d	2	Min	0.00
a	1	Median	0.00
Unanswered	1	Max	1.00

The distribution of grades on the first exam in a general introductory statistics course is unimodal with a mean of 82 points out of 100 and a standard deviation of 15 points. Based on this information, the distribution of exam scores is most likely

- a. Symmetric
- *b. Skewed Left
- c. Skewed Right
- d. We don't have enough information to answer the question.

(67) Question "To3.L.T.03.1.1.MC.distance" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 17 out of the total of 50 students. The average score was 0.29 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
c	5	Mean	0.29
a	4	Std.dev	0.47
b	4	Min	0.00
d	4	Median	0.00
		Max	1.00

The distribution of the distance from the hometowns of students in a general introductory statistics course to campus is unimodal with a mean of 321.4 miles and a standard deviation of 1,111.1 miles. Based on this information, the distribution of this distance is most likely

- a. Symmetric
- b. Skewed Left
- *c. Skewed Right
- d. We don't have enough information to answer the question.

(68) Question "To3.L.T.03.1.1.MC.exercise" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 18 out of the total of 50 students. The average score was 0.22 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
a	6	Mean	0.22
d	6	Std.dev	0.43
c	4	Min	0.00
b	2	Median	0.00
		Max	1.00

The distribution of the number of hours students in a general introductory statistics course spend exercising in a typical week is unimodal with a mean of 3.7 hours and a standard deviation of 4.2 hours. Based on this information, the distribution of the number of hours spent exercising in a typical week is most likely

- a. Symmetric
- b. Skewed Left
- *c. Skewed Right
- d. We don't have enough information to answer the question.

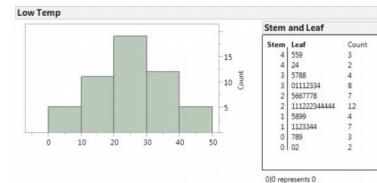
(69) Question "To3.M.U.02.1.1.MC.lowtemp" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 31 out of the total of 50 students. The average score was 0.32 out of 1.

(Back to the question summary Table ??.)

Answer	Count
c	12
b	10
a	9

Summary	Value
Mean	0.32
Std.dev	0.48
Min	0.00
Median	0.00
Max	1.00

Below is the distribution of low temperatures (in degrees F) for 52 cities in the U.S.



Based on this information, the mean will be _____ the median.

- a. greater than
- *b. approximately the same as
- c. less than

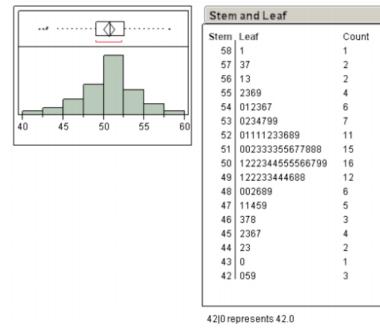
(70) Question "To3.M.U.02.1.1.MC.hist1" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 19 out of the total of 50 students. The average score was 0.53 out of 1.

(Back to the question summary Table ??.)

Answer	Count
b	10
a	7
c	1
Unanswered	1

Summary	Value
Mean	0.53
Std.dev	0.51
Min	0.00
Median	1.00
Max	1.00

For the distribution pictured below, the mean will be _____ the median.



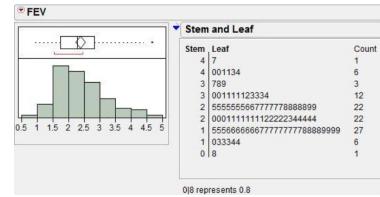
- a. greater than
- *b. approximately the same as
- c. less than

(71) Question "To3.M.V.03.1.1.MC.FEV" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 17 out of the total of 50 students. The average score was 0.29 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	9	Mean	0.29
a	5	Std.dev	0.47
c	3	Min	0.00
		Median	0.00
		Max	1.00

Data are obtained on the forced expiratory volume (FEV) of youths in East Boston in the late 1970s. Forced expiratory volume (FEV) is a measure of lung capacity, in liters. The initial measurements in the 1970s provide a baseline value to study the impact of smoking on lung function. The histogram and stem and leaf plot for a random sample of 100 FEV values are given below.



Based on the distribution, the mean will be _____ the median.

- *a. greater than
- b. less than
- c. approximately the same as

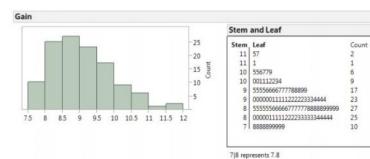
(72) Question "To3.M.V.03.1.1.MC.amps" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 14 out of the total of 50 students. The average score was 0.5 out of 1.

(Back to the question summary Table ??.)

