Math 1308 Syllabus

This course satisfies the University of Texas at Arlington core curriculum requirement in mathematics.

This course will address three objectives

- Critical Thinking Skills - to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
- Communication Skills - to include effective development, interpretation and expression of ideas through written, oral and visual communication.
- Empirical and Quantitative Skills - to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

Learning outcomes

Upon completion of MATH 1308

1. Students will be able to construct histograms and compute probabilities using histograms.
2. Students will be able to compute the average, standard deviation, median and identify outliers of a set of data. They will also be able to interpret these statistics and make use of these statistics in analyzing data.
3. Students will be able to estimate the population average, population percentage and construct confidence intervals for these parameters.
4. Students will be able to test hypotheses about population average and population percentage and interpret the results of these tests.
5. Students will be able to distinguish observational studies from experiments and criticize cases of each relative to their strengths and weaknesses.

Course Information

Course title: Elementary Statistical Analysis
Course number: Math 1308  Section number:  200
Course discipline: Mathematics
Course description: (3 hour credit) This course covers descriptive statistics, relationships between variables, interpretation of data and graphs, probability, elementary statistical models, hypothesis testing, inference and estimation.
Course start date: January XXX
Jan. 30: Census Date
Mar. 29: Last day to drop classes
Final Exam Date: Saturday, May 4th from 3:30 - 6:00 pm at UTA, building and room TBA.

Prerequisite(s): Passing score on the Mathematics Placement Test, and Math 1302, 1315 or 1303.

Textbooks and Materials

Book Title: Statistics (4th edition)
Author: Freedman, Pisani, and Purves
Publisher: W.W. Norton
ISBN: #0-393-92972-8
Type: Required resource
Note: Sometimes an "International Version" is available. As long as it is the fourth edition, this version is fine, it just isn't hard-cover.

Book Title: Math 1308 Course Pack for Statistics (Supplemental Note Packet)
Author: Available at UTA Bookstore
Type: Required resource
Book Title: **Calculator** (at least Scientific)
Type: Required resource

**Instructor Information**

e-mail address:

Phone number:

Office:

Office hours:

Help at UTA:

**UTA Email**: Students must check their **UTA email** daily, as this is the primary way that I will send important information to you. If you are not able to access your UTA email, please either email [mymav@uta.edu](mailto:mymav@uta.edu) or call 817-272-2208 for assistance. I will not send separate emails out to other email addresses.

**Course Description**:  
(3 hour credit) This course covers descriptive statistics, relationships between variables, interpretation of data and graphs, probability, elementary statistical models, hypothesis testing, inference and estimation.

**Course Learning Goal**: This course teaches effective methods of taking samples, presenting and analyzing data and making reliable statistical inference.

**Assignments and Grading**: Three major tests will make up 60% of the final grade, and will be equally weighted. Quizzes will make up 10% of the final grade. The final exam will make up the remaining 30% of the final exam. The grading scale is standard one: Ex: 100 - 90 = A, 89 - 80 = B, etc.

**Quizzes/Signature Assignment**: All quizzes are equally weighted, and are all given online. 11 quizzes will be given. No makeup quizzes will be given. 1 quiz (the lowest score) will be dropped. The average of the quizzes will make up 10% of the final grade. Quizzes will be anywhere from 5 - 10 questions each. To specifically assess the core objectives of Critical Thinking, Communication, and Empirical and Quantitative Reasoning, all students will complete a **signature assignment** (described at the end of this syllabus), which will count for one quiz grade.

**Exams**: There are three regular exams, each worth 20% each. No makeup exams will be given. They will have from around 20 - 30 questions on them, and you will be given the class period to complete them. You will be provided with the Formula Sheet and the Normal Curve Table that is contained in your Supplemental Note Packet. You need a scantron form for the exams. You need form 882 or 882ES.

**Final Exam**: The Final Exam will count for 30% of your final grade. The final examination is comprehensive and will consist of 75 multiple-choice questions. You will be provided with the Formula Sheet and the Normal Curve Table that is contained in your Supplemental Note Packet. You will be given 2.5 hours to take the exam. A scantron is required. You need form 882 or 882ES. It is the long skinny green one with answer choices A-E per question, and it has 50 questions on the front and the same on the back. You can get these from the UTA bookstore.
Exam dates: Exam 1: Thursday, Feb. 14th  
Exam 2: Thursday, Mar. 21st  
Exam 3: Thursday, April 18th  
Final Exam: Saturday, May 4th

For the Quizzes, go to "COURSE CONTENT" for each week a quiz is given. A link for the quiz will be there during the time that it is available. The link will not show if the quiz is not yet open, or if the testing period has ended.

