

**Homework 2; Monday, February 9****NAME:**

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1) One survey produced the following summary of responses to the question “*What is your favorite color?*”: blue, 42%; green, 14%; purple, 14%; red, 8%; black, 7%; orange, 5%; yellow, 3%; brown, 3%; gray, 2%; and white, 2%. Make a bar chart of the percents and write a short summary of the major features of your graph.

2) The survey about color preferences reported the age distribution of the people who responded. Here are the age distribution of the results:

Age group (years)	1-18	19-24	25-35	36-50	51-69	70 and over
Count	10	97	70	36	14	5

- Add the counts and compute the percents for each age group
- Make a bar chart of the percents
- Describe the distribution
- Explain why your bar chart is not a histogram

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3) The following table gives a breakdown of the materials that made up municipal solid waste (garbage):

Material	Weight (tons)	Percent
Food scraps	25.9	11.2
Glass	12.8	5.5
Metals	18.0	7.8
Paper	86.7	37.4
Plastics	24.7	10.7
Rubber & Textiles	15.8	6.8
Wood	12.7	5.5
Yard trimmings	27.7	11.9
Other	7.5	3.2
<i>Total</i>	<i>231.9</i>	<i>100.0</i>

- a. Calculate the cumulative frequency of the percent values in decreasing order (i.e. ordering the values from tallest to shortest)

Material	Relative Frequency (percent)	Cumulative Frequency
<i>Total</i>	<i>100</i>	<i>100</i>

- b. Make a bar chart with relative frequencies (from tallest to shortest) and add a pareto line of the cumulative percents.

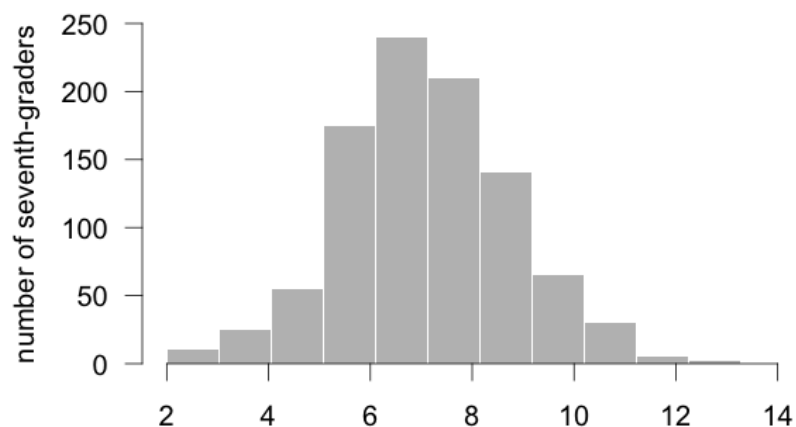
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4) The following table gives the percentages of women among students seeking various graduate and professional degrees.

Degree	Percent
Master's in business administration	39.8
Master's in education	76.2
Other master of arts	59.6
Other master of science	53.0
Doctorate in education	70.8
Other PhD degree	54.2
Medicine (MD)	44.0
Law	50.2
Theology	20.2

- Explain clearly why we cannot use a pie chart to display these data
- What type of chart would you use to graph the data (explain why)

5) The next figure displays the scores of all 947 seventh-grade students, in the public schools of Springfield, on the vocabulary part of the Test of Basic Skills. Give a brief description of the overall pattern (shape, center, spread) of this distribution.



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6) The states differ greatly in the kinds of severe weather that afflict them. The table below shows the average property damage caused by tornadoes per year over the period 1950 to 1999 in each of the fifty states.

