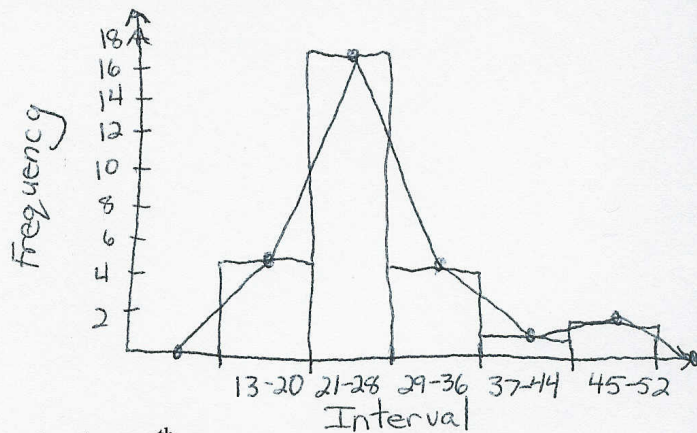


Sample Problems

1. The following list of data represents highway fuel consumption in miles per gallon (mpg) for a random sample of 30 cars. Construct a grouped frequency table, histogram and frequency polygon for this data using five equal interval lengths and starting with the interval 13-20.

30,27,22,25,24,35,35,33,52,49,20,23,24,25,30,18,20,25,27,24,24,27,26,25,24,13,13,21,28,37

mpg	Tally	Frequency
13-20		5
21-28		17
29-36		5
37-44		1
45-52		2



2. Using the following frequency chart for ages of senators in the 95th Congress, calculate the mean, median and mode. Hint: you will need to calculate the midpoint for each class.

Age (yrs)	Frequency	Midpoint	Product (mf)
30-39	6	34.5	207
40-49	26	44.5	1157
50-59	35	54.5	1907.5
60-69	21	64.5	1354.5
70-79	10	74.5	745
80-90	2	84.5	169

Totals

100

5440

$$\bar{x} = \frac{5440}{100} = 54.4$$

$$\text{Median} = \frac{\# \text{ of data points} + 1}{2} = \frac{101}{2} = 50.5$$

Use the 50th and 51st midpoints median = 54.5

$$\text{mode} = 54.5$$

(midpoint)

3. The Pro Football Encyclopedia gave the following ages for a random sample of football players. Calculate the mean, median and mode.

24,23,25,23,30,29,28,26,33,29,24,37,25,23,22,27,28,25,31,29,25,22,31,29,22,28,27,26,23,21

21, 22, 22, 22, 23, 23, 23, 23, 24, 24, 25, 25, 25, 25, (26, 26), 27, 27,
28, 28, 28, 29, 29, 29, 29, 30, 31, 31, 33, 37

$$\bar{x} = \frac{795}{30} = 26.5$$

$$\text{median} = \frac{30+1}{2} = 15.5 \quad \text{use \# 15 and 16} \quad \text{median} = 26$$

$$\text{mode} = 23, 25, 29$$

4. A reporter for the *Honolulu Star-Bulletin* was doing a news article about car theft in Honolulu. For a given 10-day period, the police reported the following number of car thefts;

9,6,10,8,10,8,4,8,3,8

3,4,6,8,8,8,8,9,10,10

Calculate the mean, mode, and median.

$\bar{x} = \frac{74}{10} = 7.4$ median = 8 mode = 8

5. What is the mode for the following group of numbers:

1,2,3,4,5,8,9,10,12,13

no mode

6. Given the following grades for an entire class:

Hint: Is this a sample or a population? population

73, 99, 67, 67, 82, 86, 94, 87, 86, 82, 81, 67, 91, 73, and 50

Find the range: $99 - 50 = 49$ Find the variance: 153.2 Find the standard deviation: 12.377

X	μ	$x - \mu$	$(x - \mu)^2$
73	79	-6	36
99	79	20	400
67	79	-12	144
67	79	-12	144
82	79	3	9
86	79	7	49
94	79	15	225
87	79	8	64
86	79	7	49
82	79	3	9
81	79	2	4
67	79	-12	144
91	79	12	144
73	79	-6	36
50	79	-29	841
		<u>2298</u>	

$\sigma^2 = \frac{2298}{15} = 153.2$
 $\sigma = 12.377$

7. Given the following prices of a random sample of used homes (in thousands):

Hint: Is this a sample or a population? sample

190,144,140,110,140,140,115,100,70,100,80,200,140,120,100,120,150

Find the range, variance, and standard deviation

X	\bar{x}	$x - \bar{x}$	$(x - \bar{x})^2$
190	127	63	3969
144	127	17	289
140	127	13	169
140	127	-17	289
110	127	13	169
140	127	13	169
140	127	13	169
115	127	-12	144
100	127	-27	729
70	127	-57	3249
100	127	-27	729
80	127	-47	2209
200	127	73	5329
140	127	13	169
120	127	-7	49
100	127	-27	729
120	127	-7	49
150	127	23	529
		<u>18968</u>	

Range
 $200 - 70 = 130$

Variance
 $s^2 = \frac{18968}{17-1} = 1185.5$

std dev
 $s = \sqrt{1185.5} = 34.431$

8. Normal Distribution Curve:

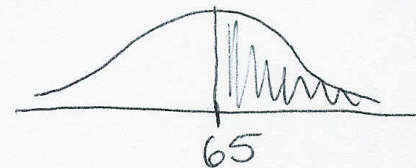
What percentage of area under the normal curve lies:

- a. to the left of μ 50%
- b. between $\mu - \sigma$ and $\mu + \sigma$ 68%
- c. between $\mu - 3\sigma$ and $\mu + 3\sigma$ 99.7%

9. Assuming that the heights of college women are normally distributed, with a mean of 65 inches and standard deviation of 2.5 inches answer the following questions.

