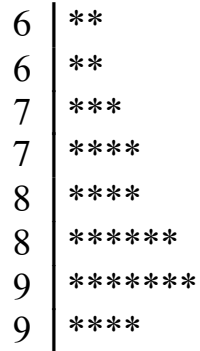


**AP Statistics  
Summer Assignment**

**Name:** \_\_\_\_\_

1. The graph below displays the scores of 32 students on a recent exam. Scores on this exam ranged from 64 to 95 points.



a. What does the graph tell you about how the grades are distributed?

b. Explain how you would estimate the mean and the median? Use your method to estimate the mean and the median.

- c. Based on (a) and (b), which summary statistics, the mean or the median should the teacher use to report the overall performance of the students on the exam? Justify your answer.

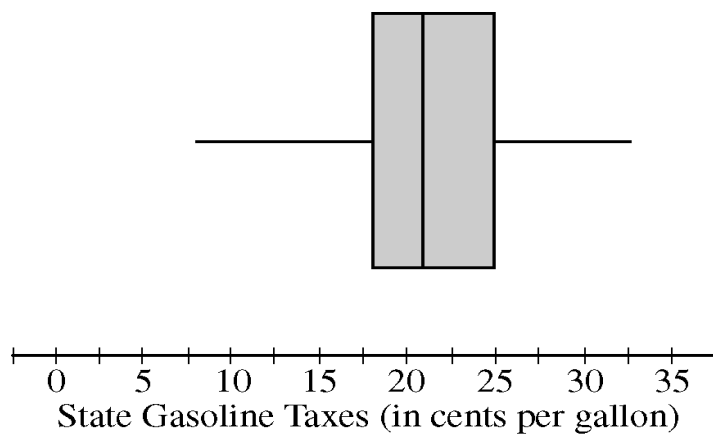
2. The Better Business Council of a large city has concluded that students in the city's schools are not learning enough about economics to function in the modern world. These findings were based on test results from a random sample of 20 twelfth-grade students who completed a 46 question multiple-choice test on the basic economics concepts. The data set below shows the number of questions that each of the 20 students in the sample answered correctly.

12 16 18 17 18 33 41 44 38 35 19 36 19 13 43  
8 16 10 9

- a. Display these data in a stemplot and a boxplot.
- b. Explain what stands out in the stemplot that is not visible in the boxplot.
- c. Explain what stands out in the boxplot that is not in the stemplot.
- d. What does the graph tell you about the distribution of the correctly answered questions for the 20 students?

- e. Why would it be misleading to report **only** a measure of center for this score distribution?

3. As gasoline prices have increased in recent years, many drivers have expressed concern about the taxes they pay on gasoline for their cars. In the United States, gasoline taxes are imposed by both the federal government and by individual states. The boxplot below shows the distribution of the state gasoline taxes, in cents per gallon, for all 50 states on January 1, 2006.



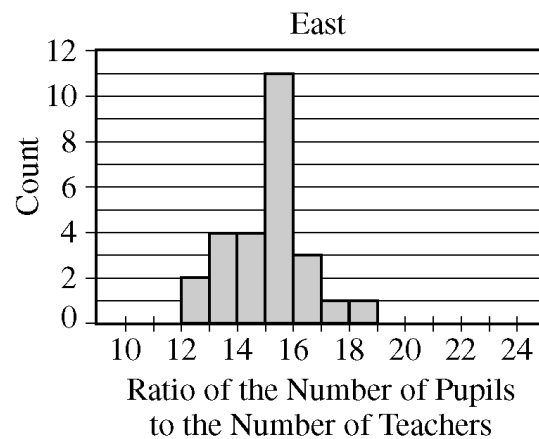
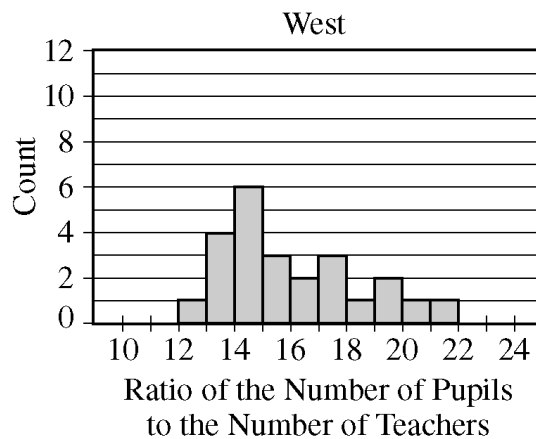
(a) Based on the boxplot, what are the approximate values of the median and the interquartile range of the distribution of state gasoline taxes, in cents per gallon? Mark and label the boxplot to indicate how you found the approximated values.