State	Damage	State	Damage	State	Damage
Alabama	51.88	Louisiana	27.75	Ohio	44.36
Alaska	0.00	Maine	0.53	Oklahoma	81.94
Arizona	3.47	Maryland	2.33	Oregon	5.52
Arkansas	40.96	Massachusetts	4.42	Pennsylvania	17.11
California	3.68	Michigan	29.88	Rhode Island	0.09
Colorado	4.62	Minnesota	84.84	South Carolina	17.19
Connecticut	2.26	Mississippi	43.62	South Dakota	10.64
Delaware	0.27	Missouri	68.23	Tennessee	23.47
Florida	37.32	Montana	2.27	Texas	88.60
Georgia	51.68	Nebraska	30.26	Utah	3.57
Hawaii	0.34	Nevada	0.10	Vermont	0.24
Idaho	0.26	New Hampshire	0.66	Virginia	7.42
Illinois	62.94	New Jersey	2.94	Washington	2.37
Indiana	53.13	New Mexico	1.49	West Virginia	2.14
Iowa	49.51	New York	15.73	Wisconsin	31.33
Kansas	49.28	North Carolina	14.90	Wyoming	1.78
Kentucky	24.84	North Dakota	14.69		

- What are the top five states for tornado damage?
- What are the bottom five states for tornado damages?
- Make a histogram of the data with classes " $0 \leq \text{damage} < 10$ ", " $10 \leq \text{damage} < 20$ ", " $20 \leq \text{damage} < 30$ ", and so on. Describe the shape, center, and spread of the distribution. Which states may be outliers?

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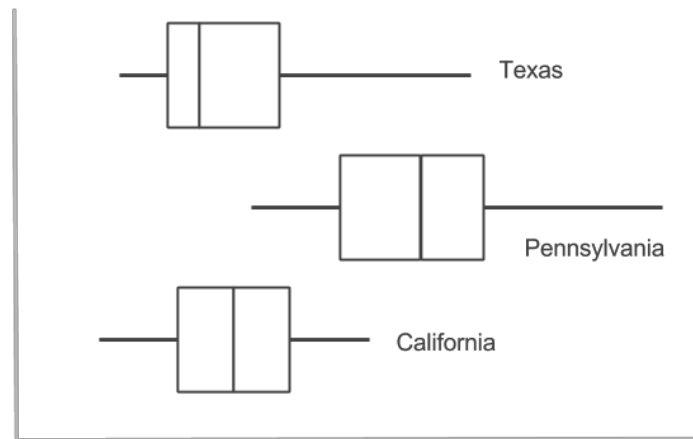
7) Students from a statistics class were asked to record their heights in inches. The heights (as recorded) were:

65	72	68	64	60	55	73	71	52	63	61	74
69	67	74	50	4	75	67	62	66	80	64	65

- Make a box plot of the data
- Find the first and third quartiles  $Q_1$  and  $Q_3$ , and then obtain the value of the interquartile range (IQR)
- Multiply the IQR by 1.5 and find the lower and upper limits
- Are there any data values below the lower limit? above the upper limit? List any suspected outliers. What might be some explanations for the outliers?

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8) *Consumer Reports* rated automobile insurance companies and listed annual premiums for top-rated companies in several states. The figure below shows box plots for annual premiums for urban customers in three states. The box plots in ent

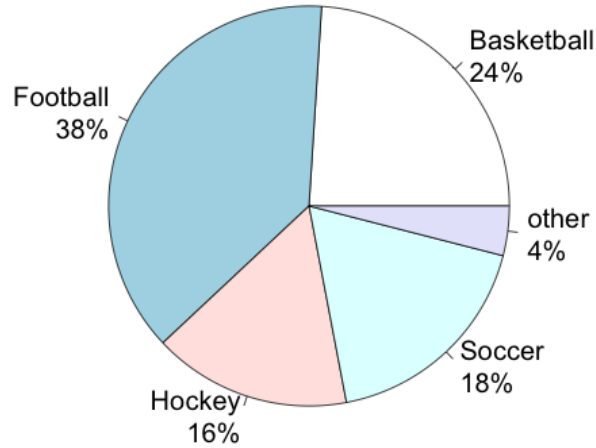


- Which state has the lowest premium?
- Which state has the highest premium?
- Which state has the highest median premium?
- Which state has the smallest range of premiums?
- Which states has the smallest interquartile range?
- The table below shows the five-number summaries for the box plots. Match the summaries to the appropriate box plots.

