

Business Statistics, MGT 233

Homework #3, Summer 2012

Instructions: Download the Homework 3 Excel Data.xlsx file from the MGT 233 web site. Use the appropriate table to create the Excel Descriptive statistics. You must print the output of the descriptive statistics as part of your homework. Answer all parts clearly with proper probability notation and interpretation. Assume all samples come from a large population (at least 20 times the sample size). For all confidence intervals you must interpret the results.

Problem 1

BookIt.com—*Spring Break is a rite of passage: a chance to migrate south to warmer weather or escape to vibrant cities while taking a break from responsibilities. Whether you prefer sugar-white sand or sparkling skyscrapers as your playground, we've got your hookup to the hottest deals.*



Below is a list of prices for spring break packages. The packages are for a 3 night stay at a hotel and a round trip plane ticket from Kansas City to the list destination. Assume that prices are normally distributed:

Location	Rate
Panama City -Seahaven	549
Panama City -Palms Resort	589
Panama City -Beach Resort	681
Cancun -Barcelo Costa	1021
Cancun - Oasis	988
Cancun -Hyatt Regency	1283
Daytona Beach -Plaza	634
Daytona Beach -Mayan Inn	1108
Daytona Beach -La Playa Resort	616
New Orleans -Wyndham Riverfront	866
New Orleans -Ramada Plaza	562
New Orleans -Maison Dupuy Hotel	904
Miami -Royal Palm Hotel	954
Miami -Carlton Hotel	934
Miami -Whitelaw Hotel	916
Fort Lauderdale -Beach Resort	767
Fort Lauderdale -Sea Club Resort	740
Fort Lauderdale -Hollywood Beach Resort	425

Print the descriptive statistics in Excel and use the information to complete this problem.

- a) Compute and interpret the 90% confidence level for the average price of a three night stay with round trip plane tickets. Interpret the results.
- b) Compute and interpret the 95% confidence level for the average price of a three night stay with round trip plane tickets. Interpret the results.
- c) Compute and interpret the 99% confidence level for the average price of a three night stay with round trip plane tickets. Interpret the results.

Problem 2

ESPN.com—*The average age of starting quarterbacks has been falling the past two years thanks to good, young passers such as Matt Ryan, Joe Flacco, Sam Bradford, Josh Freeman and others. In 2009 and 2010, the average age of starters was 28.3, down from 29.1 in 2008.*



Below is a random list of some of the 2011 quarterbacks in the NFL. Assume that their ages are normally distributed.

Name	Age	Name	Age	Name	Age	Name	Age
Kaepernick, Colin	24	Orton, Kyle	29	O'Connell, Kevin	26	Grossman, Rex	31
Smith, Alex	27	Palko, Tyler	28	Sanchez, Mark	25	Brees, Drew	33
Tolzien, Scott	24	Stanzi, Ricky	24	Hill, Shaun	32	Canfield, Sean	25
Cutler, Jay	28	Collins, Kerry	39	Stafford, Matthew	24	Daniel, Chase	25
Enderle, Nathan	24	Manning, Peyton	35	Stanton, Drew	27	Jackson, Tarvaris	28
Hanie, Caleb	26	Orlovsky, Dan	28	Flynn, Matt	26	Lee, Zac	24
McCown, Josh	32	Painter, Curtis	26	Harrell, Graham	26	Portis, Josh	24
Dalton, Andy	24	Greisen, Chris	35	Hill, Nick	26	Whitehurst, Charlie	29
Gradkowski, Bruce	29	McGee, Stephen	25	Rodgers, Aaron	28	Batch, Charlie	37
Robinson, Zac	25	Romo, Tony	31	Anderson, Derek	28	Dixon, Dennis	27
Fitzpatrick, Ryan	29	Devlin, Pat	23	Clausen, Jimmy	24	Johnson, Jerrod	23
Thigpen, Tyler	27	Henne, Chad	26	Newton, Cam	22	Leftwich, Byron	32
Lewis, Thaddeus	24	Losman, J.P.	30	Brady, Tom	34	Roethlisberger, Ben	30
McCoy, Colt	25	Moore, Matt	27	Hartline, Mike	23	Smith, Troy	27
Wallace, Seneca	31	Edwards, Trent	28	Hoyer, Brian	26	Delhomme, Jake	37
Quinn, Brady	27	Kafka, Mike	24	Mallett, Ryan	23	Garcia, Jeff	42
Tebow, Tim	24	Vick, Michael	31	Boller, Kyle	30	Leinart, Matt	28
Weber, Adam	24	Young, Vince	28	Bomar, Rhet	26	Schaub, Matt	30
Carpenter, Rudy	25	Redman, Chris	34	Campbell, Jason	30	Yates, T.J.	24
Freeman, Josh	24	Ryan, Matt	26	Palmer, Carson	32	Hasselbeck, Matt	36
Johnson, Josh	25	Wilson, John Parker	26	Pryor, Terrelle	22	Locker, Jake	23
Ratliff, Brett	26	Carr, David	32	Bradford, Sam	24	Smith, Rusty	25
Bartel, Richard	29	Manning, Eli	31	Brandstater, Tom	27	Bethel-Thompson, McLeod	23
Hall, Max	26	Perrilloux, Ryan	25	Clemens, Kellen	28	Ponder, Christian	24
Kolb, Kevin	27	Gabbert, Blaine	22	Feeley, A.J.	34	Rosenfels, Sage	34
Skelton, John	23	LeFevour, Dan	24	Flacco, Joe	27	Webb, Joe	25
Rivers, Philip	30	McCown, Luke	30	Taylor, Tyrod	22		
Volek, Billy	35	Brunell, Mark	41	Beck, John	30		
Cassel, Matt	29	McElroy, Greg	23	Crompton, Jonathan	24		

