

REVIEW FOR FINAL EXAMINATION

Study the **“Review”** (in gold) at the end of each chapter. Look back at your test (and the sample test also) and review the types of problems you’ve already solved and see if you can identify the chapter for each problem. Review any you missed. Then do the questions on these sheets for each chapter. The solutions to these problems will be discussed in class.

CHAPTERS 2 (Test 1)

1. *Code 4.3* Find the class boundaries, class limits, class width, and class centers for all the classes in the following distribution.

Trials for Rats to Learn Discrimination	
Numbers of Trials	Number of Rats
1-3	7
4-6	5
7-9	3
10-12	3

2. *Code 6.5* A household appliance service and repair company received the following numbers of orders for service and repair daily during eight weeks of six working days each. Construct a histogram using 7 classes.

15	19	22	24	25	26	28	30
16	20	22	24	25	26	28	30
18	21	22	24	25	26	28	31
18	21	22	24	25	26	28	31
18	22	23	24	25	27	29	32
19	22	23	25	25	27	29	34

3. The following data are from a set of test results from a statistics class. For the data construct a stem plot and a box plot. (Save the data for a question in the next Chapter.)

39, 71, 60, 57, 47, 47, 74, 55, 63, 60, 65, 96, 38, 57, 49, 89, 20, 73, 91, 85, 79, 53, 93,
82, 59, 76, 67, 64, 69, 40, 100, 59, 26, 74, 9, 75

CHAPTERS 3 (Test 1)

1. *Code 4.5* The rainfall each month in Miami, Florida is shown in the following table. Find A. the mean monthly rainfall, B. the median monthly rainfall. C. the standard deviation D. the variance and E. the range.

Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inches:	2.0	1.8	2.5	3.7	6.8	7.5	6.5	7.1	9.7	8.0	2.6	1.8

2. *Code 1.3* In a certain city the mean price of a quart of milk is 63 cents and the standard deviation is 8 cents. In the same city, the mean price of a pound of ground beef is \$1.75 and the standard deviation is 12 cents. A late-night convenience store charges 89 cents for a quart of milk and \$2.12 for a pound of ground beef. Which of these items is relatively more overpriced?

3. The following data are from a set of test results from a statistics class. For the data (a) find the percentile for the score of 55 and (b) find P80.

39, 71, 60, 57, 47, 47, 74, 55, 63, 60, 65, 96, 38, 57, 49, 89, 20, 73, 91, 85, 79, 53, 93,
82, 59, 76, 67, 64, 69, 40, 100, 59, 26, 74, 9, 75

CHAPTER 4 (Test 1)

1. *Code 6.1* If a window display of live kittens at a pet shop contains 8 Domestic Shorthair, 11 Siamese, 4 Persian, and 7 Angora kittens, what are the probabilities that 1 kitten selected at random will be:

- Persian
- Domestic Shorthair or Angora
- If two kittens are chosen at random, what is the probability that both are Persian

2. The following table represents the employment status and gender of the civilian labor force for people ages 16 to 24 years of age (data in millions of people). Find the probability that a randomly selected person age 16 to 24 is male or employed.

<u>Gender</u>	<u>Male</u>	<u>Female</u>
Employed	11.2	10.4
Unemployed	1.6	1.4

3. Use the above data to find the probability that a randomly selected person is a female given that the person is employed.

4. *Code 4.6* Assume that 70 percent of crimes occur at night, and that 40 percent of the crimes at night and 20 percent of daytime crimes are violent. If the record of one crime is chosen at random from the police files on which these percentages are based, what is the probability that it is a violent crime?

5. Three channels, 6, 8, and 10, have quiz shows, comedies, and dramas.

Type of Show	Chan 6	Chan 8	Chan 10
Quiz Show	5	2	1
Comedy	3	2	7
Drama	4	4	2

Use the table above to answer the following questions:

- (a) What is the probability that the show is a quiz show or it is a show on channel 8? (b) What is the probability that the show is a drama or a comedy? (c) What is the probability that the show is a Comedy given that it is on Channel 10? (d) If two shows are randomly selected, what is the probability that they are both Quiz Shows?

CHAPTER 5 (Test 1)

1. *Code 1.1* The random variable x has the following probability distribution. Find its mean, variance, and standard deviation. First fill in the missing probability. Show your work. Also do the work on your calculator as backup support.

x	:	0	2	4	6
$P(x)$:	0.1	0.3	0.1	

2. *Code 4.2* The probabilities are 0.24, 0.35, 0.29, and 0.12 that a speculator will be able to sell a subdivision lot within a year at a profit of \$12,500, at a profit of \$8,000, at a profit of \$1,000, or a loss of \$2,500 respectively. What is her expected value?

