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SECTION MOB

SOME FORMULAS:

1. The formula for sample **mean** is $\bar{X} = \frac{\sum X}{n}$

and the formula for **variance** is :

$$s^2 = \frac{\sum (X - \bar{X})^2}{n-1} = \frac{n \sum (X^2) - (\sum X)^2}{n(n-1)} = \frac{1}{n-1} (\sum (X^2) - n \cdot \bar{X}^2)$$

2. For group data, the formula for sample **mean** is $\bar{X} = \frac{\sum f \cdot X_m}{n}$

and the formula for **variance** is :

$$s^2 = \frac{\sum f \cdot (X_m - \bar{X})^2}{n-1} = \frac{n \sum (f \cdot X_m^2) - (\sum f \cdot X_m)^2}{n(n-1)} = \frac{1}{n-1} (\sum (f \cdot X_m^2) - n \cdot \bar{X}^2)$$

3. To **standardize any observation** x , use the formula $z = \frac{x - \mu}{\sigma}$. The z -score says how many standard deviations x lies from the mean.

True/False:

1. The stem and leaf plot to the right give information on the life expectancy in 37 different countries. The stems represent the nearest year, and the leaves represent the nearest tenth of a year. Determine which of the following are true or false.

T	a. The percentage of countries which have a life expectancy above the age of 80 is 48.6%.
T	b. Although this data somewhat bell shaped and symmetric, there is a slight right skew.
T	c. The mode of this data is unique

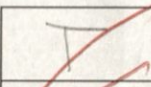
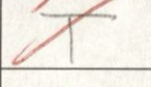
Life Expectancy										
Stems (Nearest Year)										
Leaves (Nearest tenth of Year)										
73	3									
74										
75	8									
76	0	9								
77	1	1	4	5						
78	1	3	3	3						
79	3	5	6	6	7	9				
80	0	1	5	6	7	7	7	8		
81	0	1	5	6	6	7	8			
82	4	5	9							
83	3									

2. Hemoglobin is a protein molecule associated with red blood cells. It carries oxygen to the blood and it also gives the red blood cell its red color. The mean red blood count (RBC) for young men is 9.7 millimoles/liter with a standard deviation of 0.9 millimoles/liter. Determine whether the following statements are true or false.

T	a. Approximately 84% of the population will have an RBC above 8.8.
F	b. A person is considered to be anemic if they have a RBC that is more than 1.6 standard deviations below the mean. A person with an RBC of 8.0 would NOT be considered anemic.

3. The chart below gives some brief statistics of the NMSU system according to the NMSU Quick Facts. Determine whether the following would be true or false.

New Mexico State University		
Quickfacts (2011-2012)		
Campus	Headcount	% Fulltime
Main	18,024	81.6
Alamogordo	3,372	29.8
Carlsbad	1,744	28.2
Dona Ana	9,803	41.4
Grants	1,257	30.0
Total	34,200	

	a. A pie chart would not be acceptable for % Fulltime, but it would be acceptable for Student Headcount.
	b. Approximately 2367 students at the Alamogordo campus are part-time students.
	c. If a pie chart were used for Student Headcount, the percentage of NMSU students attending the Main campus would be about 52.7% and would be represented using an angle just slightly smaller than 180°.

Exercise Sets: You must show **ALL NECESSARY WORK** to receive credit.

1. The chart to the right shows the diabetes rate (in percentage) for all the 33 counties in New Mexico. Create a chart which gives the class limits, class boundaries, tally, frequency and cumulative frequency for this data. Use five classes starting at 4.0 for the lower limit of the first class.

Counties in New Mexico					
Diabetes Rate (in Percentage)					
Bernalillo	9.6	Harding	5.3	Roosevelt	9.2
Catron	9.6	Hildago	6.7	Sandoval	10.2
Chaves	13.1	Lee	14.2	San Juan	10.3
Cibola	16.6	Lincoln	6.8	San Miguel	12.5
Colfax	9.8	Los Alamos	4.9	Santa Fe	8.2
Curry	14.5	Luna	12.4	Sierra	13.5
DeBaca	8.7	McKinley	15.2	Socorro	15.0
Dona Ana	12.3	Mora	16.1	Taos	8.4
Eddy	14.4	Otero	11.9	Torrance	10.1
Grant	11.5	Quay	9.5	Union	5.3
Guadalupe	9.9	Rio Arriba	12.4	Valencia	12.7

Class limit	Class boundaries	tally
4.0 - 6.9	3.95 - 6.95	
7.0 - 9.9	6.95 - 9.95	
10 - 12.9	9.95 - 12.95	
13 - 15.9	12.95 - 15.95	
16 - 18.9	15.95 - 18.95	
		33

5
9
10
7
2

CF
5
14
24
31
33

$$\text{max} = 16.6 - 3.4 = 13.2$$

$$\text{min} = 4.9 - 5 = -0.1$$

6

2. Seven emergency medical response times were randomly collected from the Mesilla Valley Regional Dispatch Authority for the month of August 2014. Those response times are as follows. Compute the mean, variance and standard deviation for this data. Please show all computations. Times were measured in seconds.

