

Intro Stats
Solution Set 1: Supplementary Problems
Politics Section

1. Generate a frequency distribution of cvote. What proportion of challengers in 1990 won at least 45% of the vote?

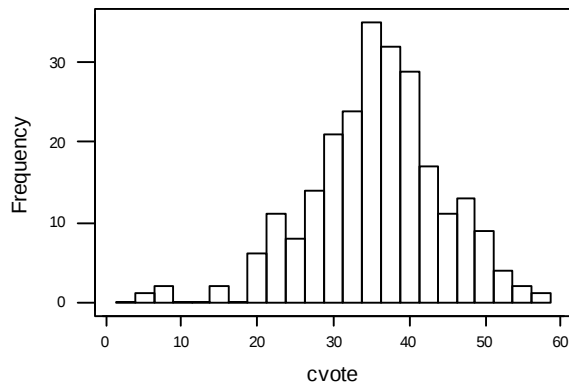
Answer: 14%. House races are seldom competitive.

Summary Statistics for Discrete Variables

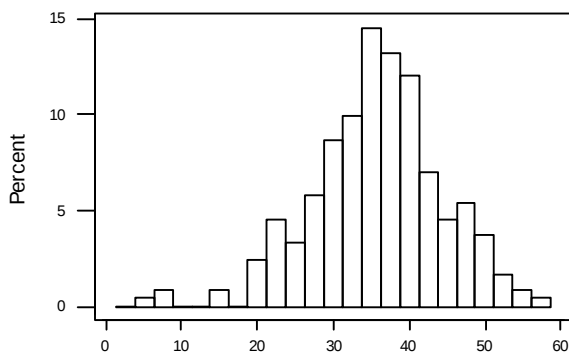
cvote	Count	CumCnt	Percent	CumPct
6.2000	1	1	0.41	0.41
7.9000	1	2	0.41	0.83
8.7000	1	3	0.41	1.24
15.9000	1	4	0.41	1.65
16.1000	1	5	0.41	2.07
19.3000	1	6	0.41	2.48
19.6000	2	8	0.83	3.31
20.0000	2	10	0.83	4.13
20.6000	1	11	0.41	4.55
21.8000	1	12	0.41	4.96
21.9000	1	13	0.41	5.37
22.3000	2	15	0.83	6.20
22.8000	1	16	0.41	6.61
22.9000	2	18	0.83	7.44
23.2000	1	19	0.41	7.85
23.4000	2	21	0.83	8.68
23.7000	1	22	0.41	9.09
23.9000	1	23	0.41	9.50
24.4000	1	24	0.41	9.92
24.6000	1	25	0.41	10.33
25.5000	2	27	0.83	11.16
25.6000	2	29	0.83	11.98
25.7000	1	30	0.41	12.40
26.7000	1	31	0.41	12.81
27.0000	1	32	0.41	13.22
27.1000	3	35	1.24	14.46
27.6000	1	36	0.41	14.88
27.9000	1	37	0.41	15.29
28.0000	1	38	0.41	15.70
28.1000	1	39	0.41	16.12
28.2000	2	41	0.83	16.94
28.6000	2	43	0.83	17.77
28.7000	1	44	0.41	18.18
28.8000	4	48	1.65	19.83
29.1000	1	49	0.41	20.25
29.2000	1	50	0.41	20.66
29.3000	1	51	0.41	21.07
29.5000	2	53	0.83	21.90
29.6000	1	54	0.41	22.31
30.3000	2	56	0.83	23.14
30.4000	3	59	1.24	24.38
30.7000	2	61	0.83	25.21
31.0000	1	62	0.41	25.62
31.1000	1	63	0.41	26.03
31.2000	2	65	0.83	26.86
31.4000	1	66	0.41	27.27
31.6000	1	67	0.41	27.69
31.8000	1	68	0.41	28.10
31.9000	2	70	0.83	28.93
32.0000	3	73	1.24	30.17
32.4000	1	74	0.41	30.58
32.5000	1	75	0.41	30.99
32.8000	1	76	0.41	31.40
32.9000	3	79	1.24	32.64
33.0000	1	80	0.41	33.06
33.1000	1	81	0.41	33.47
33.3000	4	85	1.65	35.12
33.4000	1	86	0.41	35.54
33.5000	1	87	0.41	35.95
33.6000	2	89	0.83	36.78
33.8000	1	90	0.41	37.19
33.9000	2	92	0.83	38.02
34.0000	4	96	1.65	39.67
34.1000	1	97	0.41	40.08
34.2000	3	100	1.24	41.32
34.3000	1	101	0.41	41.74
34.4000	1	102	0.41	42.15
34.5000	2	104	0.83	42.98
34.6000	1	105	0.41	43.39
34.7000	2	107	0.83	44.21