(b) List the possible gasoline taxes for each state that would produce the boxplot above. Explain why the data that you listed would coincide with the box plot.

c. The federal tax imposed on gasoline was 18.4 cents per gallon at the time the state taxes were in effect. The federal tax was added the state gasoline tax for each state to create a new distribution of combined gasoline taxes. What are the approximate values in cents per gallon, of the mean, median,

standard deviation and the interquartile range of the new distribution of combined gasoline taxes? Justify your answer.

4. Records are kept by each state in the United States on the number of pupils enrolled in public schools and the number of teachers employed by public schools for each school year. From these records, the ratio of the number of pupils to the number of teachers (P-T ratio) can be calculated for each state. The histograms below show the P-T ratio for every state during the 2001–2002 school year. The histogram on the left displays the ratios for the 24 states that are west of the Mississippi River, and the histogram on the right displays the ratios for the 26 states that are east of the Mississippi River.

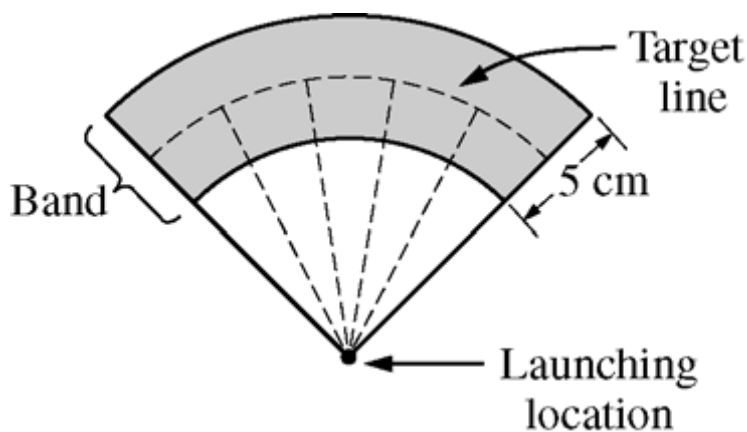


(a) Describe how you would use the histograms to estimate the median P-T ratio for each group (west and east) of states. Then use this procedure to estimate the median of the west group and the median of the east group.

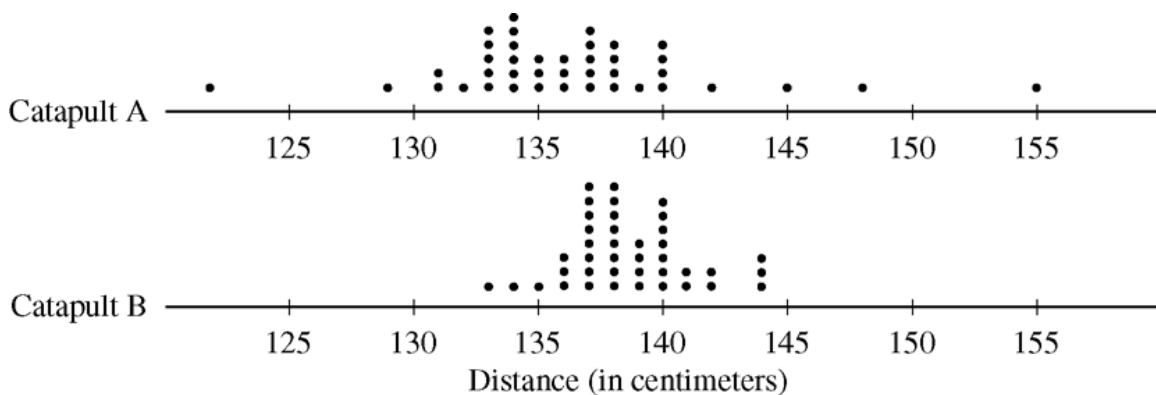
(b) Write a few sentences comparing the distributions of P-T ratios for states in the two groups (west and east) during the 2001–2002 school year. Included in your discussion are the differences or similarities in the medians, the ranges and whether the shape of the distributions.