Answer	Count
a	7
b	4
c	2
Unanswered	1

Summary	Value
Mean	0.50
Std.dev	0.52
Min	0.00
Median	0.50
Max	1.00

A telecommunications equipment manufacturer was getting complaints about low volume on long distance calls. Amplifiers are used to boost the signal at various points in the long distance lines. The boosting ability of the amplifiers is called gain. Amplifiers are designed to have a gain of 10 decibels (dB). This means that a 1 dB input signal would be boosted to a 10 dB output signal. A sample of 120 amplifiers is tested for gain.



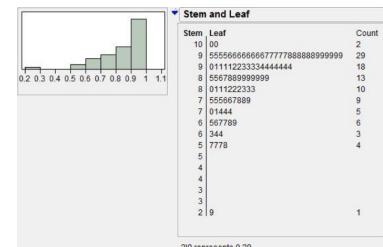
Based on the distribution, the mean will be _____ the median.

- *a. greater than
 - b. less than
 - c. approximately the same as

(73) Question "To3.M.V.03.1.1.MC.HW" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 19 out of the total of 50 students. The average score was 0.47 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
c	9	Mean	0.47
b	6	Std.dev	0.51
a	4	Min	0.00
		Median	0.00
		Max	1.00



Based on the distribution, the mean will be _____ the median.

- a. greater than
 - b. approximately the same as
 - *c. less than

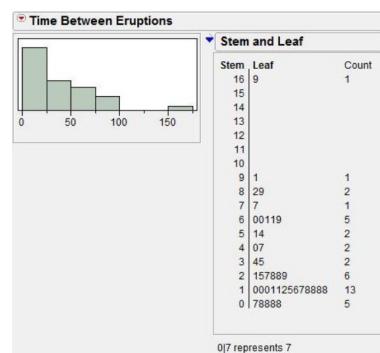
(74) Question "To3.M.W.03.1.1.MC.blowhole" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 14 out of the total of 50 students. The average score was 0.5 out of 1.

(Back to the question summary Table ??.)

Answer	Count
a	7
b	3
c	2
d	1
Unanswered	1

Summary	Value
Mean	0.50
Std.dev	0.52
Min	0.00
Median	0.50
Max	1.00

A blowhole is a hole in a cliff that produces eruptions of water when the ocean swell hits the cliff. Below are 40 times (in seconds) between eruptions for the Kiama blowhole in Australia.



Choose the correct statement below.

- *a. The large outlier affects the value of the mean, but not the value of the median.
- b. The large outlier affects the value of the median, but not the value of the mean.
- c. The large outlier does not affect the value of the mean or the value of the median.
- d. The large outlier affects both the value of the mean and the value of the median.

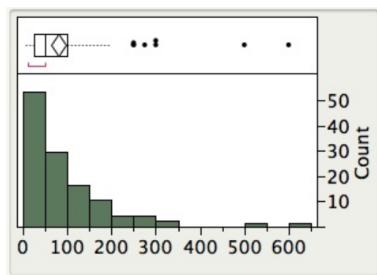
(75) Question "To3.M.W.03.1.1.MC.CDs" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 17 out of the total of 50 students. The average score was 0.41 out of 1.

(Back to the question summary Table ??.)

Answer	Count
a	7
b	4
c	3
d	3

Summary	Value
Mean	0.41
Std.dev	0.51
Min	0.00
Median	0.00
Max	1.00

A random sample of 120 students was selected from those students who completed a survey in a general introductory statistics course. The survey asked the number of music CDs owned by each of these students. The histogram of the number of music CDs owned by the students is shown below.



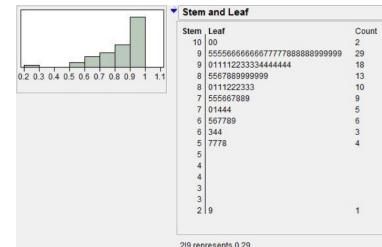
Choose the correct statement below.

- *a. The large outliers affect the value of the mean but not the value of the median.
- b. The large outliers affect the value of the median but not the value of the mean.
- c. The large outliers affect both the value of the median and the value of the mean.
- d. The large outliers do not affect the value of the mean or the value of the median.

(76) Question "To3.M.W.03.1.1.MC.HW" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 19 out of the total of 50 students. The average score was 0.37 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	8	Mean	0.37
a	7	Std.dev	0.50
d	3	Min	0.00
c	1	Median	0.00
		Max	1.00



Choose the correct statement below.

- *a. The small outlier affects the value of the mean but not the value of the median.
 - b. The small outlier affects the value of the median but not the value of the mean.
 - c. The small outlier affects both the value of the median and the value of the mean.
 - d. The small outlier does not affect the value of the mean or the value of the median.