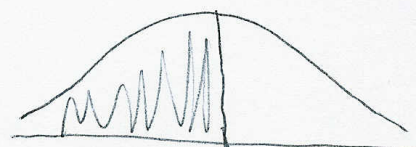
- a. What percentage of women are taller than 65 inches?

50%



- b. What percentage of women are shorter than 65 inches?

50%



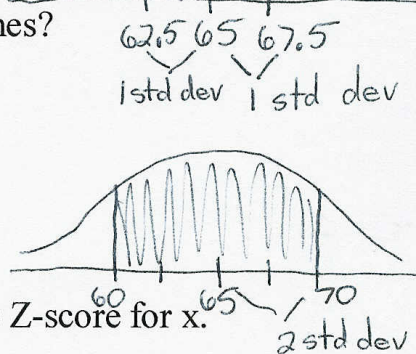
- c. What percentage of women are between 62.5 inches and 67.5 inches?

68%



- d. What percentage of women are between 60 inches and 70 inches?

95%



10. Using the given population mean and standard deviation calculate the Z-score for x.

- a. $\mu=14, \sigma=3, x=20$

$$Z = \frac{20 - 14}{3} = 2$$

- b. $\mu=140, \sigma=15, x=125$

$$Z = \frac{125 - 140}{15} = -1$$

- c. $\mu=32, \sigma=13, x=10$

$$Z = \frac{10 - 32}{13} = -1.69$$

Hint: Use 68-95-99.7 rule

11. Using the given Normal Distribution Curve and assuming that the scores for the final exam in Math 114 are normally distributed with a mean of 75 and a standard deviation of 10 answer the following questions.

a. What percentage of students score above 75?

50%

b. What percentage of students scored below 75?

50%

c. What percentage of students scored between 65 and 85?

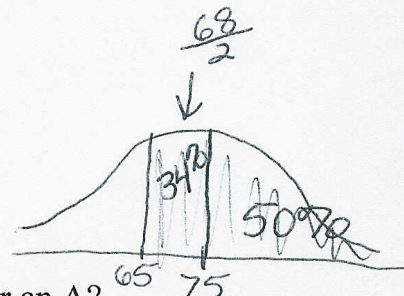
68%

d. What percentage of students scored between 55 and 95?

95%

e. If 65 is passing, what percentage of students passed the exam?

34% + 50% = 84%



f. If the top 15% of the students get A's, what is the cut-off score for an A?

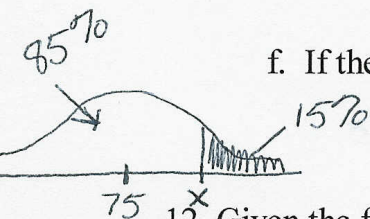
Look up area of .85 in body of table to find z-score

.8508 is the closest value

$z = 1.04$

$1.04 = \frac{x - 75}{10}$

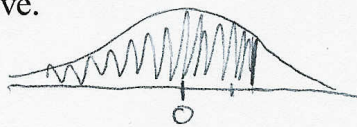
$x = 85.4$



12. Given the following z-scores on a standard normal distribution find the percent of the total area under the standard normal curve.

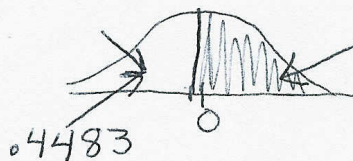
a. area to the left of $z = 1.45$

92.65%



b. area to the right of $z = -0.13$

55.17%

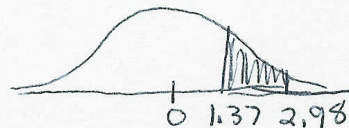


$1 - 0.4483 = 0.5517$

c. area between $z = 1.37$ and $z = 2.98$

$0.9986 - 0.9147 = 0.0839$

8.39%

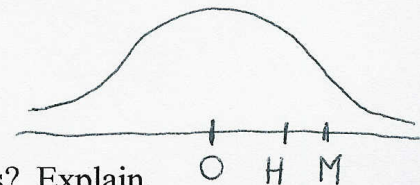


13. Ashley earned an 89 on her History midterm and an 81 on her Math midterm. In the History class the mean score was an 82 with a standard deviation of 5. In the Math class the mean score was 76 with a standard deviation of 3.

a. Convert each score to a standard z-score.

History $\frac{89 - 82}{5} = 1.4$

Math $\frac{81 - 76}{3} = 1.67$



b. On which test did she do better compared to the rest of the class? Explain.

She did better on her math test

In history she did better than 91.92% of the class and in math she did better than 95.25% of the class.