34.8000	1	108	0.41	44.63
34.9000	1	109	0.41	45.04
35.1000	2	111	0.83	45.87
35.2000	4	115	1.65	47.52
35.3000	2	117	0.83	48.35
35.4000	1	118	0.41	48.76
35.5000	1	119	0.41	49.17
35.6000	3	122	1.24	50.41
35.9000	1	123	0.41	50.83
36.2000	1	124	0.41	51.24
36.3000	2	126	0.83	52.07
36.4000	2	128	0.83	52.89
36.5000	3	131	1.24	54.13
36.6000	2	133	0.83	54.96
36.7000	1	134	0.41	55.37
36.8000	2	136	0.83	56.20
37.0000	1	137	0.41	56.61
37.2000	1	138	0.41	57.02
37.4000	1	139	0.41	57.44
37.9000	2	141	0.83	58.26
38.0000	3	144	1.24	59.50
38.1000	3	147	1.24	60.74
38.2000	2	149	0.83	61.57
38.5000	2	151	0.83	62.40
38.6000	1	152	0.41	62.81
38.7000	4	156	1.65	64.46
38.8000	1	157	0.41	64.88
38.9000	2	159	0.83	65.70
39.0000	3	162	1.24	66.94
39.1000	1	163	0.41	67.36
39.3000	2	165	0.83	68.18
39.4000	2	167	0.83	69.01
39.5000	2	169	0.83	69.83
39.7000	1	170	0.41	70.25
39.9000	2	172	0.83	71.07
40.0000	1	173	0.41	71.49
40.3000	2	175	0.83	72.31
40.4000	2	177	0.83	73.14
40.6000	2	179	0.83	73.97
40.8000	1	180	0.41	74.38
40.9000	2	182	0.83	75.21
41.0000	1	183	0.41	75.62
41.1000	2	185	0.83	76.45
41.6000	1	186	0.41	76.86
41.7000	1	187	0.41	77.27
41.9000	4	191	1.65	78.93
42.1000	1	192	0.41	79.34
42.2000	1	193	0.41	79.75
42.4000	1	194	0.41	80.17
42.5000	1	195	0.41	80.58
42.6000	1	196	0.41	80.99
42.7000	1	197	0.41	81.40
42.8000	1	198	0.41	81.82
43.0000	1	199	0.41	82.23
43.2000	1	200	0.41	82.64
43.4000	2	202	0.83	83.47
43.8000	1	203	0.41	83.88
44.0000	1	204	0.41	84.30
44.1000	1	205	0.41	84.71
44.2000	1	206	0.41	85.12
44.7000	1	207	0.41	85.54
44.9000	1	208	0.41	85.95
45.0000	1	209	0.41	86.36
45.2000	1	210	0.41	86.78
45.3000	1	211	0.41	87.19
45.4000	1	212	0.41	87.60
45.6000	1	213	0.41	88.02
46.5000	1	214	0.41	88.43
46.6000	1	215	0.41	88.84
46.9000	1	216	0.41	89.26
47.0000	1	217	0.41	89.67
47.3000	1	218	0.41	90.08
47.4000	1	219	0.41	90.50
47.7000	1	220	0.41	90.91
47.8000	1	221	0.41	91.32
47.9000	1	222	0.41	91.74
48.0000	2	224	0.83	92.56
48.1000	2	226	0.83	93.39
49.0000	2	228	0.83	94.21
49.2000	1	229	0.41	94.63
49.7000	1	230	0.41	95.04
50.0000	1	231	0.41	95.45
50.7000	1	232	0.41	95.87
50.8000	2	234	0.83	96.69
50.9000	1	235	0.41	97.11
51.4000	1	236	0.41	97.52
53.2000	1	237	0.41	97.93
53.6000	1	238	0.41	98.35
53.7000	1	239	0.41	98.76
54.5000	1	240	0.41	99.17
55.1000	1	241	0.41	99.59
56.8000	1	242	0.41	100.00
N=	242			