For the FINAL EXAM, come to UTA on Saturday, May 4th from 3:30 to 6:00 pm, building and room TBA.

Exam times: Times that the quizzes are open will be on the COURSE CONTENT page. (Normally the quizzes open at 6 am and close at 11 pm.)

Note on Extra Credit: There is no extra credit given for this course. Your grade will be averaged, and you will be assigned a letter grade, as stated in Assignments and Grading. Example: An average of 79 is a C. An average of 79.5 is rounded to an 80, which is a B. Anything less than 79.5 does NOT get rounded to an 80.

Note on Homework: The homework assignments are not to be turned in. It is VERY important, however, that you do the assignments. Working out these exercises helps you to understand the material and also, it shows you what to expect on quizzes and exams.

Note: Quizzes will be given on Friday of the week that they are scheduled. For the FINAL EXAM, the student must come to UTA to take the exam the designated day/time, as it is departmental. These dates are not flexible. If these do not fit your schedule, you can drop this course and take it during a different semester that is more acceptable to your schedule.

Note: Remember that the first quiz is due by Friday, January 25 by 11:00 pm, central-standard time. You will be able to see your grade once you submit the quiz. On Monday, after the window for taking the quiz has passed, you will be able to see which questions you missed. To do this, go to your grade book, double click on the grade for the quiz, this will open a new window where you will see "attempt" and the grade for the quiz again. Select this line, and the quiz will open for you. If you attempt to see your quiz before the testing window has passed, you will only be able to see basic information like your grade and the time it took you to complete the quiz.

Note: Quizzes are given on Fridays so that the student has ALL week to learn the material before taking the quiz. When these items are given earlier in the week, students tend to not do as well on them.

Note: All of the (online) quizzes in this course have time limits. Time limits are posted when the quiz begins. Be careful and watch the clock! Just because the system allows you to go back into it after many hours have passed. It should be obvious as to why this is the case. The system doesn't allow the student to look at the questions, or copy them down, exit the system, then work the questions, or get help on them, or just have unlimited time to take the quiz then be allowed to go back in to record his/her answers! There would be no time limit given if you could take an unlimited amount of time to actually work out the questions---this would indicate that the student had, for example, 30 minutes to record the answers and an unlimited amount of time to work the questions out, which is not the case. The only reason it is set up so that you can go back in at all, is so that if you are accidentally kicked offline, you can go right back into the quiz(it will allow you to do this) and finish it, as long as the time limit hasn't expired. So, once you open your quiz, the time limit begins from that moment. If you go over the time limit, you will be severely penalized, so please watch the clock!
Additional information:

**What to do in this course:** 1) Read the proper chapter(s) for the week. 2) Listen/watch to the Multimedia Files for the week, or attend class for the lecture. 3) Do the assigned homework problems. 4) For any problems that you do not understand, seek help. The best place to get help is from breakout session. 5) Take the quiz or exam for that week.

**Where to look:** Go to "Course Content". Instructions/expectations/due dates are given here for each week.

**How to Study for Tests:** (These are things you should do AFTER you have read the chapters, watched the videos, and done all the homework problems at the specified time). Read back over the chapters that the test is over. Go to each assignment page, and choose a problem or two, and work them out(even though you have already worked them out before-when you looked at that particular chapter). Study more the sections that you had more trouble with. Be sure to know things that are boxed throughout the chapters. Be sure, also, to focus on the Summary at the end of each chapter. These, almost always, contain important information. When you have studied, and you feel pretty good about the material, take the Test1Spring 1998 in Supplemental Note Packet. Take it with no book available, but do use the Formula Sheet, and the Normal Curve Table. Don't peek at how to do any problem. Grade the test. Study areas on the test that you did not do well on. Then, take Test1Spring 1999 in the same way as mentioned above. Repeat this process until you make about 10 more points than you would like to make on your Test 1. The worked-out answers to the practice exams are in the COURSE MATERIALS section of your Blackboard course. Plan to be given about 2 minutes per question as far as the time limit is concerned. If you are working more slowly than this pace, you need more practice to ensure you can finish within the specified time limits given. Remember to use your Formula Sheet/Normal Curve Table/Student's Curve Table when you do your homework problems, practice exams, and take the actual exams, as this is what you will be allowed on the Final Exam.

