

# MATH 143: Introduction to Probability and Statistics

## Worksheet 5 for Thurs., Oct. 8: Random Sampling

There appears at the end of this worksheet a table of the members of the U.S. Senate in 1999, along with how long they had served in 1999, the states they are from and their party affiliations. Each has been assigned a 2-digit number appearing in the *ID#* column. Some characteristics of this population are:

Sex:

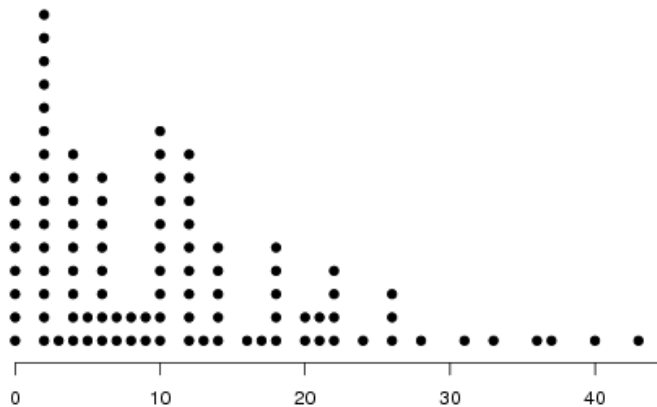
Males	91
Females	9

Party:

Democrats	45
Republicans	55

Years of Service:

Mean	Std. dev.	Min	$Q_1$	Median	$Q_3$	Max
11.09	9.75	0	4	10	16.25	43



1. Use Table B, employing the line assigned to you, to select a simple random sample of 10 U.S. Senators. (If you happen to get repeats, keep going until you have ten different two-digit numbers.) Record the names and other information of the Senators you choose below.

	ID	Senator	Gender	Party	State	Years
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

2. Enter in the table below the numbers of men, women, Democrats and Republicans in your sample.

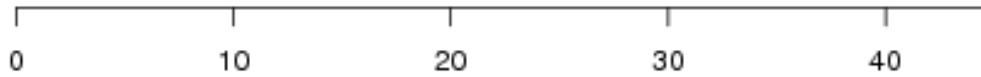
Sex:

Males	
Females	

Party:

Democrats	
Republicans	

3. Create (by hand) a dotplot of the *years of service* in your sample. Also, calculate summary statistics for *years of service* within your sample, recording the values in the table.



Mean	Std. dev.	Min	$Q_1$	Median	$Q_3$	Max

4. How do the proportional breakdowns of men/women and Democrats/Republicans in your sample compare to those of the entire population of 1999 Senators? How about the mean number of years of service in your sample as compared to the mean for the population? Do the values for your sample match those for the population? If not, does this mean that your sampling method is *biased*? Explain.

The distinction between *population* and *sample* is a crucial one in statistics. Along with it, there is an important distinction between *parameter* and *statistic*. A *parameter* is a numerical characteristic of the *population*, while a *statistic* is a numerical characteristic of a *sample*. We will be careful to use different symbols to denote parameters and statistics, adopting the following conventions for proportions, means and standard deviations:

	Parameter (population)	Statistic (sample)
Proportion	$p$	$\hat{p}$
Mean	$\mu$	$\bar{x}$
Standard deviation	$\sigma$	$s$

5. Identify each of the following as a parameter or a statistic, indicate the symbol used to denote it, and specify its value in this context.
- the proportion of men in the entire 1999 Senate
  - the proportion of Democrats among your 10 Senators
  - the mean years of service among your 10 Senators
  - the standard deviation of the years of service in the 1999 Senate

