Name:_____

Math 1040
Midterm Examination
February 19, 2016

Relax and good luck!

Problem	Points	Score
1	15	
2	15	
3	20	
4	20	
5	20	
6	10	
Total	100	

1. (3 pts each) Identify the level of measurement for each data set:

(nominal, ordinal, interval or ratio)

(a) The departments of a car dealership:
sales, financing, parts and service, customer service

nominal

(b) The birth years of the students in this class:

interval

(c) The size-classes of automobiles: subcompact, compact, midsize, large

ordinal

(d) The heights of the students in this class.

ratio

(e) The prices of houses in Salt Lake City.

ratio

2. (3 points each) Describe the method of data collection you would use:

(observational study, experiment, simulation or survey)

(a) To determine whether a sleep aid is effective.

experiment

(b) To estimate the damage of a fifteen foot tsunami hitting San Francisco.

simulation

(c) To estimate how many college students intend to vote

survey

(d) To find the prices of a portfolio of 100 stocks.

observational study

(e) To determine the favorite foods of Utahns in various age groups.

survey

1 1 2 4 5 | 6 8 10 11 12

3. The ages of 10 cars randomly selected from the student parking lot are:

12 6 4 11 1 10 8 5 1 2

(a) (10 points) Compute the mean, median and mode of the data:

$\overline{x}$ = Mean = $60/10 = 6$

Median = 5.5

Mode = 1

(b) (10 points) Compute the standard deviation of the data:

$$\sigma = \sqrt{\frac{\sum(x-\overline{x})^2}{n}}$$

$x-\overline{x}$: -5 -5 -4 -2 -1 0 2 4 5 6

$(x-\overline{x})^2$: 25 25 16 4 1 0 4 16 25 36

$$\frac{\sum(x-\overline{x})^2}{n} = \frac{152}{10}$$

σ = Standard Deviation = $\sqrt{15.2} \sim 3.9$

4. Take the same data as in the previous problem:

12 6 4 11 1 10 8 5 1 2

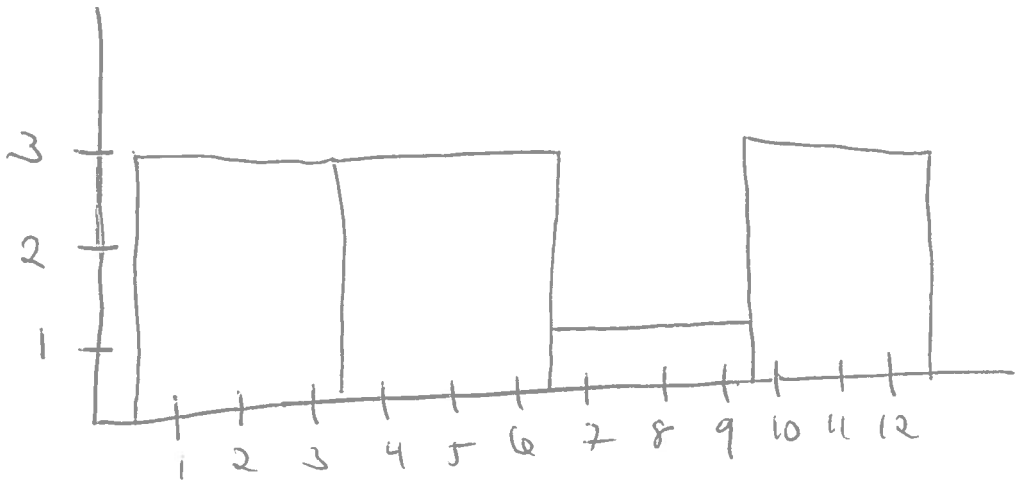
$\frac{12-1}{4} = 2.75 \uparrow 3$

and put it into **4 classes**.

(a) (10 points) Fill out the frequency table for the data:

Classes	Midpoints	Frequencies	Cumulative Frequencies
1-3	2	3	3
4-6	5	3	6
7-9	8	1	7
10-12	11	3	10

(b) (10 points) Sketch the frequency histogram for the data with four classes.



