Measures of Central Tendency and Variability
SW 504

Calculate the mean, median, mode, range and interquartile range for each question.

Smith and Bryn Mawr social work students both take IQ tests and get the following scores.

Score	Smith	Bryn Mawr
85	4	1
90	5	1
95	6	1
100	8	8
105	1	7
110	1	7
N	25	25

2 - Adolescent girls and self-esteem

** Do not calculate standard deviation*

Adolescent girls at two middle schools participate in a self-esteem group and then take a test to assess their self confidence (test scale ranges from 0 to 100). The scores are as follows.

Scores for School A: 89, 56, 45, 78, 98, 45, 55, 77, 88, 99, 98, 97, 54, 34, 94
Scores for School B: 77, 88, 87, 67, 98, 87, 55, 77, 45, 44, 88, 99, 69, 67, 98

3 - Behavioral problems among children at a community center

You hypothesize that students who participate in activities at your community center have different degrees of behavioral problems based on the school they attend. You keep track of infractions of two groups of children from two schools and get the following results.

Behavioral problems	School A Students	School B Students
0	0	8
1	6	7
2	8	3
3	9	5
Observations	23	23

12

4 – Length of calls at a crisis center

You want to get a sense of how long crisis workers are on the phone with callers. Y track for a month and get the following results.

TABLE 6.6 Cumulative Frequency Distribution: Length of Calls Fielded by Crisis Call Center in June

LENGTH OF CALL IN MINUTES (X)	FREQUENCY (*f*)	CUMULATIVE FREQUENCY (*Cf*)	PERCENT (%)	CUMULATIVE PERCENT (%)
1	135	135	14.88	14.88
2	82	217	9.04	23.92
3	129	346	14.22	38.14
4	112	458	12.35	50.49
5	65	523	7.17	57.66
7	84	607	9.26	66.92
9	45	652	4.96	71.88
10	56	708	6.17	78.05
12	38	746	4.20	82.25
13	33	779	3.64	85.89
14	23	802	2.54	88.43
15	18	820	1.98	90.41
16	24	844	2.65	93.06
18	16	860	1.76	94.82
20	25	885	2.76	97.58
23	14	899	1.54	99.12
24	5	904	0.55	99.67
28	2	906	0.22	99.89
35	1	907	0.11	100.00
	$N = 907$		100.00	

(Note: I will not ask you to determine the mean value for something like this on a test. I provide the answer for those of you who want to calculate this.)

Answers:

1 – IQ scores of Bryn Mawr and Smith social work students

Smith:
Mode = 100
Median = 95

- Way 1 = 25 + 1 = 26/2 = 13 → 95 is at the 13th spot in the array
- Way 2: 95 is at the 50th percentile

Score	f	%	C%
85	4	16	16
90	5	20	36
95	6	24	60
100	8	32	92
105	1	4	96
110	1	4	100
N	25	100	

Mean = 95
(85*4) + (90*5) + (95*6) + (100*8) + (105*1) + (110*1) = 340 + 450 + 570 + 800 + 105 + 110 = 2375/25 = 95

Range = 26 (110-85 +1)

Interquartile range=110-85=25

Smith:
Mode = 100
Median = 95

- Way 1 = 25 + 1 = 26/2 = 13 → 95 is at the 13th spot in the array
- Way 2: 95 is at the 50th percentile

Score	f	%	C%
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90	5	20	36
95	6	24	60
100	8	32	92
105	1	4	96
110	1	4	100
N	25	100	

Mean = 95
(85*4) + (90*5) + (95*6) + (100*8) + (105*1) + (110*1) = 340 + 450 + 570 + 800 + 105 + 110 = 2375/25 = 95

Range = 26 (110-85 +1)

Interquartile Range=100-90=10

2 – Adolescent girls and self-esteem

School A:

Score	F	%	C%
34	1	6.7	6.7
45	2	13.3	20
54	1	6.7	26.7
55	1	6.7	33.4
56	1	6.7	40.1
77	1	6.7	46.8
78	1	6.7	53.5
88	1	6.7	60.2
89	1	6.7	66.9
94	1	6.7	73.6
97	1	6.7	80.3
98	2	13.3	93.6
99	1	6.7	100
Total	15	100	

Mode = 45 and 98
Median = 78
Mean = 73.8 (scores total 1107/15)
Range = 66 (99-34+1)
Interquartile Range=97-54=65

School B:

Score	F	%	C%
44	1	6.7	6.7
45	1	6.7	13.4
55	1	6.7	20.1
67	2	13.3	33.4
69	1	6.7	40.1
77	2	13.3	53.4
87	2	13.3	66.7
88	2	13.3	80
98	2	13.3	93.3
99	1	6.7	100
Total	15	100	

Mode = 67, 77, 87, 88, 98
Median = 77
Mean = 76.4 (scores total 1146/15)
Range = 56 (99-44+1)
Interquartile Range=88-67=21

3 – Behavioral problems among children at a community center

School A:

Problems	F	%	C%	Value*f (for mean calculation)
0	0	0	0	0
1	6	26	26	6
2	8	35	61	16
3	9	39	100	27
	23	100		49

Mode = 3
Median = 2
Mean = 2.13
Range = 3 (3-1+1)
Interquartile Range=3-1=2

School B:

Problems	F	%	C%	Value*f (for mean calculation)
0	8	35	35	0
1	7	30	65	7
2	3	13	78	6
3	5	22	100	15
	23	100		28

Mode = 0
Median = 1
Mean = 1.22
Range = 4 (3-0+1)
Interquartile Range=2-0=2

4 – Length of calls at a crisis center

Mode = 1
Median = 4
Mean = 6.83 minutes (total minutes 6,194/907)
Range = 35 (35-1+1)
Interquartile Range=35-1=34.