

p40, #18

Students in an intro stats class were asked to describe their politics as liberal, moderate, or conservative:

	L	M	C	Total
Female	35	36	06	77
Male	50	44	21	115

- (a) What percent of the class is male?
- (d) What percent of students are male and consider themselves to be conservative?
- (e) What percent of females are liberals?
- (f) Do politics and gender appear independent?

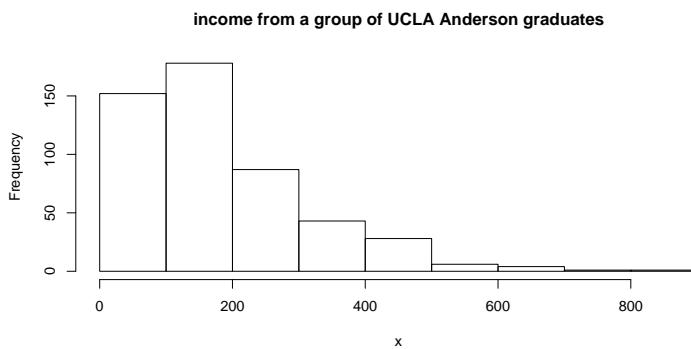
p42, #27

Just how accurate are weather forecasts? The following table compares the daily forecast with a city's actual weather for the year:

		Actual	
		Rain	No Rain
Forecast	Rain	27	63
Forecast	No Rain	7	268

- (a) On what percent of days did it actually rain?
- (b) On what percent of days was it predicted it would rain?
- (c) What percent of the time was the forecast correct?
- (not in book d) Is the predicted weather independent of the actual weather? What does your conclusion mean?

Not in book 1 Describe the distribution (shape, center, spread, unusual features, and if it is unimodal, bimodal, or multimodal)



Not in the book 2

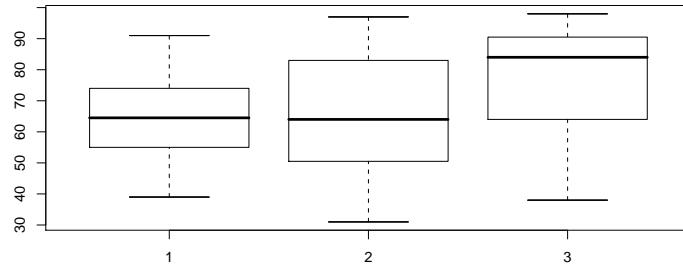
Identify if the mean and median are about the same, if the mean is greater than the median, or if the median is greater than the mean in the following types of distributions:

- (a) symmetric distribution.
- (b) right skewed.
- (c) left skewed.

Not in book 3

Identify the boxplot with:

- (a) the highest median,
- (b) the highest mean,
- (c) the smallest standard deviation,
- (d) skew.



p135, #9

The Virginia Cooperative Extension reports that the mean weight of yearling Angus steers is 1152 pounds. Suppose the weights of the animals follows a normal model with standard deviation of 84 pounds.

- (a) How many st. dev.'s from the mean would a steer weighing 1000 pounds be?
- (b) Which would be more unusual, a steer weighing 1000 pounds, or one weighing 1250 pounds?
- (not in book c) What is the cutoff for the 90th percentile for the steer?
- (not in book d) What percent of steer are smaller than 1100 pounds?
- (not in book e) What percent of steer are between 1000 pounds and 1100 pounds?

p362, #13

A customer organization estimates that over a 1-year period 17% of cars will need to be repaired once, 7% will need to be repaired twice, and 4% will need more than two repairs. What is the probability that a car chosen at random will need

- (a) no repairs?
- (b) no more than one repair?
- (c) some repairs?

p362, #15

Same setup as the last problem. One vehicle owner has 2 cars. What is the probability...

- (a) neither need repair?
- (b) both need repair?
- (c) at least one needs a repair?
- (d) what assumption did you use in the last three steps? is this assumption reasonable?

p386, #15

You are dealt a hand of three cards (from a deck of 52 cards without replacement). Find the probability...

- (a) you get no aces.
- (b) you get three red cards.
- (c) you get at least one spade.
- (not in book d) if all three are face cards, what is the probability that at least one is a king?

Not in book 4

You roll 6 dice, one at a time. What is the probability that

- (a) your sixth dice is the first 3 you got.
- (b) all the dice give even numbers.
- (c) the 4th dice is the first 3 you get.

p283, #9

You are pretty sure that your candidate for the class president has about 55% of the votes in the entire school (which is of size 2000). However, you are worried that only 100 students will show up to vote. How often will the underdog (the other candidate with 45% of the vote) win?