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ID	name	sex	party	state	years
1	Abraham	m	Rep	Michigan	4
2	Akaka	m	Dem	Hawaii	9
3	Allard	m	Rep	Colorado	2
4	Ashcroft	m	Rep	Missouri	4
5	Baucus	m	Dem	Montana	21
6	Bayh	m	Dem	Indiana	0
7	Bennett	m	Rep	Utah	6
8	Biden	m	Dem	Delaware	26
9	Bingaman	m	Dem	New Mexico	16
10	Bond	m	Rep	Missouri	12
11	Boxer	f	Dem	California	6
12	Breaux	m	Dem	Louisiana	12
13	Brownback	m	Rep	Kansas	2
14	Bryan	m	Dem	Nevada	10
15	Bunning	m	Rep	Kentucky	0
16	Burns	m	Rep	Montana	10
17	Byrd	m	Dem	West Virginia	40
18	Campbell	m	Rep	Colorado	6
19	Chafee	m	Rep	Rhode Island	13
20	Cleland	m	Dem	Georgia	2
21	Cochran	m	Rep	Mississippi	21
22	Collins	f	Rep	Maine	2
23	Conrad	m	Dem	North Dakota	12
24	Coverdell	m	Rep	Georgia	6
25	Craig	m	Rep	Idaho	8
26	Crapo	m	Rep	Idaho	0
27	Daschle	m	Dem	South Dakota	12
28	Dewine	m	Rep	Ohio	4
29	Dodd	m	Dem	Connecticut	18
30	Domenici	m	Rep	New Mexico	26
31	Dorgan	m	Dem	North Dakota	7
32	Durbin	m	Dem	Illinois	2
33	Edwards	m	Dem	North Carolina	0
34	Enzi	m	Rep	Wyoming	2
35	Feingold	m	Dem	Wisconsin	6
36	Feinstein	f	Dem	California	7
37	Fitzgerald	m	Rep	Illinois	0
38	Frist	m	Rep	Tennessee	4
39	Gorton	m	Rep	Washington	10
40	Graham	m	Dem	Florida	12
41	Gramm	m	Rep	Texas	14
42	Grams	m	Rep	Minnesota	4
43	Grassley	m	Rep	Iowa	18
44	Gregg	m	Rep	New Hampshire	6
45	Hagel	m	Rep	Nebraska	2
46	Harkin	m	Dem	Iowa	14
47	Hatch	m	Rep	Utah	22
48	Helms	m	Rep	North Carolina	26
49	Hollings	m	Dem	South Carolina	33
50	Hutchinson, K	f	Rep	Texas	6

ID	name	sex	party	state	years
51	Hutchinson, T	m	Rep	Arkansas	2
52	Inhofe	m	Rep	Oklahoma	5
53	Inouye	m	Dem	Hawaii	36
54	Jeffords	m	Rep	Vermont	10
55	Johnson	m	Dem	South Dakota	2
56	Kennedy	m	Dem	Massachusetts	37
57	Kerrey	m	Dem	Nebraska	10
58	Kerry	m	Dem	Massachusetts	14
59	Kohl	m	Dem	Wisconsin	10
60	Kyl	m	Rep	Arizona	4
61	Landrieu	f	Dem	Louisiana	2
62	Lautenberg	m	Dem	New Jersey	17
63	Leahy	m	Dem	Vermont	24
64	Levin	m	Dem	Michigan	20
65	Lieberman	m	Dem	Connecticut	10
66	Lincoln	f	Dem	Arkansas	0
67	Lott	m	Rep	Mississippi	10
68	Lugar	m	Rep	Indiana	22
69	Mack	m	Rep	Florida	10
70	McCain	m	Rep	Arizona	12
71	McConnell	m	Rep	Kentucky	14
72	Mikulski	f	Dem	Maryland	12
73	Moynihan	m	Dem	New York	22
74	Murkowski	m	Rep	Alaska	18
75	Murray	f	Dem	Washington	6
76	Nickles	m	Rep	Oklahoma	18
77	Reed	m	Dem	Rhode Island	2
78	Reid	m	Dem	Nevada	12
79	Robb	m	Dem	Virginia	10
80	Roberts	m	Rep	Kansas	2
81	Rockefeller	m	Dem	West Virginia	14
82	Roth	m	Rep	Delaware	28
83	Santorum	m	Rep	Pennsylvania	4
84	Sarbanes	m	Dem	Maryland	22
85	Schumer	m	Dem	New York	0
86	Sessions	m	Rep	Alabama	2
87	Shelby	m	Rep	Alabama	12
88	Smith, B	m	Rep	New Hampshire	9
89	Smith, G	m	Rep	Oregon	2
90	Snowe	f	Rep	Maine	4
91	Specter	m	Rep	Pennsylvania	18
92	Stevens	m	Rep	Alaska	31
93	Thomas	m	Rep	Wyoming	4
94	Thompson	m	Rep	Tennessee	5
95	Thurmond	m	Rep	South Carolina	43
96	Torricelli	m	Dem	New Jersey	2
97	Voinovich	m	Rep	Ohio	0
98	Warner	m	Rep	Virginia	20
99	Wellstone	m	Dem	Minnesota	8
00	Wyden	m	Dem	Oregon	3