Print the descriptive statistics in Excel and use the information to complete this problem.

- a) With 95% confidence interval, what is the margin of error?
- b) What is the 95% confidence interval estimate for the mean age of NFL quarterbacks?
Interpret your results.
- c) What is the 99% confidence interval estimate for the mean age of NFL quarterbacks?
Interpret your results.

Problem 3



According to the journal article *The Impact of Team Revenues on MLB Salaries*, the goal of a major league baseball (MLB) team is to win the World Series. To win the World Series, a team must qualify for the playoffs. The best way to make the playoffs is to win a lot of regular-season games. MLB teams acquire players with the goal of winning games. A player's value to his team, therefore, is a function of his ability to help them win games.

Different teams may assign different values to player characteristics. In *Moneyball* (2003), Michael Lewis follows the Oakland Athletics' General Manager, Billy Beane, through the 2002 draft as he attempted to solve a constrained optimization problem: maximize wins subject to a severe budget constraint.

- a) Referring to USAtoday.com, last season the top ten largest salary MLB teams had an average salary of \$4.92 million and standard deviation of \$6 million. Assuming 80% confidence, what is the sample size needed to obtain a margin of error of \$1.25 million for next year's salaries of the top ten MLB teams?
- b) Additionally, last year the standard deviation of all MLB teams is \$4.4 million. Assuming 95% confidence, what is the sample size needed to obtain a margin of error of \$1.25 million for next year's salaries of all MLB teams?

Problem 4



MovieInsider.com—*It was another year where sequels ruled the global box office. The top sequels of 2011 included: Harry Potter and the Deathly Hallows Part 2 (\$1.3 billion), Transformers: Dark of the Moon (\$1.1B), Pirates of the Caribbean: On Stranger Tides (\$1.0B), The Twilight Saga: Breaking Dawn Part 1 (\$702 million), Kung Fu Panda 2 (\$665M), Mission: Impossible - Ghost Protocol (\$653M), Fast Five (\$626M), The Hangover Part II (\$582M), and Cars 2 (\$560M). Originality couldn't be counted on to bring in worldwide audiences. The only 'original' film (without an underlying franchise, adaptation work or established property) to make the top 20 highest grossing*

worldwide films was Fox/Blue Sky Studio's 3D animated adventure Rio (\$485 million). Female audiences, among other demographics, drove big success for comedy hit Bridesmaids (\$288 million) and book adaptation The Help (\$207 million).

Below is a list of 100 randomly selected movies and their opening revenue. Assume the opening revenue is normally distributed.