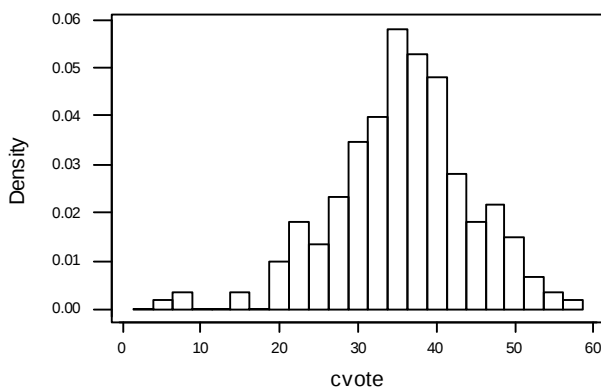
2. Generate three different types of histograms (click on Options): the default histogram (frequency), a percentage histogram, and a density histogram. How do the shapes of these three diagrams differ? The units on the Y-axis differ across these graphs; pick a vertical bar in the diagram and explain how its meaning changes from one graph to the next.



Frequency histogram: each bar is 2.5 percentage points wide. Thus, the bar centered at 35 ranges from 33.75 to 36.25 and comprises 35 House races.



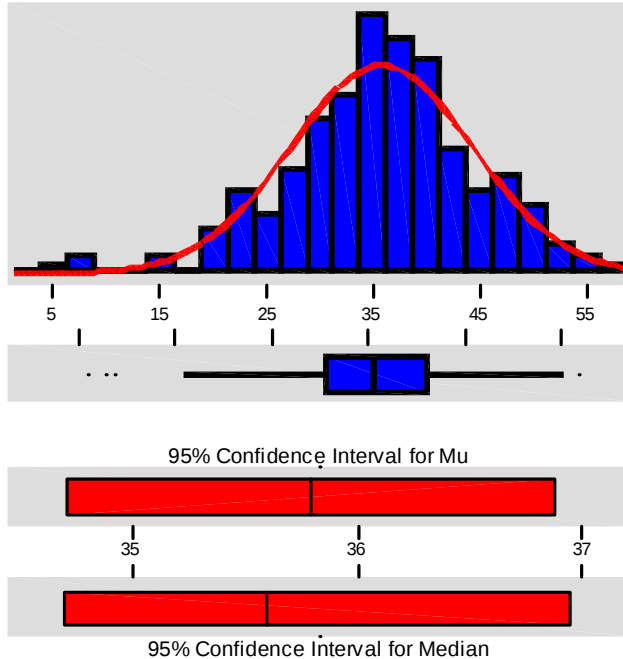
Percentage histogram: same shape as the frequency histogram. Now each bar represents the percentage of the sample falling within each bin. Thus, the bin centered at 35% contains approximately 15% of the sample.



Density histogram: Again, same shape. Now the y-axis is scaled so that the total area under the curve equals 1.0. This graph is just a rescaled version of the percentage histogram. (Multiply x and y axes to get area in each bar.)

3. Generate a 5 number summary of cvote and interpret each statistic.

Descriptive Statistics



Variable: cvote

Anderson-Darling Normality Test

A-Squared: 0.569
P-Value: 0.138

Mean 35.7926
StDev 8.5528
Variance 73.1497
Skewness -3.2E-01
Kurtosis 0.677065
N 242

Minimum 6.2000
1st Quartile 30.7000
Median 35.6000
3rd Quartile 40.9250
Maximum 56.8000

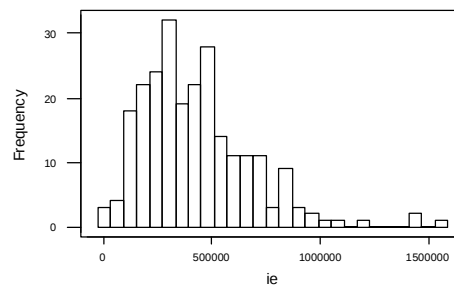
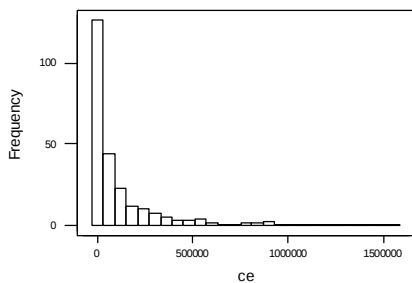
95% Confidence Interval for Mu
34.7096 36.8756

95% Confidence Interval for Sigma
7.8526 9.3911

95% Confidence Interval for Median
34.7000 36.9442

Minimum: some poor challenger won only 6.2% of the vote; Maximum: another challenger won by a 56.8% landslide. Median: Half of all challengers win more less than 35.6% of the vote. IQR: Half fall between 30.7 and 40.9%. The shape of the distribution is approximately normal, so the mean and median are similar.