(c) Using your answers in parts (a) and (b), Explain which distribution would have the larger mean.

5. Two parents have each built a toy catapult for use in a game at an elementary school fair. To play the game, students will attempt to launch Ping-Pong balls from the catapults so that the balls land within a 5-centimeter band. A target line will be drawn through the middle of the band, as shown in the figure below. All points on the target line are equidistant from the launching location.



If a ball lands within the shaded band, the student will win a prize. The parents have constructed the two catapults according to slightly different plans. They want to test these catapults before building additional ones. Under identical conditions, the parents launch 40 Ping-Pong balls from each catapult and measure the distance that the ball travels before landing. Distances to the nearest centimeter are graphed in the dotplots below.





(a) Comment on any similarities and any differences in the two distributions of distances traveled by balls launched from catapult A and catapult B.

(b) If the parents want to maximize the probability of having the Ping-Pong balls land within the band, which one of the two catapults, A or B, would be better to use than the other? Justify your choice.

(c) Using the catapult that you chose in part (b), how many centimeters from the target line should this catapult be placed? Explain why you chose this distance.

6. Select at random 10 senators from the list below. (See list of US Senators at the end of the questions.)

- i. Explain the method you used to select the senators that you chose randomly.

- ii. Record the years of service for the senators that you selected in the table below.

<b>ID#</b>										
<b>Years of service</b>										

- iii. Construct a dotplot for the years of service of the 10 senators that you selected.

- iv. Use the distribution of the dotplot along with the mean, the median, the standard deviation and the interquartile range to draw conclusions about the number of years of service of US Senators in 1994.

### US Senators (1994)

ID #	Name	Sex	Party	State	Years
01	Akaka	M	Dem	Hawaii	4

02	Baucus	M	Dem	Montana	16
03	Bennett	M	Rep	Utah	1
04	Biden	M	Dem	Delaware	21
05	Bingaman	M	Dem	New Mexico	11
06	Bond	M	Rep	Missouri	7
07	Boren	M	Dem	Oklahoma	15
08	Boxer	F	Dem	California	1
09	Bradley	M	Dem	New Jersey	15
10	Breaux	M	Dem	Louisiana	7
11	Brown	M	Rep	Colorado	3
12	Bryan	M	Dem	Nevada	5
13	Bumpers	M	Dem	Arkansas	19
14	Burns	M	Rep	Montana	5
15	Byrd	M	Dem	West Virginia	35
16	Campbell	M	Dem	Colorado	1
17	Chafee	M	Rep	Rhode Island	18
18	Coats	M	Rep	Indiana	5
19	Cochran	M	Rep	Mississippi	16
20	Cohen	M	Rep	Maine	15
21	Conrad	M	Dem	North Dakota	7
22	Coverdell	M	Rep	Georgia	1
23	Craig	M	Rep	Idaho	3
24	D'Amato	M	Rep	New York	13
25	Danforth	M	Rep	Missouri	18
26	Daschle	M	Dem	South Dakota	7
27	DeConcini	M	Dem	Arizona	17
28	Dodd	M	Dem	Connecticut	13
29	Dole	M	Rep	Kansas	25
30	Domenici	M	Rep	New Mexico	21
31	Dorgan	M	Dem	North Dakota	1
32	Durenburger	M	Rep	Minnesota	16
33	Exon	M	Dem	Nebraska	15
34	Faircloth	M	Rep	North Carolina	1
35	Feingold	M	Dem	Wisconsin	1
36	Feinstein	F	Dem	California	1
37	Ford	M	Dem	Kentucky	20
38	Glenn	M	Dem	Ohio	20
39	Gorton	M	Rep	Washington	13
40	Graham	M	Dem	Florida	7
41	Gramm	M	Rep	Texas	9
42	Grassley	M	Rep	Iowa	13
43	Gregg	M	Rep	New Hampshire	1
44	Harkin	M	Dem	Iowa	9
45	Hatch	M	Rep	Utah	17
46	Hatfield	M	Rep	Oregon	27

