

5pts 1. Suppose a statistician is interested in the average household income of all households in Dover. Five hundred households are contacted and questioned about their annual income.

a) What is the variable of interest?

Dover Household income

b) What is the population?

All households in Dover

10pts 2. Classify the following data by class (qualitative, quantitative) and by type (nominal, ordinal, interval, ratio)

a) Your weight. Quantitative, Ratio

b) The Fahrenheit temperature needed to boil water. Quantitative, Interval

c) The brand of calculator you are using. Qualitative, Nominal

d) The star rating of a hotel. Qualitative, Ordinal

e) The Kelvin temperature outside today. Quantitative, Ratio

10pts 3. Suppose a medium sized company has 300 workers (¹⁰⁵100 secretarial, 75 managerial, ⁴⁵50 custodial and 75 others). Construct a relative frequency bar chart to depict this information.

See graph paper

10pts 4. Suppose a medium sized company has \$120,000 to spend during this month. \$60,000 will go towards payroll, \$30,000 for utilities, \$15,000 for rent and the rest for advertising. Draw a pie chart (use % instead of \$) to show this information and make sure to give your chart an appropriate title as well.

See graph paper

Test 1 Fall 2011

10pts

3

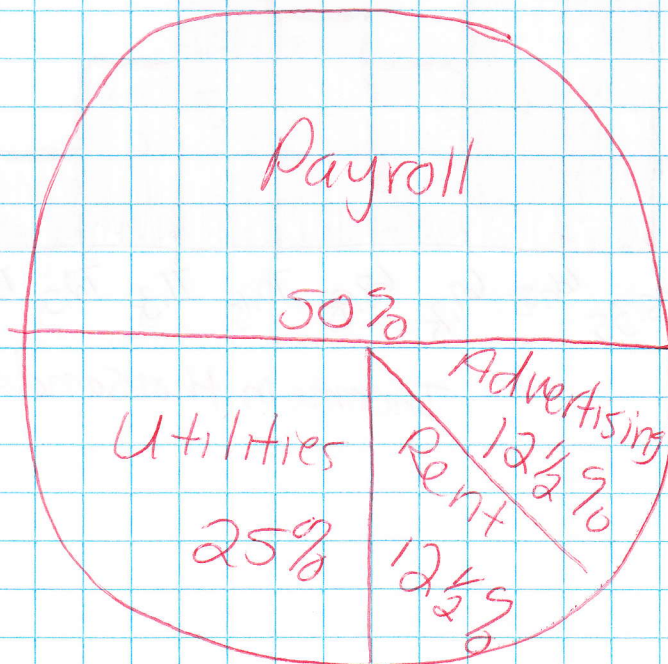
300 workers classifications at a medium sized company



