*Math 1040*

# EXAM #1

Name **KEY**
*(print)*

*Total = 100 points*

**Please show all your work.**

1. (20 pts) Find the mean and standard deviation for the starting annual salary (in thousand of dollars) for a sample of private elementary school teachers:

| Salary | Frequency | $x_i - \bar{x}$ | $(x_i - \bar{x})^2$ |
|--------|-----------|-------|---------|
| 26 | 9 | −6.7 | 44.89 |
| 28 | 12 | −4.7 | 22.09 |
| 35 | 18 | 2.3 | 5.29 |
| 33 | 14 | .3 | .09 |
| 43 | 7 | 10.3 | 106.09 |

$$\bar{x} = \frac{26 \times 9 + 28 \times 12 + 35 \times 18 + 33 \times 14 + 43 \times 7}{60} = 32.7$$

$$SS_x = 9 \times 44.89 + 12 \times 77.09 + 18 \times 5.29 + 14 \times .09 + 7 \times 106.09 = 1508.2$$
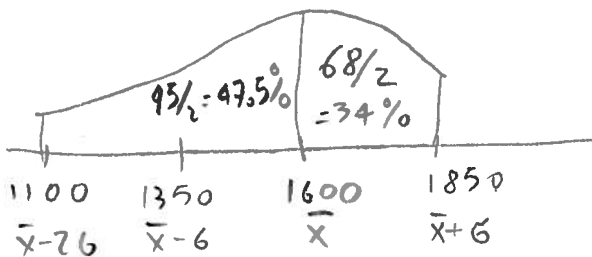
$$G = \sqrt{\frac{1508.2}{59}} = \sqrt{25.56} = 5.1$$

Sample

Mean _____ 3 2.7 _____  32,717 ok

Standard deviation ___5.1___

2. (15 pts) The mean value of land and buildings per acre from a sample of farms is $1,600, with a standard deviation of $250. The data set has a bell-shaped distribution. If there are 125 farms in a county, estimate about how many farms have the land and building values per acre between $1,100 and $1,850?

total = 47.5 + 34 = 81.5 %

# of farms = 125 × 81.5% = 101.875

≈ 102

| | 95% ÷ 47.5% | 68/2 = 34% | |
|---|---|---|---|
| 1100 | 1350 | 1600 | 1850 |
| $\bar{x} - 2G$ | $\bar{x} - G$ | $\bar{x}$ | $\bar{x} + G$ |

Answer _____ 102 _____

3. (12 pts) The heights (in inches) of a sample of male students in a history class are given. Approximate the mean of the grouped data.
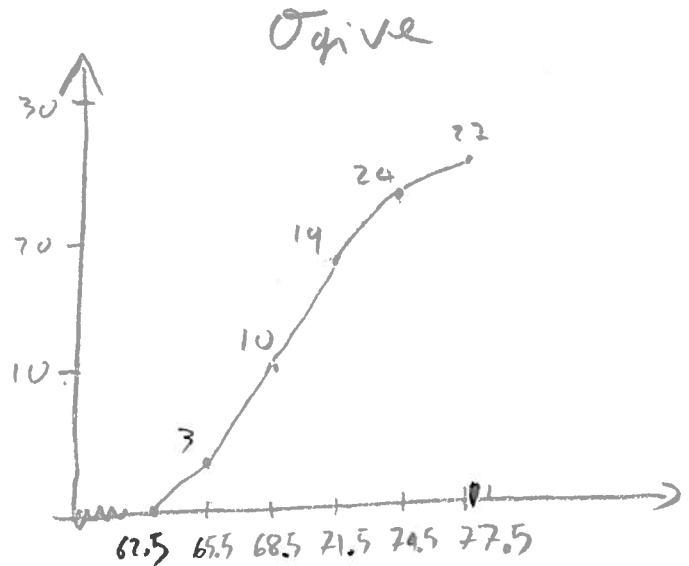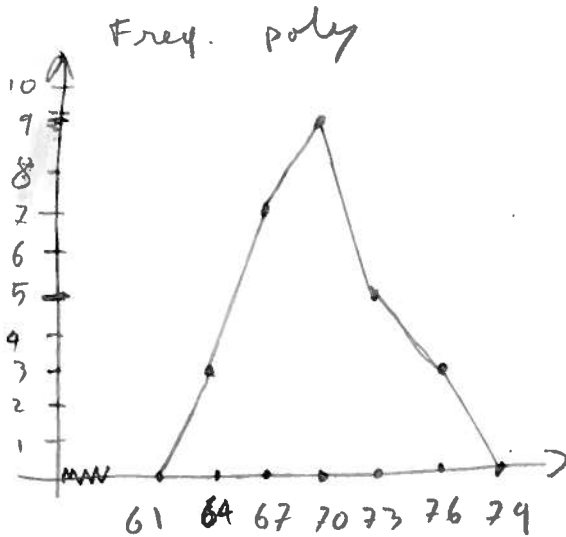
Mid pt
64
67
70
73
76

| Height (in inches) | Frequency | Cumm Freq |
|---|---|---|
| 63-65 | 3 | 3 |
| 66-68 | 7 | 10 |
| 69-71 | 9 | 19 |
| 72-74 | 5 | 24 |
| 75-77 | 3 | 27 |

$$\bar{X} = \frac{64 \times 3 + 67 \times 7 + 70 \times 4 + 73 \times 5 + 76 \times 3}{27}$$
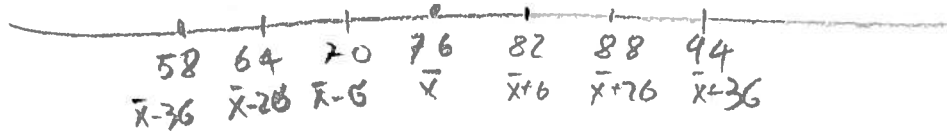
$$= \frac{1884}{27} = 69.8 \text{ inches}$$

Mean ___69.8 inches___

4. (15 pts) Construct the frequency polygon AND the cumulative frequency polygon (Ogive) for the data given in the previous exercise.

Freq. poly

Ogive

5. (15 pts) In a sample of 120 restaurant customers, the mean bill was $76 with a standard deviation of $6. On the basis of Chebychev's Theorem, at least how many customers spent between $58 and $94?

$$58 \quad 64 \quad 70 \quad 76 \quad 82 \quad 88 \quad 94$$
$$\bar{x}-36 \quad \bar{x}-26 \quad \bar{x}-6 \quad \bar{x} \quad \bar{x}+6 \quad \bar{x}+76 \quad \bar{x}+36$$

$K = 3$

$1 - \dfrac{1}{K^2} = 1 - \dfrac{1}{9} = 88.9\%$

$120 \times 88.9\% \cong 107$

Answer _____107 customers_____

6. (8 pts) Determine whether the data are qualitative or quantitative:

a) the colors of automobiles on a used car lot _____qualitative_____

b) the numbers on the shirts of the football team _____qualitative_____

c) the number of seats in this class _____quantitative_____

d) a list of house numbers on your street _____qualitative_____

7. (15 pts) Identify the data set's level of measurement (nominal, ordinal, interval, ratio):

a) numbers on the shirts of a girl's soccer team _____nominal_____

b) performance at a work place rated as "unacceptable", "acceptable" or "excellent" _____ordinal_____

c) temperatures ($^\circ F$) of 20 selected offices _____interval_____

d) number of milligrams of tar in 28 cigarettes _____ratio_____

e) years of birth of students in a given class _____interval_____