**Tips and Truths:** 1) **This course is a math course that builds.** That means that you have to stay on top of the material. If you fall behind, you likely won't be able to catch up. So, please let me stress the importance of you keeping up with the material.

2) **Most people aren't able to simply read a mathematics textbook to get the knowledge they need.** So, the "Multimedia Files" in the "Course Content" section are VERY important. These are the lectures that the physical classes get, and you guys need them also. It will take a bit of time to watch them. You MUST take the time to watch them, however. Without these, you will have a much more difficult time learning the material. When I made these recordings, I did not take any shortcuts. They are what I believe you need to have success in understanding the material. And, that is what your goal is...to learn the material. You have to show your understanding of the material through tests, so you need to do well on them.

3) **Please do not underestimate the tests.** Sometimes students underestimate the tests, especially if the material seems to make sense during lecture. While the material may make sense when I am lecturing, the only way that you will know if you really understand it, is if you are doing the homework. Also, you SHOULD study for the tests by doing more homework problems, or by re-doing the ones you have already done. Practicing mathematics is how you get good at it. Also, always keep in mind that you are ultimately preparing to do well on the Final Exam, as it is comprehensive.

4) **Get the material you need RIGHT AWAY.** I am talking about the textbook and the Supplemental Note Packet (available at the UTA bookstore). If you end up waiting, you will just cost yourself points and frustration. I recommend getting a copy of the book from the UTA bookstore, if at all possible. If this isn't possible, get it asap, and in the meantime, definitely look at the multimedia videos, as they will probably suffice until receiving your book. Don't forget to get the Supplemental Note Packet. This one, you will HAVE to get from the UTA bookstore. It has 8 pages of notes in it, and it also
has 2 of each of these: practice test 1s, practice test 2s, practice test 3s, practice final exams. You should study with the practice exams only after you have read the chapter, listen to/watched the multimedia videos, and tried your homework from the proper chapters. Going straight to the study tests without doing what I just mentioned will give you a false sense of security, and you likely won't do as well as you planned on the exams, especially the Final Exam.

5) **Contact myself or your breakout session leader for help when you begin to have troubles understanding something.** By the way, the only way you can really know this, is if you are doing your homework.

6) **Plan on working hard for the full period.** You CAN do it! And, think how proud you'll be, and how good you'll feel when you are one course closer to reaching your goal! It IS worth it!!

7) **Keep a positive attitude, as the best always comes from this.** If you think math might not be your thing, ditch that idea. You can do math! You can do Statistics! It'll be fun! :) When you need some help, ask for it, and you will get it!

8) **Good luck!**

**Answers to Exercises:** The answers to the regular exercises ie. "Exercise Set A" are in the back of your textbook. The answers to the Review Exercises are NOT in the back of your textbook, but are in the COURSE MATERIALS section of your Blackboard course.

**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not automatically be dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/ses/fao).

**Americans With Disabilities Act:** The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the Americans with Disabilities Act (ADA). All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so far as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817)272-3364.

**Academic Integrity:** All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

*I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*

*I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*
Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communication with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week: A period of five days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Course Schedule: The course schedule is described weekly in the weekly COURSE CONTENT modules. "As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course."-Shelley Hamilton

COURSE CONTENT:

Week 1 Instructions:

1) Do the Required Reading: Chapters 1 and 2

2) Watch the Multimedia Content videos: Ch. 1: Design of Experiments
   The Salk Vaccine Field Trial
   The Portacaval Shunt
   Historical Controls
   Ch. 2: Observational Studies: A Study on Smoking
   The Clofibrate Trials
   Sex Bias in Graduate Admissions
General: Textbook Tips

NOTE: To access the Multimedia content, click on "Week 1". This will take you to the first video listed. Then, at the top right-hand part of the page, you will see an arrow. Click on the arrow, thus going through the pages, until you reach the desired video.