154	298	244	318	213	162	186
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$$\text{mean} = \frac{\sum x}{n} = \frac{1575}{7} = 225$$

$$\frac{2}{6}$$

x	x - $\bar{x}$	(x - $\bar{x}$) ²
154	-71	5041
298	73	5329
244	19	361
318	93	8649
213	-12	144
162	-63	3969
186	-39	1521
		total 25014

$$s^2 = \frac{25014}{7-1} = 4169$$

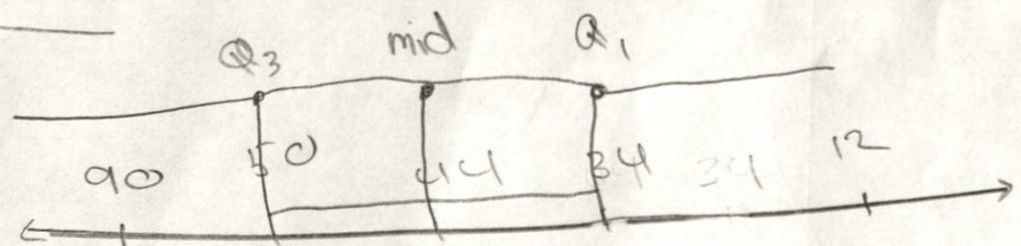
3. The following data gives the gross annual income (in thousands of dollars) for 20 randomly selected households in New Mexico.

- Create a stemplot for this data
- Find the five-number summary and create a boxplot for this data
- Check this data for outliers.