- (a) Describe how you would simulate a voter using a random number table.
- (b) Would it take a relatively short or very long time to simulate the election 20 times?
- (c) Simulate 10 voters using the random numbers below:

177406 264088 438264 292706 020103

(d) Compute the probability of your candidate losing. Be sure to check assumptions (we'll assume that the probability of an individual voting is not influenced by the person she/he is voting for or by her/his friends voting or not... that is, assume independence is okay here).

(Not in book e) Suppose that your candidate wins with 80 of 100 votes. Do you still think her actual support was 55%? Setup and run a hypothesis test to check.

(Not in book f) Construct a confidence interval for your candidate's support if she received 80 of 100 votes.

p387, #21

In the real estate ads, suppose 64% of homes have garages, 21% have swimming pools, and 17% have both features.

- (a) if a home for sale has a garage, what is the probability that it has a pool, too?
- (b) are having a garage and a pool independent events?
- (c) are having a garage and a pool mutually exclusive?
- (d) what is the probability of having neither?

p388, #38

23% of adults smoke in the US. It's known that 57% of smokers and 13% of non-smokers develop lung conditions by age 60.

- (a) Explain how these statistics indicate that lung conditions and smoking are not independent.
- (b) What's the probability that a randomly selected 60 year old individual has a lung condition?
- (Not in book c) If a 60 year old has a lung condition, what is the probability he/she is (was?) a smoker?

p425, #24

An orchard owner knows that he'll have to use about 6% of the apples he harvests for cider due to bruises/blemishes. He expects a tree to produce about 300 apples.

- (b) Find the probability there will be no more than a dozen cider apples. (Hint: Central Limit Theorem.)
- (c) How likely is it there will be at least 50 cider apples?
- (Not in book d) What model would you use if you wanted to compute the probability that exactly 13 apples are cider apples?
- (Not in book e) Suppose we find the actual number of cider apples is 50. Setup a hypothesis test and run it.
- (Not in book f) Find a 95% confidence interval for the true proportion if the number of cider apples is 50.

p457, #16

A seed packet claims that 92% of the seeds will germinate. What's the probability that at least 95% will germinate if there are 160 seeds in the pouch? Would this probability increase or decrease if the number of seeds was 1,600?

p542, #21

It is widely believed that regular mammogram screening may detect breast cancer early, resulting in fewer deaths from that disease. One study that investigated this issue over a period of 18 years was published during the 1970's. Among 30,565 women who had never had mammograms, 196 died of breast cancer, while only 153 of 30,131 who had undergone screening died of breast cancer. Do these results suggest that mammograms may be an effective screening tool to reduce breast cancer deaths?

Not in book 6

The race in Pennsylvania is tight for the Democratic primary. You have the job of conducting a (simple random) survey (sample) of the state to determine who has the edge. As a pollster, you know that to give your poll credit, you need to ensure the estimate is within 4 percentage points (with 95% confidence). Determine the sample size that will ensure this accuracy.

p604, #13

Major League Baseball is interested in whether more runs are scored in the American League than the National League. To test this, the average number of runs scored in each stadium is reviewed and it is found that the American League teams scores an average of 9.81 runs with a standard deviation of 0.80 (there are 14 teams). The National League averages 9.58 with a standard deviation of 1.55 (16 teams). [We will suppose these are normally distributed, although this differs a little from the book.]

(b) Create 95% confidence intervals for the means of each league (ie, 2 C.I.'s).

(not in book f) Setup and run a test to see whether the American League teams score more runs on average.

Not in book 7

Job satisfaction is measured and is found to be low (mean: 5.1, standard deviation: 1.1, sample size: 15) so the company gives its employees an additional 15 minute break each day. One month later they repeat their survey (mean: 5.3, standard deviation: 1.3, sample size: 15).

(a) If the same employees are sampled and asked about their job satisfaction one month later, is the data paired? (If it is paired, the differences average 0.2 with a standard deviation of 0.2 and a sample size of 15.)

(b) What if a new set of employees is randomly selected for the job satisfaction survey? Is the data paired?

(c) Run the tests for (a) and (b).