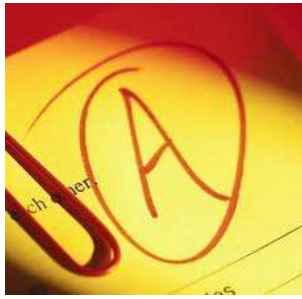
Title	Opening	Title	Opening
Harry Potter and the Deathly Hallows Part 2	\$169,189,427	Hugo	\$11,364,505
Transformers: Dark of the Moon	\$97,852,865	No Strings Attached	\$19,652,921
The Twilight Saga: Breaking Dawn Part 1	\$138,122,261	Mr. Popper's Penguins	\$18,445,355
The Hangover Part II	\$85,946,294	Happy Feet Two	\$21,237,068
Pirates of the Caribbean: On Stranger Tides	\$90,151,958	Unknown	\$21,856,389
Fast Five	\$86,198,765	The Adjustment Bureau	\$21,157,730
Mission: Impossible - Ghost Protocol	\$12,785,204	Water for Elephants	\$16,842,353
Cars 2	\$66,135,507	The Lincoln Lawyer	\$13,206,453
Sherlock Holmes: A Game of Shadows	\$39,637,079	Midnight in Paris	\$599,003
Thor	\$65,723,338	Friends with Benefits	\$18,622,150
Rise of the Planet of the Apes	\$54,806,191	I Am Number Four	\$19,449,893
Captain America: The First Avenger	\$65,058,524	Source Code	\$14,812,094
The Help	\$26,044,590	New Year's Eve	\$13,019,180
Bridesmaids	\$26,247,410	Insidious	\$13,271,464
Kung Fu Panda 2	\$47,656,302	Tyler Perry's Madea's Big Happy Family	\$25,068,677
Puss in Boots	\$34,077,439	Diary of a Wimpy Kid: Rodrick Rules	\$23,751,502
X-Men: First Class	\$55,101,604	Footloose (2011)	\$15,556,113
Rio	\$39,225,962	The Dilemma	\$17,816,230
The Smurfs	\$35,611,637	Arthur Christmas	\$12,068,931
Alvin and the Chipmunks: Chipwrecked	\$23,244,744	Hall Pass	\$13,535,374
Super 8	\$35,451,168	Soul Surfer	\$10,601,862
Rango	\$38,079,323	Final Destination 5	\$18,031,396
Horrible Bosses	\$28,302,165	The Ides of March	\$10,470,143

Green Lantern	\$53,174,303	Hanna	\$12,370,549
Hop	\$37,543,710	Something Borrowed	\$13,945,368
Paranormal Activity 3	\$52,568,183	Spy Kids: All the Time in the World	\$11,644,672
Just Go With It	\$30,514,732	Scream 4	\$18,692,090
The Girl with the Dragon Tattoo (2011)	\$12,768,604	Big Mommas: Like Father, Like Son	\$16,300,803
Bad Teacher	\$31,603,106	Red Riding Hood	\$14,005,335
Cowboys & Aliens	\$36,431,290	In Time	\$12,050,368
Gnomeo and Juliet	\$25,356,909	The Artist	\$204,878
The Green Hornet	\$33,526,876	Paul	\$13,043,310
The Lion King (in 3D)	\$30,151,614	J. Edgar	\$11,217,324
The Muppets	\$29,239,026	The Roommate	\$15,002,635
Real Steel	\$27,319,677	Jumping the Broom	\$15,215,487
Crazy, Stupid, Love.	\$19,104,303	The Change-Up	\$13,531,115
Battle: Los Angeles	\$35,573,187	30 Minutes or Less	\$13,330,118
Immortals	\$32,206,425	Colombiana	\$10,408,176
The Descendants	\$1,190,096	Sucker Punch	\$19,058,199
Zookeeper	\$20,065,617	Larry Crowne	\$13,096,065
Limitless	\$18,907,302	A Very Harold & Kumar 3D Christmas	\$12,954,142
War Horse	\$7,515,402	Drive (2011)	\$11,340,461
Tower Heist	\$24,025,190	50/50	\$8,644,095
The Adventures of Tintin	\$9,720,993	Courageous	\$9,112,839
Contagion	\$22,403,596	The Rite	\$14,789,393
Moneyball	\$19,501,302	Arthur (2011)	\$12,222,756
We Bought a Zoo	\$9,360,434	Extremely Loud & Incredibly Close	\$72,348
Jack and Jill	\$25,003,575	The Debt	\$9,909,499
Justin Bieber: Never Say Never	\$29,514,054	The Sitter	\$9,851,435
Dolphin Tale	\$19,152,401	Priest	\$14,953,664

Print the descriptive statistics in Excel and use the information to complete this problem.

- What is the 80% confidence interval estimate for the mean opening revenue for a box office movie?
- What is the 90% confidence interval estimate for the mean opening revenue for a box office movie?
- What is the 95% confidence interval estimate for the mean opening revenue for a box office movie?

Problem 5



Petersons.com—Many colleges set a 3.0 as a baseline for freshman and transfer admission, though they might still consider students with lower GPAs. The trouble is that the GPA measure is terribly imprecise and hard to compare, as evidenced by the discussion in this article. Your GPA is very much dependent upon your high school setting and grading policies and the classes you have taken.

What you need to realize is that nationally, maintaining a B average has become routine. As you climb up the college selectivity ladder, you will find colleges expecting the B as a minimum GPA, and then evaluating thousands of applications from students with B+, A–, and A averages. Add in the weighting that many schools apply, and you will see students with 4.3 and 5.0 averages!