A	B	C
$n = 10$ $\text{min} = 2382$ $Q1 = 2758$ $\text{Median} = 2991$ $Q3 = 3652$ $\text{max} = 5715$	$n = 10$ $\text{min} = 3314$ $Q1 = 4326$ $\text{Median} = 5116.5$ $Q3 = 5801$ $\text{max} = 7527$	$n = 10$ $\text{min} = 2323$ $Q1 = 2801$ $\text{Median} = 3377.5$ $Q3 = 3966$ $\text{max} = 4482$

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9) A survey of 500 teenagers was taken to see which sport was their favorite to watch on television. The pie chart below displays the results. Choose the correct data (numbers of teenagers) from which the pie chart was constructed (*Explain your answer*).



- a. Basketball, 190; football, 120; hockey, 90; soccer, 80; other, 20
- b. Basketball, 120; football, 190; hockey, 90; soccer, 80; other, 20
- c. Basketball, 20; football, 90; hockey, 80; soccer, 190; other, 120
- d. Basketball, 240; football, 380; hockey, 160; soccer, 180; other, 40
- e. Basketball, 120; football, 190; hockey, 80; soccer, 90; other, 20

10) In Chemistry 400, weights are assigned to required activities as follows:

*Class participation 15%; Exam 1, 20%; Exam 2, 20%; Exam 3, 20%; Laboratory 25%*

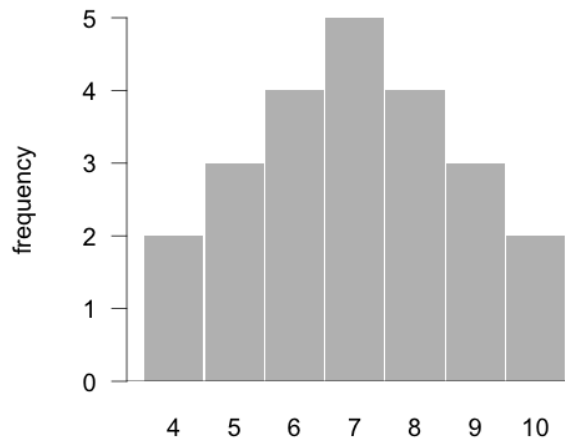
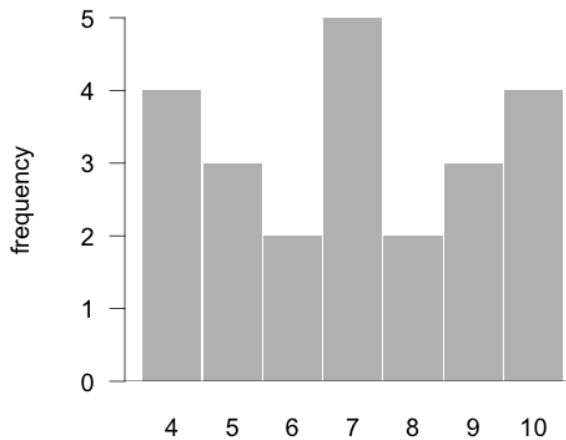
Each activity is graded on a 100-point scale. Mary earned 70 points on class participation, 80 points on exam 1, 64 points on exam 2, 77 points on exam 3, and 96 points on laboratory. Compute her overall weighted average in the Chemistry 400 class.

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**11)** A data set has values ranging from a low 10 to a high 52. What's wrong with using the class limits: 10-19, 20-29, 30-39, 40-49 for a frequency table?

**12)** A data set with whole numbers (i.e. integers) has a minimum value of 20 and a maximum value 82. Find the class width and class limits for a frequency table with 7 classes.

**13)** Look at the two histograms below. Each involves the same number of data. The data are all whole (i.e. integer) numbers, so the height of each bar represents the number of values equal to the corresponding midpoint shown on the horizontal axis. Notice that both distributions are symmetric.



a. Estimate the mode, median, and the mean for each histogram

b. Which distribution has the larger standard deviation? Why?