Not in book 8

We would like to determine the difference in average femur lengths for birds that died and those that survived. If we suppose Bumpus' study is a simple random sample of all birds that died and survived, use the Fathom output from below to

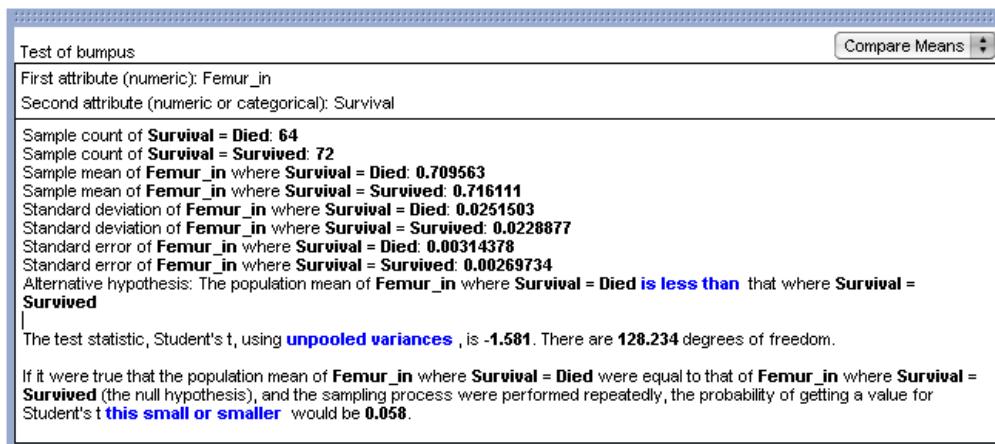
(a) construct the confidence interval for the difference.

(b) describe whether there is a significant difference for the mean femur length of birds that died and those that survived.

Estimate of bumphus	Difference of Means
First attribute (numeric): Femur_in	
Second attribute (numeric or categorical): Survival	
Interval estimate for the difference of means of Femur_in for Survival = Died and Survived.	
Sample count of Survival = Died: 64 Sample count of Survival = Survived: 72 Sample mean of Femur_in where Survival = Died: 0.709563 Sample mean of Femur_in where Survival = Survived: 0.716111 Standard deviation of Femur_in where Survival = Died: 0.0251503 Standard deviation of Femur_in where Survival = Survived: 0.0228877 Standard error of Femur_in where Survival = Died: 0.00314378 Standard error of Femur_in where Survival = Survived: 0.00269734	
Based on the samples and using unpooled variances , the 95.0 % confidence interval for the mean(Femur_in where Survival = Died) - mean(Femur_in where Survival = Survived) is -0.00654861 plus or minus 0.00819619 ranging from -0.0147448 to 0.00164758 .	
If the sampling process were performed repeatedly, the confidence intervals generated would capture the population difference of means 95.0 % of the time.	

Not in book 9

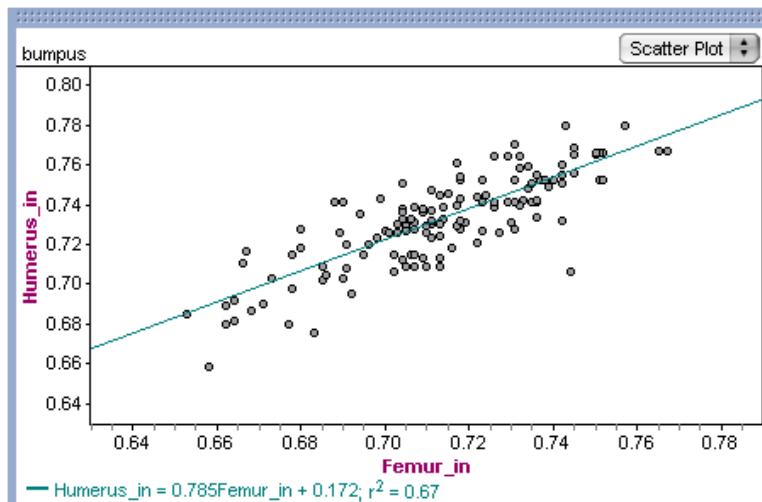
The hypothesis test uses the same data as above. Describe the hypothesis test (H_0 and H_A) along with other relevant test information (t , p-value) and whether you would reject or would not reject H_0 .



Not in book 10

Below is a scatterplot and linear model for Bumpus' data, looking at the humerus and femur length.

(a) Construct the equation for the linear model.



- (b) If a bird has a femur length of 0.704 inches, what is its predicted humerus length? (remember units!)
- (c) If the same bird's actual humerus length is 0.733 inches, what is its residual? Was the predicted value an overestimate or underestimate?
- (d) What is the correlation for this fit?
- (e) What does r^2 represent?