3) Do the Assignments: Ch. 2 p. 20: 1-5, 7-8, 11-12, 14-15

Week 2 Instructions:

1) Do the Required Reading: Chapter 3

2) Watch the Multimedia Content videos: Ch. 3: The Histogram
   Drawing a Histogram
   The Density Scale
   Types of Variables
   Controlling for a Variable

3) Do the Assignments: Ch. 3 p. 33: 1-8; p. 38: 1-4; p. 41: 1-2, 4; p. 44: 1-2; p. 46: 1-2; p. 50: 4

4) Anytime between Friday at 6 am and 11 pm, take Quiz 1 over Chapter 3.
   NOTE: When Quiz 1 opens on Friday morning, after you click on "Week 2", there will be a link for the quiz that comes up.

Week 3 Instructions:

1) Do the Required Reading: Chapter 4 and the Supplemental Note Packet pp. 1-6

2) Watch the Multimedia Content videos: Ch. 4: Measures of Center and Spread
   Cross-Sectional and Longitudinal
   Exercise Set A: page 60
   The Average and the Histogram
   Root-Mean-Square
   Standard Deviation
   Computing the Standard Deviation

   Supp. Notes: Stemplots
   Five-Number Summary
   Boxplot
   Outliers

3) Do the Assignments:
   Ch. 4 p. 60: 1-6; p. 65: 1-6; p. 70: 1-6; p. 72: 1-5, 8, 11, 12; p. 74: 1-7, 9-11
   Supplementary Notes p. 5: 1-3

4) Anytime between Friday at 6 am and 11 pm, take Quiz 2, over Ch. 4 and Supp. Notes pp. 1-6.
**Week 4 Instructions**

1) Do the Required Reading: Chapter 5

2) Watch the Multimedia Content videos: The Normal Curve
   - Standardizing
   - Finding Areas Under the Normal Curve: Part 1
   - Finding Areas Under the Normal Curve: Part 2
   - The Normal Approximation for Data
   - Percentiles
   - Percentiles and the Normal Curve
   - Changes of Scale

3) Do the Assignments:
   - Ch. 5 p. 82: 1-2; p. 84: 1-5; p. 88: 1-3; p. 89: 1-5; p. 92: 1-3; p. 93: 1-11

**Week 5 Instructions**

1) Do the Required Reading: Chapter 6

2) Watch the Multimedia Content videos: Ch. 6: Measurement Error

3) Do the Assignments: Ch. 6 p. 104: 1-4; p. 105 1-2a, 3-4

4) Anytime between 6 am and 11 pm, take Quiz 3 online over Ch. 5.

**Week 6 Instructions**

1) Do the Required Reading: Chapters 13 and 16.

2) Watch the Multimedia Content videos: Ch. 13: Chance and Probability
   - Limits on Probability
   - Opposites
   - Example 1, p. 223
   - Drawing WITH and WITHOUT replacement
   - Conditional Probability
   - The Multiplication Rule
   - Independence

   Ch. 16: Kerrich's Coin Tossing Experiment
   - Coin Toss Example
   - Sum of Draws
3) Do the Assignments:


4) On Tuesday IN-CLASS, take Exam I over Chapters 1-6 and pp. 1-6 of the Supplemental Note Packet.

**Week 7 Instructions:**

1) Do the Required Reading: Chapter 17

2) Watch the Multimedia Content videos: Ch. 17 The Expected Value
   - The Standard Error
   - Using the Normal Curve
   - The SD Short-Cut Method
   - Classifying and Counting

3) Do the Assignments:
   - Ch. 17 p. 290: 1-6; p. 293: 1-4; p. 296: 1-7; p. 299: 1, 3, 4; p. 303: 1-6; p. 305: 6-8, 12

4) Sometime between Friday at 6 am and 11pm, take Quiz 4, over Chapter 17.

**Week 8 Instructions:**

1) Do the Required Reading: Chapters 18 and 19

2) Watch the Multimedia Content videos: Ch. 18 Probability Histograms
   - Probability Histograms; continued
   - The Normal Approximation
   - The Scope of the Normal Approximation

   Ch. 19 Sample Surveys
   - Sampling Techniques
   - Probability Methods
3) Do the Assignments:
   Ch. 18 p. 312: 1-6; p. 318: 1-5; p. 324: 1-3, 5-8
   Ch. 19 p. 349: 1-4, 8-9; p. 351: 1-2, 4-5

4) I have re-opened Quiz 4 over Ch. 17 from Tuesday at 1 pm until Friday at 11 pm. You may take this quiz up to 3 times.