10pts

4

monthly \$120,000 medium sized company budget



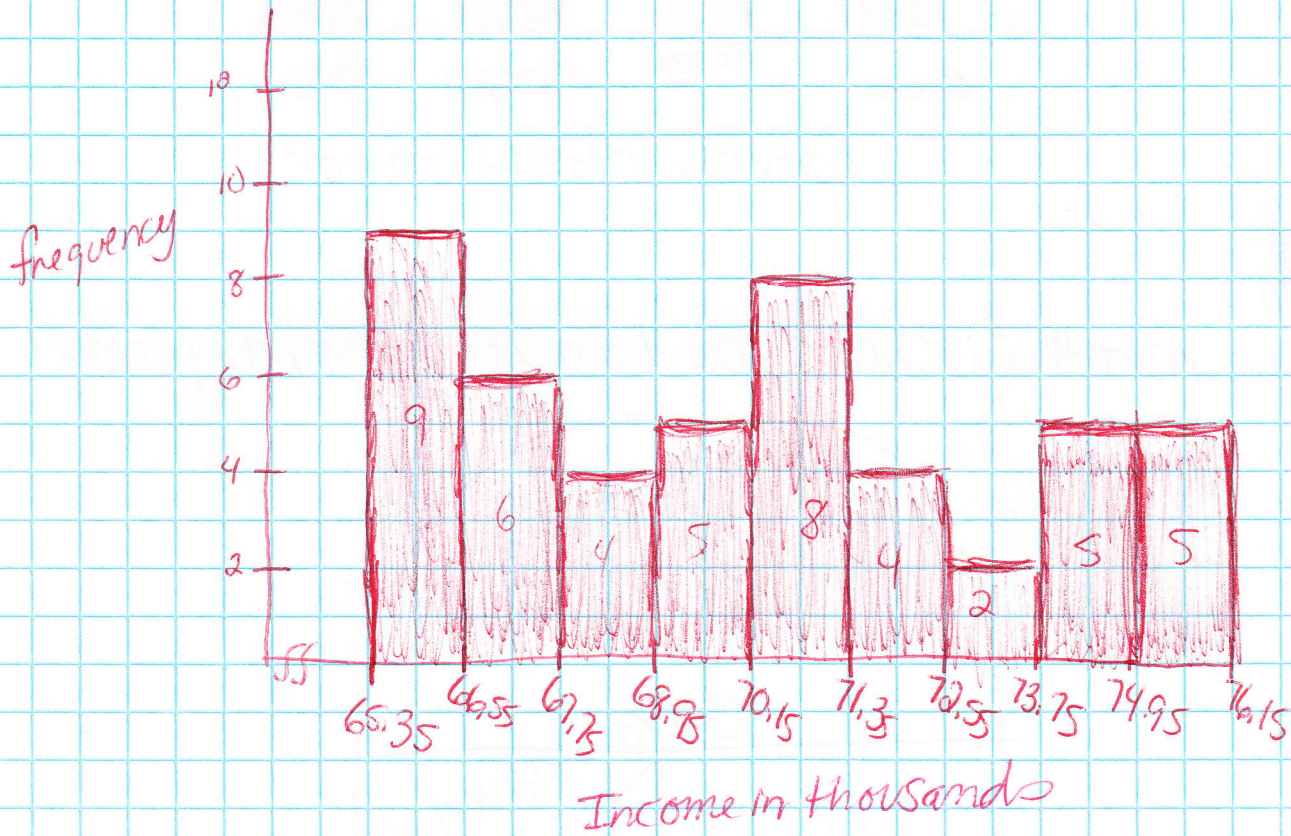
10pts
5

Prices in cents per gallon of gas at
30 Delmarva service station

Stem 10's	leaf
34	1
35	9
36	2, 3, 5, 6, 7, 9, 9, 9, 9
37	1, 1, 2, 3, 3, 3, 5, 5, 8, 8, 8
38	1, 4, 6, 6, 7, 7
39	0, 5

10pts
6

Salaries of 48 instructors at a small college



10pts 5. Construct a stem and leaf display for the following prices in cents of a gallon of gasoline at various Delmarva service stations.

378, 362, 366, 390, 363, 386, 375, 387, 371, 365, 381, 369, 373, 367, 372
386, 395, 371, 369, 373, 359, 375, 384, 373, 369, 378, 369, 387, 378, 341

See graph paper

10pts 6. The annual incomes of 48 randomly selected instructors of a small college are recorded below in thousands of dollars. Construct a frequency histogram using a class interval of 1.2 and 65.35 as the lower class boundary of the first class.

65.4 65.5 65.7 65.8 65.7 65.8 66.1 66.4 66.5 66.7 67.2 67.2
67.3 67.6 67.7 67.8 68.4 68.5 68.8 69.1 69.5 69.8 70.0 70.1
70.2 70.3 70.4 70.7 70.9 71.0 71.1 71.3 71.6 71.8 72.2 72.5
72.7 73.3 73.8 74.1 74.5 74.7 74.9 75.1 75.2 75.3 75.5 75.6

9 8
6 4 5
4 2
5 5

5pts 7. Find the median of the following data

$\frac{18}{2}, \frac{18+1}{2}$
9th 10th

116, 76, 88, 76, 82, 98, 98, 82, 74, 56, 112, 96, 110, 88, 98, 94, 112, 112

56, 74, 76, 76, 82, 82, 88, 88, 94, 96

$\frac{94+96}{2} = 95$
median

25pts 8. Given the following data 305, 330, 295, 424, 295, 367, 397, 421, 365, 331, 295, 330, 408 show work and find

a) The mean $\frac{305 + \dots + 408}{13} = \frac{4563}{13} = 351$

b) The median $\frac{13+1}{2} = 7^{th}$ 295, 295, 295, 305, 330, 330, 331

c) The mode(s) 295

d) The range $424 - 295 = 129$

e) The standard deviation $\sqrt{\frac{(305-351)^2 + \dots + (408-351)^2}{13-1}} = \sqrt{\frac{28852}{12}} = \sqrt{2404.33} = 49.034$

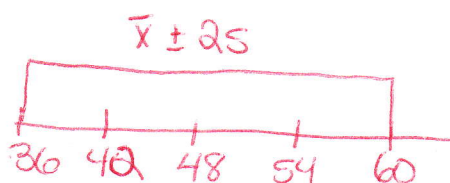
5pts 9. Find the z-score for the x value and note whether the result is a sample or population z-score.

$$x = 258 \quad \sigma^2 = 36 \quad \mu = 240$$

pop. z score of 3

$$\frac{x - \mu}{\sigma} = \frac{258 - 240}{6} = \frac{18}{6} = 3$$

5pts 10. A manufacturer of automobile batteries claims that the average length of life for its grade A battery is 48 months. Suppose the standard deviation of the life length is known to be 6 months, and the frequency distribution of the life length data is unknown. Explain how to determine the approximate percentage of the manufacturer's grade A batteries that could be expected to last 36 to 60 months, assuming the manufacturer's claim to be true.



According to Chebyshev's Rule
up to $\frac{3}{4}$ of the values may
lie within ± 2 std dev.
Up to 75% could last between
36 and 60 months