4. Generate (default) histograms for incumbent expenditures and challenger expenditures (in \$1000s). To facilitate comparison, use the Frame > Multiple Graphs > different y, same x option. Using these graphs, describe how incumbent and challenger expenditures differ?

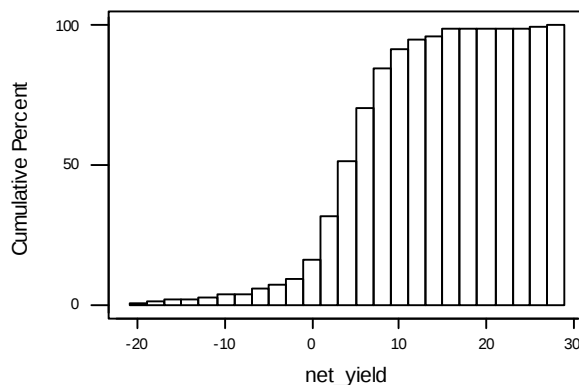


The distribution of challenger expenditures is well to the left of incumbent expenditures. The mode is zero for challengers and about \$300,000 for incumbents. Incumbents, in short, have access to much more money.

5. Suppose challengers buy 4 percentage points of the vote for each \$100,000 they spend. (That is, challengers who would win 35% if they spent nothing, win 39% if they spend \$100,000 -- all other things being equal.) How many percentage points of the vote does the average challenger buy? Suppose incumbents buy 2 percentage points of the vote for each \$100,000 they spend. How many percentage points does the average incumbent buy? Under these assumptions, who would make out better under a complete ban on campaign expenditures, challengers or incumbents -- that is, what proportion of incumbents would do better under a complete ban?

```
MTB > let c9=c5*.00002
MTB > let c10=c6*.00004
```

Variable	N	Mean
ie_yield	242	8.477
ce_yield	242	3.811

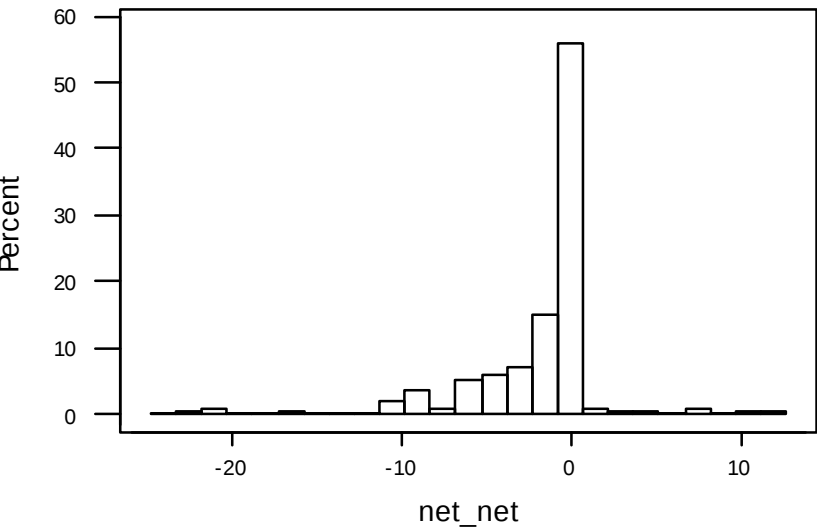


Net yield is calculated as incumbent yield minus challenger yield. This value is negative for only 12% of the sample. Thus, approximately 88% of all incumbents would be hurt by a complete ban.

Bonus question: What proportion of incumbents would do better if all candidates were prohibited from spending more than \$400,000? Hint: use the Manip > Code > Numeric to Numeric function in Minitab to simulate ceilings on campaign spending.

The graph below shows that virtually no incumbents are made better off by ceilings on campaign expenditures. Eight do better under ceilings, 127 remain unchanged, and 107 do worse. The notion that campaign finance limits are ‘incumbent protection acts’ is unsupported by these data — given the spending effects assumed in the foregoing scenario.

Effects of Ceilings of \$400,000 on Campaign Expenditures



Positive values indicate incumbents made better off by ceilings