

**NOTE: \*problems require distribution for each part w/ axis labeled w/ ((X or Xbar) and Z) or Chi<sup>2</sup>**

- 1) The following are the scores of 20 students at New York City College of Technology: 222, 233, 254, 241, 251, 268, 276, 220, 238, 253, 249, 236, 247, 256, 261, 227, 257, 244, 239, 242.
  - a) Construct a *frequency distribution (with between 5 and 10 classes)*.
  - b) Draw a histogram for the *frequency distribution* in part (a).
  - c) Draw a frequency polygon *for the frequency distribution in part (a)*.
- 2) There are 6 copying machines in a store. During past week, these machines produced 110, 93, 89, 69, and 103 copies. a) Find the mean, median, and standard deviation of the number of copies produced by these machines. b) With the values you have calculated, can you comment on the skewing?  
 $\sum x = 464, \sum x^2 = 44040$
- 3) In a recent contest w/ normally distributed scores, mean score was 210 and standard deviation was 25.
  - a) Find the z score of John who scored 190.
  - b) Find the z-score of Bill who scored 270.
  - c) If Mary had a z-score of 1.25, what was Mary's score?
  - d) Find each of their percentiles.
- 4) According to the NIH, 32% of all women will fracture their hip by age 90. If 8 women aged 90 are selected at random, what is the probability that exactly 5 of them will have suffered a hip fracture?
- 5) \*The number of major earthquakes in a year is approximately normally distributed with a mean of 20.8 and a standard deviation of 4.5.
  - a) Find the probability that in a given year there will be less than 21 major earthquakes.
  - b) Find the probability that in a given year there will be between 18 and 23 major earthquakes.
- 6) \*A professor has found that the grades on the Statistics Final are normally distributed with a mean of 68 and a standard deviation of 15. If only the best 14% of the grade in the class will receive an A, what grade must a student obtain in order to get an A?
- 7) \*One tire manufacturer claims that its tires last an average of 42,000 miles with a standard deviation of 7800 miles. A random sample of 100 of his tires is taken. What is the probability that the average of these 100 tires will last greater than 41,000 miles?
- 8) \*A recent report indicated that waiters and waitresses at a casual dining restaurant make an average of \$100 per night in tips with a standard deviation of \$15. Colleen works in a casual dining restaurant and does not think this is correct. She feels she makes less than \$100 on an average night. Over the next 30 work day nights, she computes her tips and the average is \$93. Does Colleen make significantly different than what the report stated? Use a 0.01 level of significance.
- 9) \*It is claimed that the average annual per person spending on prescription drugs is \$410. If a survey of 64 randomly selected people indicated an average spending of \$425 with a standard deviation of \$45, do we reject the claim that the average is \$410? Use a 5% level of significance.
- 10) \*A survey claims that a college graduate from Smith College can expect an average starting salary of at least \$42,000. Fifteen Smith College graduates had an average starting salary of \$40,800 with a standard deviation of \$2,250. At the 1% level of significance, can we conclude that the average starting salary of the graduates is significantly less than \$42,000?
- 11) Given the following data:

<b>X</b>	1	4	6	7
<b>Y</b>	9	7	8	1

Use  $\sum X = 18, \sum Y = 25, \sum X^2 = 102, \sum Y^2 = 195, \sum XY = 92$

- a) Find the coefficient of correlation.
- b) Find the equation of the regression line. c)What is the predicted value for  $Y$  if  $X=3$ ?

12) The following data represent the number of days absent ( $X$ ) and final grade ( $Y$ ) for college students in a general education course.

- a) Find the coefficient of correlation.
- b) Using the coefficient of correlation, can you say that students with fewer absences (good attendance) are more likely to score higher on a final exam? Give reasons to your answer.
- c) Find the equation of the regression line.
- d) If one has 5 absences, can you predict using the regression line equation, what final grade will he/she get?
- e) If one has 11 absences, can you predict using the regression line equation, what final grade will he/she get?

<u>X=Absences</u>	<u>Y=Final Grade</u>
2	83.5
5	73.9
7	71.8
3	81.1
9	66.2
6	64.3
4	78.2
8	65.5
0	89.2
1	86.4

Use  $\sum X = 45$ ,  $\sum Y = 760.1$ ,  $\sum X^2 = 285$ ,  $\sum Y^2 = 58509.93$ ,  $\sum XY = 3187.2$

13) \*The marks on a statistics exam are normally distributed with mean 70 and standard deviation of 10.

- a) Find the probability that a mark will be between 60 and 90.
- b) If less than 60 is a failing grade, what is the probability that a student fails the class.
- c) If only the best 10% of the grade in the class will receive an A, what grade must a student obtain in order to get an A?

14) \*One of the products produced by Branco Food Company is All-Bran Cereal, which competes with three other brands of similar all-bran cereals. The company's research office wants to investigate if the percentage of people who consume all-bran cereal is the same for each of these four brands. Let us denote the four brands of cereal A, B, C, and D. A sample of 1000 persons who consume all-bran cereal was taken, and they were asked which brand they often consume. The responses on consumption of cereal are listed in the table below. Does the sample provide enough evidence to reject null hypothesis that the percentage of people who consume all-bran cereal is the same for all four brands? Use significance level  $\alpha = 0.05$ .

Cereal Brand	A	B	C	D
Consumption	212	284	254	250