5. The heights of a sample of men at a football game was collected and the data was grouped into five classes with the following frequencies:

Heights	Midpt	Frequencies	Cum
63-65	64	3	3
66-68	67	6	9
69-71	70	7	16
72-74	73	4	20
75-77	76	3	23

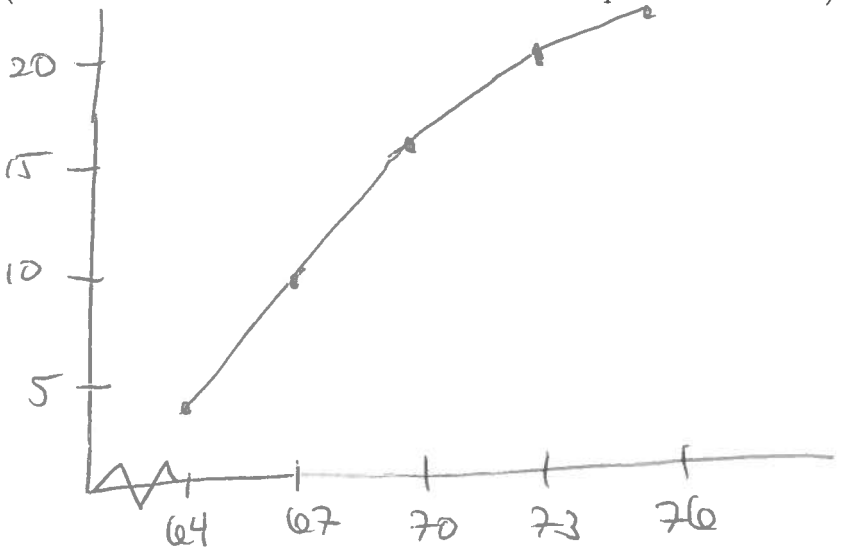
Total: 23

(a) (10 points) Find the average height of the men.

$3 \times 64 + 6 \times 67 + 7 \times 70 + 4 \times 73 + 3 \times 76 = 1604$

Weighted Average = $\frac{1604}{23} \sim 69.7$

(b) (10 points) Sketch the ogive for the data.
(Hint: You need to calculate cumulative frequencies for this!)



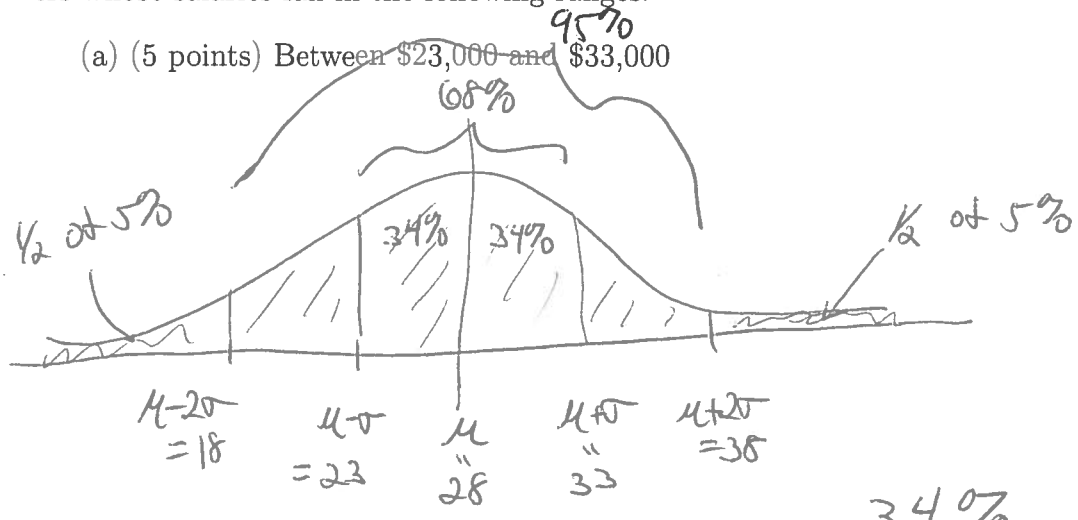
7. An large sample of salaries of elementary school teachers was collected, from which the following were calculated:

Average salary: \$28,000 $= \mu$

Standard deviation: \$5,000 $= \sigma$

Assuming that the distribution of salaries is **symmetric** and **bell-shaped**, use the empirical rule to estimate the percentage of elementary school teachers whose salaries fall in the following ranges:

(a) (5 points) Between ~~\$23,000 and~~ \$33,000



Percentage = 34%

(b) (5 points) More than \$38,000

Percentage = 2.5%