The colleges in the table below are a sampling of some of the most selective schools in the country. Assume that the average GPA of admitted students is normally distributed.

School Name	Avg. GPA of Admitted Students
Bucknell University	3.49
Carnegie Mellon University	3.64
Colgate University	3.72
Johns Hopkins University	3.68
New York University	3.60
Reed College	3.80
University of Pennsylvania	3.86
University of Southern California	3.80
Vanderbilt University	3.70

Answer the following questions using calculations by hand (without using Excel). Show the equations and summations need for the calculations. Round all work to three decimal points.

- Compute the standard deviation for the average GPA of admitted students into a selective college.
- At 99% confidence, what is the margin of error?
- What is the 99% confidence interval for the average GPA of admitted students into a selective college? Interpret the results.

Problem 6



Nytimes.com—*Humans are asymmetric animals. Early in our embryonic development, the heart turns to the left. The liver develops on the right. The left and right lungs have distinct structure.*

There are certain rare syndromes in which the usual asymmetry of organs is reversed — I remember how disconcerting it was the first time I examined a child with dextrocardia, a heart on the right side, and heard the heart sounds in unexpected places. But when it comes to handedness, another basic human asymmetry, which reflects the structure and function of the brain, the reversed pattern is relatively common, and for all that, not easily understood.

Over the centuries, left-handers have been accused of criminality and dealings with the devil, and children have been subjected to “re-education.” In recent years the stigma has largely vanished; among other things, four of our last seven presidents — Ford, the elder Bush, Clinton, Obama — have been left-handed.

But the riddle of what underlies handedness remains. Its proportions — roughly 90 percent of people are right-handed and 10 percent left-handed — stay consistent over time.

Assume you took a sample of 2500 college students. 2337 of the college students were right-handed and 163 were left-handed.

- a) Provide a 90% confidence interval for the proportion of college students that are right-handed. Interpret the results. Are the college students consistent with the “over time proportions” stated above?
- b) Provide a 95% confidence interval for the proportion of college students that are right-handed. Interpret the results. Are the college students consistent with the “over time proportions” stated above?
- c) Provide a 99% confidence interval for the proportion of college students that are right-handed. Interpret the results. Are the college students consistent with the “over time proportions” stated above?

Problem 7



Internetworldstats.com—In 2010, the population of the United States was 310,232,863. Out of the over 300 million individuals, 239,893,600 were internet users. This means 77.3% of Americans were on the internet in 2010.

You are asked to complete a survey to obtain more current internet user information.

- a) What sample size would you want to use to estimate the current proportion of individuals who are on the internet with a 2% margin of error? Use a 99% confidence level.
- b) What sample size would you want to use to estimate the current proportion of individuals who are on the internet with a 5% margin of error? Use a 95% confidence level.

Problem 8

Usaswimming.org—*The 2012 U.S. Olympic Team Trials - Swimming will return June 25-July 2 to Omaha, Nebraska, as one of the fastest, exciting, suspenseful and pressure-filled competitions held in the United States every four years. Check back often for updates as we draw closer to naming the team that will represent the United States in the pool at the London Olympic Games.*



Looking back at the 2008 Olympic Team Trials, swimmers were placed into heats. Sixteen swimmer then made it to the semi-finals, and eight swimmers competed in the finals in order to make the USA Olympic team. A random sample of the top swimmers from the first round of heats was taken. A sample of 50 men's 100m freestyle swimmers was sampled with the mean of 49.68 seconds and a standard deviation of .73 seconds. While a sample of 43 women's 100m freestyle swimmers was sampled to get a mean of 55.51 seconds and a standard deviation of .62 seconds.

- a) What is the point estimate of the difference between the mean 100m freestyle men's times and the mean 100m freestyle women's times?
- b) What is the 80% confidence interval for the difference between the men's and women's average 100m freestyle times? Interpret the results.

Problem 9



Getamericafit.org—*Diabetes, hypertension and other obesity-related chronic diseases that are prevalent among adults have now become more common in youngsters. The percentage of children and adolescents who are overweight and obese is now higher than ever before. Poor dietary habits and inactivity are reported to contribute to the increase of obesity in youth.*

Today's youth are considered the most inactive generation in history caused in part by reductions in school physical education programs and unavailable or unsafe community recreational facilities.

Based on a sample taken by the 'Get America Fit Foundation, overweight prevalence is higher in boys (32.7 percent) than girls (27.8 percent). The survey involved measuring the weight of 150 boys and 212 girls.

Compute a 95% confidence interval for the difference between the proportions of boys that are overweight verse the girls that are overweight. Interpret your results.