(77) Question "To3.M.X.01.1.1.MC.change" is given on the right. This question was selected from the question set with a frequency of 1. The question was administered to 50 out of the total of 50 students. The average score was 0.22 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
b	13	Mean	0.22
c	13	Std.dev	0.42
a	11	Min	0.00
d	11	Median	0.00
Unanswered	2	Max	1.00

A quantitative variable has 10 observations that have a median value of 22 and a mean value of 25. The minimum of the 10 observations was recorded incorrectly and is changed from a value of 5 to a value of 3.

Choose the correct statement below.

- *a. The mean value will change, but the median value will stay the same.
- b. The median value will change, but the mean value will stay the same.
- c. The mean and median values will both change.
- d. The mean and median values will both stay the same.

(78) Question "To3.N.Y.01.1.1.MC.add" is given on the right. This question was selected from the question set with a frequency of 1. The question was administered to 50 out of the total of 50 students. The average score was 0.18 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
c	15	Mean	0.18
b	13	Std.dev	0.39
d	11	Min	0.00
a	9	Median	0.00
Unanswered	2	Max	1.00

A quantitative variable has 10 observations that have a range of 8, an IQR of 2.5, and a standard deviation of 3. Five points are added to each of the 10 observations.

Choose the correct statement below.

*a. The values of the range, IQR and standard deviation will all stay the same.

b. The values of the range and IQR will stay the same, but the value of the standard deviation will change.

c. The value of the standard deviation will stay the same, but the values of the range and IQR will change.

d. The values of the range, IQR and standard deviation will all change.

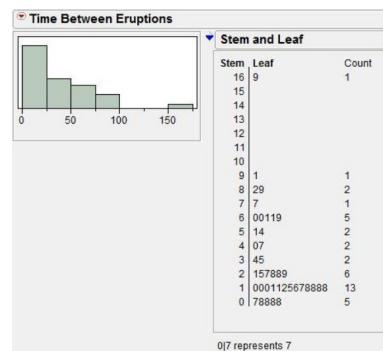
(79) Question "To3.N.Z.03.1.1.MC.blowhole" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 18 out of the total of 50 students. The average score was 0.22 out of 1.

(Back to the question summary Table ??.)

Answer	Count
c	9
a	5
b	4

Summary	Value
Mean	0.22
Std.dev	0.43
Min	0.00
Median	0.00
Max	1.00

A blowhole is a hole in a cliff that produces eruptions of water when the ocean swell hits the cliff. Below are 40 times (in seconds) between eruptions for the Kiama blowhole in Australia.



Which measure of variability is NOT affected by the large outlier in this distribution?

- a. Range
- *b. IQR
- c. Standard deviation

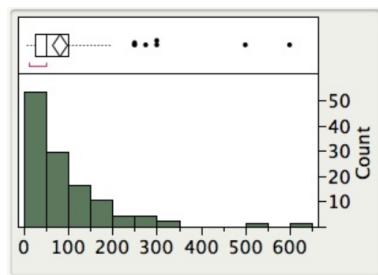
(80) Question "To3.N.Z.03.1.1.MC.CDs" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 21 out of the total of 50 students. The average score was 0.29 out of 1.

(Back to the question summary Table ??.)

Answer	Count
c	10
b	6
a	4
Unanswered	1

Summary	Value
Mean	0.29
Std.dev	0.46
Min	0.00
Median	0.00
Max	1.00

A random sample of 120 students was selected from those students who completed a survey in a general introductory statistics course. The survey asked the number of music CDs owned by each of these students. The histogram of the number of music CDs owned by the students is shown below.



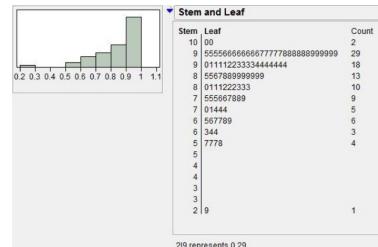
Which measure of variability is NOT affected by the large outliers in this distribution?

- a. Range
- *b. IQR
- c. Standard Deviation

(81) Question "To3.N.Z.03.1.1.MC.HW" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 11 out of the total of 50 students. The average score was 0.27 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
a	5	Mean	0.27
b	3	Std.dev	0.47
c	3	Min	0.00
		Median	0.00
		Max	1.00



Which measure of variability is NOT affected by the small outlier in this distribution?

- a. Range
 - *b. IQR
 - c. Standard Deviation

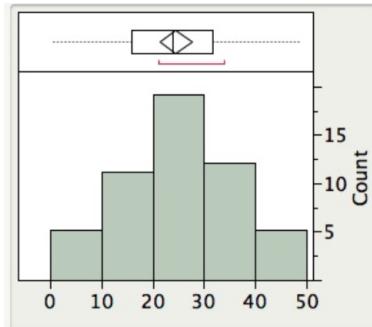
(82) Question "To3.O-AA.02.1.1.MC.lowtemp" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 27 out of the total of 50 students. The average score was 0.26 out of 1.