3. Code 1.2 For a sample of 500 adults, determine the mean and standard deviation of the number who are aware that a poor diet can increase their risk of cancer, if 82 percent of all adults are aware of this fact. Above and below what numbers would be unusual for the number of adults who are aware that a poor diet can increase their risk of cancer.

4. Code 5.4 If 80 percent of all college freshmen take a course in English composition, what is the probability that, in a random sample of 100 college freshmen (a) exactly 75 study English composition? (b) at least 80 study English composition?

5. Code 6.3 According to the *Information Please Almanac*, 80% of adult smokers started smoking before turning 18 years old. Suppose 100 adult smokers are randomly selected, would it be unusual to find at most 71 who started smoking before turning 18 years old? Explain.

6. Code 6.4 Based on U.S. Bureau of Census data, 12% of the men in the United States have earned bachelor's degrees. If 150 U.S. men are randomly selected, find the probability that at least 18 of them have a bachelor's degree.

CHAPTER 6 (Test 2)

1. Code 1.5 Off-price retailers use discounted prices to attract customers. Visitors to such stores are there an average of 40 minutes and visiting times are normally distributed. If the standard deviation is 12 minutes, what is the probability that a sample of 50 shoppers will spend an average of (a) less than 38 minutes in the store, (b) more than 45 minutes, (c) between 38 and 45 minutes in the store? (d) If one customer is chosen at random what is the probability that he or she will be in the store for more than 45 minutes? (e) What is the amount of time that separates the top 20% of all shoppers?

2. Code 2.1 A buyer for a lumber company must decide whether to buy a piece of land containing 5,000 pine trees. If 1,000 of the trees are at least 40 feet tall, the buyer will purchase the land, otherwise, he will not. The owner of the land reports that the height of the trees has a mean of 30 feet and a standard deviation of 3 feet. Based on this information, what is the buyer's decision?

3. Code 2.3 The length of time required to assemble a photoelectric cell is normally distributed with a mean equal to 18.1 minutes and a standard deviation of 1.3 minutes. What is the probability that it will require more than 20 minutes to assemble a cell?

4. Code 5.2 Three hundred women students have a mean height of 65.0 inches and a standard deviation of 2.0 inches. The 300 heights are normally distributed and are measured to the nearest inch.

- How many of them are 64 inches or less?
- Thirty percent of the students are below what height?

5. Code 5.7 Scores are normally distributed with a mean of 30 and a standard deviation of 20. If one score is chosen at random, what is the probability that it is between 60 and 80? If a random sample of 25 scores is taken, what is the probability that the sample mean is between 35 and 45?

6. Code 6.2 The weights of a large shipment of bronze castings are a random variable which have a normal distribution with mean 50.25 pounds and standard deviation of 0.63 pounds. What is the probability that casting selected from this shipment will weigh:

- less than 49 pounds
- more than 50.5 pounds
- between 50 and 51 pounds

CHAPTER 7 (Test 2)

- 1. Code 3.2** Among 100 fish caught in a certain lake, 18 were inedible as a result of the chemical pollution of the environment. Construct a 99 percent confidence interval for the corresponding true population proportion.
- 2. Code 3.4** Playing 12 rounds of golf on his home course, a golf professional averaged 72.4 with a standard deviation of 2.6. Construct a 99 percent confidence interval for the standard deviation, which here is a measure of the golf professional's consistency.
- 3. Code 3.5** A study of the annual growth of certain cacti showed that 64 of them, selected at random in a desert region, grew on the average 52.80 mm with a standard deviation of 4.5 mm. Construct a 99 percent confidence interval for the true average annual growth of the given kind of cactus.

CHAPTER 8 (Test 2)

- 1. Code 1.6** A laboratory analyzed the potency of 145 aspirin tablets selected at random of a particular brand. The label on the bottle states that each tablet contains 5 grains of aspirin. For the sample, the average strength was 5.03 grains and the standard deviation was 0.24 grain. Do the sample results indicate that the mean potency of this brand is not 5 grains? Test at the 5 percent significance level and include the P-value and a one sentence statement in your conclusion. Should this brand be taken off the shelf because it is mis-labeled? Explain.
- 2. Code 1.7** A magazine reported that 30 percent of American children skip breakfast. Suppose a foreign social scientist wants to determine if this figure differs for children in her country. What can one conclude in this regard if a random sample of 500 children revealed that 172 skip breakfast. Include the P-value and a one sentence statement with your conclusion.
- 3.** Measurements for the heights and weights of adults are used in designing products. One data set for a randomly selected group of 40 adult American males has a sample standard deviation of 26.3 pounds. Test the claim that this sample is different from population standard deviation for all American males of 28.7 pounds. Does this sample suggest that the known standard deviation might be too high? Explain.