47	Heflin	M	Dem	Alabama	15
48	Helms	M	Rep	North Carolina	21
49	Hollings	M	Dem	South Carolina	28
50	Hutchinson	F	Rep	Texas	1
51	Inouye	M	Dem	Hawaii	31
52	Jeffords	M	Rep	Vermont	5
53	Johnston	M	Dem	Louisiana	22
54	Kassebaum	F	Rep	Kansas	16
55	Kempthorne	M	Rep	Idaho	1
56	Kennedy	M	Dem	Massechusetts	32
57	Kerry, J	M	Dem	Massechusetts	9
58	Kerry, R	M	Dem	Nebraska	5
59	Kohl	M	Dem	Wisconsin	5
60	Lautenberg	M	Dem	New Jersey	12
61	Leahy	M	Dem	Vermont	19
62	Levin	M	Dem	Michigan	15
63	Lieberman	M	Dem	Connecticut	5
64	Lott	M	Rep	Mississippi	5
65	Lugar	M	Rep	Indiana	17
66	Mack	M	Rep	Florida	5
67	Matthew	M	Dem	Tennessee	1
68	McCain	M	Rep	Arizona	7
69	McConnell	M	Rep	Kentucky	9
70	Metzenbaum	M	Dem	Ohio	18
71	Mikulski	F	Dem	Maryland	7
72	Mitchell	M	Dem	Maine	14
73	Moseley-Baum	F	Dem	Illinois	1
74	Moynihan	M	Dem	New York	17
75	Murkowski	M	Rep	Alaska	13
76	Murray	F	Dem	Washington	1
77	Nickles	M	Rep	Oklahoma	13
78	Nunn	M	Dem	Georgia	22
79	Packwood	M	Rep	Oregon	25
80	Pell	M	Dem	Rhode Island	33
81	Pressler	M	Rep	South Dakota	15
82	Pryor	M	Dem	Arkansas	15
83	Reid	M	Dem	Nevada	7
84	Riegle	M	Dem	Michigan	18
85	Robb	M	Dem	Virginia	5
86	Rockefeller	M	Dem	West Virginia	9
87	Roth	M	Rep	Delaware	23
88	Sarbanes	M	Dem	Maryland	17
89	Sasser	M	Dem	Tennessee	17
90	Shelby	M	Dem	Alabama	7
91	Simon	M	Dem	Illinois	9

<b>92</b>	<b>Simpson</b>	<b>M</b>	<b>Rep</b>	<b>Wyoming</b>	<b>15</b>
<b>93</b>	<b>Smith</b>	<b>M</b>	<b>Rep</b>	<b>New Hampshire</b>	<b>3</b>
<b>94</b>	<b>Specter</b>	<b>M</b>	<b>Rep</b>	<b>Pennsylvania</b>	<b>13</b>
<b>95</b>	<b>Stevens</b>	<b>M</b>	<b>Rep</b>	<b>Alaska</b>	<b>26</b>
<b>96</b>	<b>Thurmond</b>	<b>M</b>	<b>Rep</b>	<b>South Carolina</b>	<b>38</b>
<b>97</b>	<b>Wallop</b>	<b>M</b>	<b>Rep</b>	<b>Wyoming</b>	<b>17</b>
<b>98</b>	<b>Warner</b>	<b>M</b>	<b>Rep</b>	<b>Virginia</b>	<b>15</b>
<b>99</b>	<b>Wellstone</b>	<b>M</b>	<b>Dem</b>	<b>Minnesota</b>	<b>16</b>
<b>00</b>	<b>Wofford</b>	<b>M</b>	<b>Dem</b>	<b>Pennsylvania</b>	<b>3</b>