(Back to the question summary Table ??.)

Answer	Count
c	8
a	7
b	7
d	5

Summary	Value
Mean	0.26
Std.dev	0.45
Min	0.00
Median	0.00
Max	1.00

Below is the distribution of low temperatures (in degrees F) for 52 cities in the U.S.



Which numerical summaries are most appropriate for this distribution?

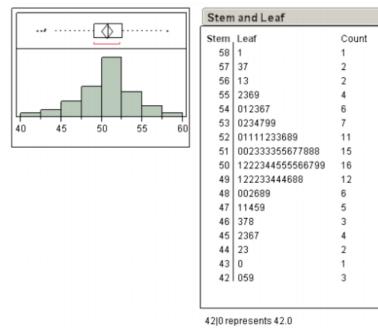
- *a. mean and standard deviation
- b. five number summary
- c. median and standard deviation
- d. mean and range

(83) Question "To3.O-AA.02.1.1.MC.random3" is given on the right. This question was selected from the question set with a frequency of 0.5. The question was administered to 23 out of the total of 50 students. The average score was 0.57 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
a	13	Mean	0.57
d	4	Std.dev	0.51
c	3	Min	0.00
b	2	Median	1.00
Unanswered	1	Max	1.00

Which numerical summaries are most appropriate for the distribution pictured below?



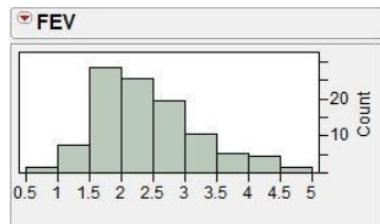
- *a. mean and standard deviation
- b. five number summary
- c. median and standard deviation
- d. mean and range

(84) Question "To3.O.AB.03.1.1.MC.FEV" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 20 out of the total of 50 students. The average score was 0.25 out of 1.

(Back to the question summary Table ??.)

Answer	Count	Summary	Value
c	6	Mean	0.25
b	5	Std.dev	0.44
a	4	Min	0.00
d	4	Median	0.00
Unanswered	1	Max	1.00

Data are obtained on the forced expiratory volume (FEV) of youths in East Boston in the late 1970s. Forced expiratory volume (FEV) is a measure of lung capacity, in liters. The initial measurements in the 1970s provide a baseline value to study the impact of smoking on lung function. The data for this problem are a random sample of 100 FEV values.



- Which numerical summaries are most appropriate for this distribution?
- a. mean and standard deviation
 - *b. five number summary
 - c. mean and range
 - d. median and standard deviation

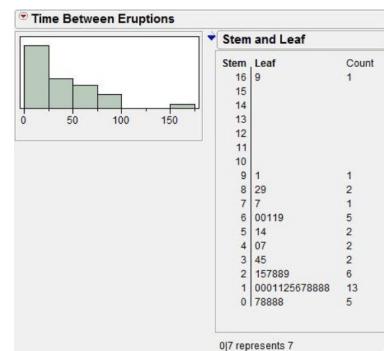
(85) Question "To3.O.AB.03.1.1.MC.blowhole" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 14 out of the total of 50 students. The average score was 0.21 out of 1.

(Back to the question summary Table ??.)

Answer	Count
a	5
d	5
b	3
c	1

Summary	Value
Mean	0.21
Std.dev	0.43
Min	0.00
Median	0.00
Max	1.00

A blowhole is a hole in a cliff that produces eruptions of water when the ocean swell hits the cliff. Below are 40 times (in seconds) between eruptions for the Kiama blowhole in Australia.



Which numerical summaries are most appropriate for this distribution?

- a. mean and standard deviation
- *b. five number summary
- c. mean and range
- d. median and standard deviation

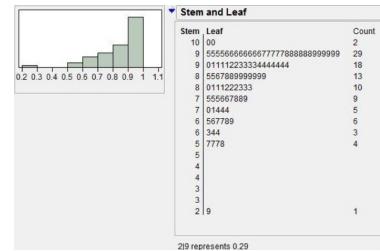
(86) Question "To3.O.AB.03.1.1.MC.random2" is given on the right. This question was selected from the question set with a frequency of 0.33. The question was administered to 16 out of the total of 50 students. The average score was 0.44 out of 1.

(Back to the question summary Table ??.)

Answer	Count
b	7
d	6
a	2
c	1

Summary	Value
Mean	0.44
Std.dev	0.51
Min	0.00
Median	0.00
Max	1.00

Which numerical summaries are most appropriate for the distribution pictured below?



- a. mean and standard deviation
 - *b. five number summary
 - c. mean and range
 - d. median and standard deviation