New Mexico			
46	90	33	14
62	37	59	41
48	12	35	52
76	43	21	45
25	47	35	46

12, 14, 21, 25, 33, 35, 35, 37, 41, 43, 45, 46, 47, 52, 59, 62, 76, 90

min	12
Q ₁	34
mid	44
Q ₃	50
max	90



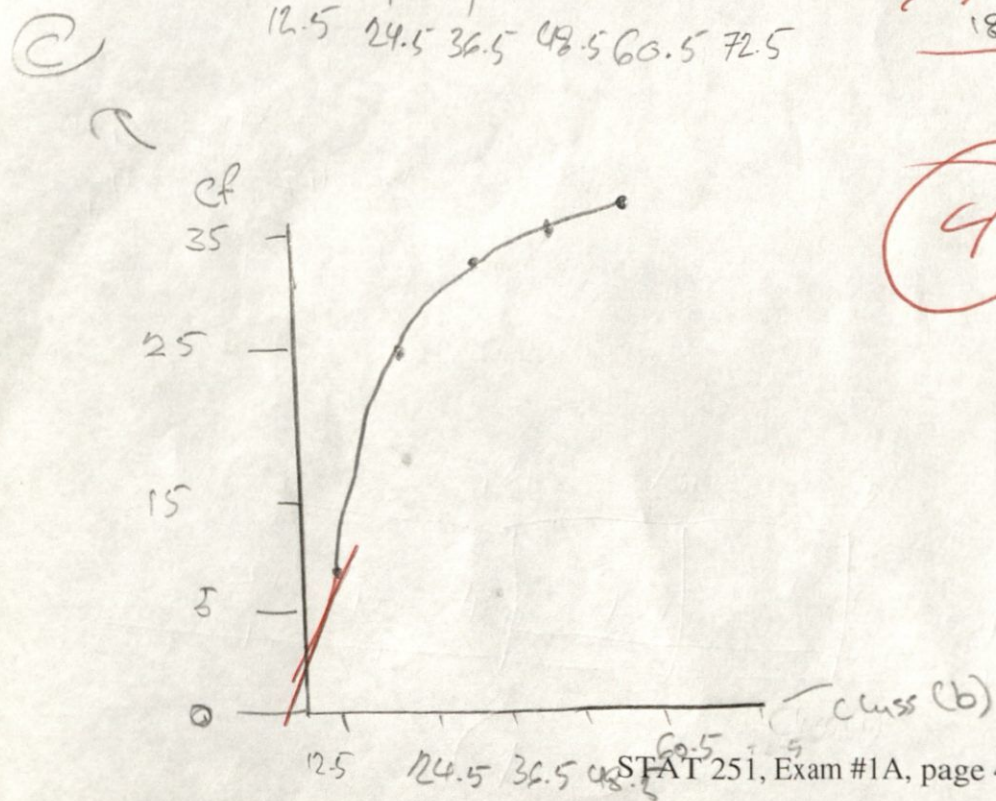
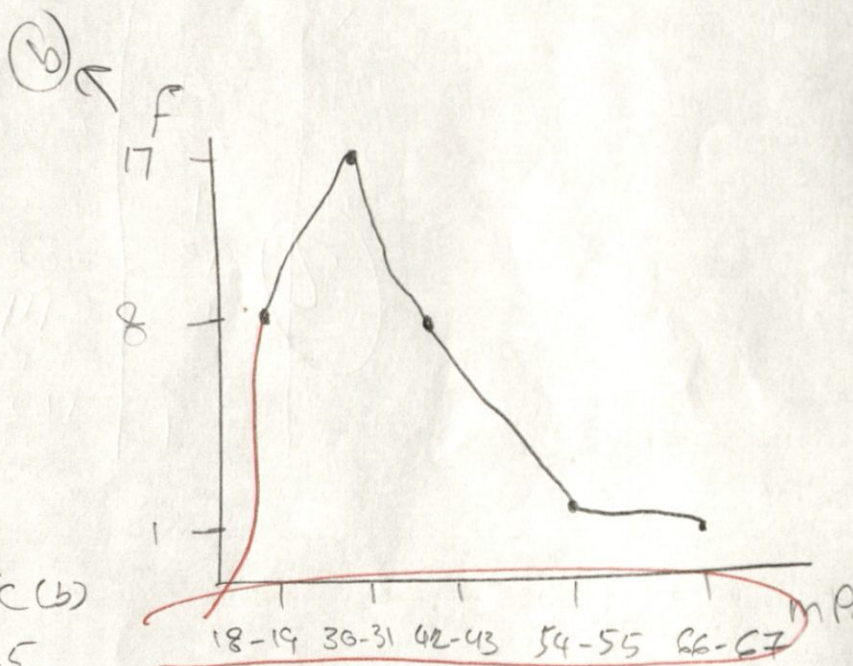
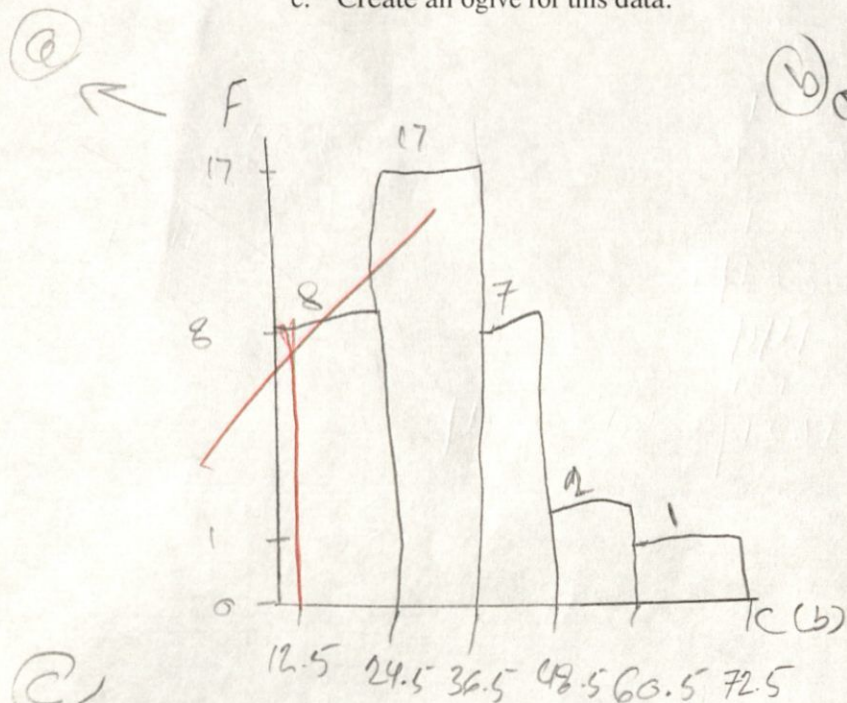
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1345578921234
11112222

4. The costs per load (in cents) of 35 laundry detergents tested by a consumer organization are shown below.

Class limits	Frequency	Class (b)	cf	MP
13-24	8	12.5-24.5	8	18-19
25-36	17	24.5-36.5	25	30-31
37-48	7	36.5-48.5	32	42-43
49-60	2	48.5-60.5	34	54-55
61-72	1	60.5-72.5	35	66-67

- Create a histogram for this data.
- Create a frequency polygon for this data.
- Create an ogive for this data.



4

5. The number of driving citations received the past year for a randomly selected sample of 175 teenage drivers is shown to the right. Find the mean, the modal class, the variance, and the standard deviation for this grouped data. Please show all computations.

Citations Issued	Frequency
0	31
1	76
2	39
3	18
4	8
5	3

6. Follow the directions below:

- a. Find the z-scores for the following exam scores.

i. A score of 3.2 on a test with $\bar{X} = 4.6$ and $s = 1.5$.

ii. A score of 630 on a test with $\bar{X} = 800$ and $s = 200$.

iii. A score of 43 on a test with $\bar{X} = 50$ and $s = 5$.

- b. Which one of the scores has the highest relative position? Explain your answer