CHAPTER 9 (Test 3)

- 1. Code 4.9** An experiment was conducted to evaluate the effectiveness of a work-site health program in reducing obesity as measured by a body mass index (BMI). A random sample of 12 workers received classes in exercise and diet education. The subjects were given a BMI before the program began and then after six months of the program. The data is given below. Test the claim that the program was effective in reducing body fat as measured by the BMI. Should the program be continued? Explain.

Subject	A	B	C	D	E	F	G	H	I	J	K	L
Before:	26.5	26.1	25.4	27.4	25.4	25.4	25.8	26.3	26.5	26.1	26.5	25.9
After:	25.0	24.4	25.5	26.3	23.5	23.7	22.1	26.2	26.5	23.4	22.2	23.7

- 2. Code 3.6** One method of seeding clouds was successful in 57 of 150 attempts, while another method was successful in 33 of 100 attempts. At the 0.05 level of significance, can we conclude that the first method is better than the second?

3. The aluminum bottle, first introduced in 1991 by CCL Container for mainly personal and household items such as lotions, has become popular with beverage manufacturers. Beside being lightweight and requiring less packaging, the aluminum bottle is reported to cool faster and stay cold longer than typical glass bottles. A small brewery tests this claim (in minutes) required to chill a bottle of beer from room temperature (75° F) to serving temperature (45° F). Test the claim that the aluminum bottle chills faster than the typical glass bottle.

	<u>Clear Glass</u>	<u>Aluminum</u>
Sample Size	n = 42	n = 35
Mean Time to Chill	133.8	92.4
Sample Standard Deviation	9.9	7.3

CHAPTER 10 (Test #3)

1. The Jebsen-Taylor Hand Function Test is used to measure the recovery of coordination after traumatic injury. Below are the times after injury (in weeks) and the scores on one subtest for eight patients with similar medial nerve injuries. (a) Construct the scatter diagram and include the regression line. (b) Measure the strength of the linear relationship by calculating the correlation coefficient r and drawing a conclusion about the significance. (c) What is the coefficient of determination? Use the coefficient of determination to make a one sentence statement. (d) What is the best point estimate of a Subset score when the Time is 7 weeks after injury? (e) Construct a 95% prediction interval (if appropriate) for 7 weeks after injury.

Time after injury	3	2	5	6	2	4	10	5
Subtest score	6	8	5	3	7	6	3	4

CHAPTER 11 (Test #3)

1. In a nutrition experiment, an investigator studied the effects of different diets on the growth of young rats. Twenty rats from the same inbred strain were divided at random into four groups of 5 each and used for the experiment. A different diet was fed to each group and, after a specified length of time, the increase in growth of each rat was measured (in grams). The data are shown below. Test the claim that the mean increase is the same for all four diets. Test at the 0.01 significance level. Provide a one sentence statement to accompany your conclusion.

Diet A: 10, 8, 12, 11, 9
 Diet B: 13, 15, 14, 13, 17
 Diet C: 12, 16, 13, 11, 15
 Diet D: 15, 13, 15, 10, 12

2. The American Journal of Public Health (July 1995) reported on a population-based study of trauma in Hispanic children. One of the objectives of the study was to compare the use of protective devices in motor vehicles used to transport Hispanic and non-Hispanic white children. Data was collected for 792 randomly selected children from the San Diego County Regionalized Trauma System. The data are given in the table below. Test the claim that seatbelt usage depends on ethnic status. Test at the 0.01 significance level. Provide a one sentence statement to accompany your conclusion. What are the implications of the hypothesis test? Explain.

	Hispanic	Non-Hispanic White
Seatbelts worn	31	148
Seatbelts not worn	283	330

3. According to one geneticist's theory, a crossing of red and white roses should produce offspring that are 25% red, 50% pink, and 25% white. An experiment conducted to test the theory produced 30 red, 78 pink, and 36 white offspring. Test the geneticist's claim. Provide a one sentence statement to accompany your conclusion. Can we prove the geneticist's claim? Explain.