**Week 9 Instructions:**

1) Do the Required Reading: Any chapter that you need review over before Exam 2

2) Watch the Multimedia Content videos: Any necessary to catch up, or any that you need review over.

3) Do any assignments necessary to catch up to prepare for Exam 2.

4) On Thursday, during class, take Exam 2 over Chapters 13, and 16-19.

**Week 10 Instructions:**

1) Do the Required Reading: Chapters 20 and 21

2) Watch the Multimedia Content videos: Ch. 20 Estimation EV and SE
   - Expected Value and Standard Error
   - Using the Normal Curve
   - The Correction Factor
   - The Correction Factor: Sample Exercise

   Ch. 21 The Accuracy of Percentages
   - Confidence Intervals
   - Confidence Intervals: Sample Exercise
   - Interpreting a Confidence Interval
   - Confidence Intervals: Exercise Set C

3) Do the Assignments:
   Ch. 20 p.361: 1-6, p. 366: 1-5; p. 370: 1,5
   Ch. 21 p. 379: 1-3, 7-8; p. 383: 1-4

4) Anytime on Friday between 6 am and 11 pm, take Quiz 5 over Chapter 20.
**Week 11 Instructions:**

1) Do the Required Reading: Chapters 22 & 23.

2) Watch the Multimedia Content videos: Ch. 22: Measuring Employment and Unemployment  
   Ch. 23: The Accuracy of Averages  
   The Sample Average  
   SE Formulas

3) Do the Assignments:  
   Ch. 22 p. 403: 1-3; p. 405: 1-2, 5, 11-12  
   Ch. 23 p. 413: 1-10  

4) Anytime between Friday at 6 am and 11 pm, take Quiz over Chapter 23.

**Week 12 Instructions:**

1) Do the Required Reading: Chapter 26

2) Watch the Multimedia Content videos: Ch. 26 Tests of Significance(z-tests---these are one-tailed tests)  
   Calculating Test Statistics  
   Interpreting Test Statistics  
   Test Statistic Definitions  
   Tests of Significance Review Exercise

3) Do the Assignments:  
   Ch. 26 p. 476: 1-5; p. 478: 1-5  
   Ch. 26 p. 481: 1-8; p. 482: 1-4; p. 486: 1-7

4) Anytime between 6 am and 11 pm on Friday, take Quiz 7 over Ch. 26.

**Week 13 Instructions:**

1) Do the Required Reading: Supplemental Notes pp. 7-8  
   Ch. 27 (through p. 506)

2) Watch the Multimedia Content videos: Supplemental Notes: The t-test(these are one-tailed tests)  
   Supplemental Notes: Student's Curve  
   Supplemental Notes: Sample Exercise  
   The Scope of the Normal Approximation

3) Do the Assignments:  
   Supplementary Notes p. 8: 2; Ch. 26 p. 494: 1-3; p. 495: 1, 5  
   Ch. 27 p. 503: 2-6; p. 506: 1-8

4) During class on Thursday, take Exam 3 over Chapters 20-23, 26(z-test only).
**Week 14 Instructions:**

1) Do the Required Reading: Chapter 27(p. 507 - 522)  
Chapter 29(through p. 554)

2) Watch the Multimedia Content videos: Ch. 27 Comparing Two Sample Averages  
The Two-Sample z-statistic

3) Do the Assignments:  
Ch. 27 p. 511: 1-5, p. 514: 1-4; p. 518: 5-67  
Ch. 29 p. 546: 1-2; p. 550: 1, 6-8; p. 554: 1-5

4) Anytime on Friday between 6 am and 11 pm, take Quiz 8 over the t-test (pp. 7-8 of the Supplemental Note Packet.)

**Week 15 Instructions:**

1) Do the Required Reading: Chapter 29 (p. 555-576)

2) Watch the Multimedia Content videos: Ch. 29 A Closer Look at Tests of Significance

3) Do the Assignments:  
Ch. 29 p. 558: 1-2; p. 561: 1-4

4) Anytime between Tuesday at 2 pm and Friday at 11 pm, take Quiz 9 over Ch. 29.

5) Final Exam over Chapters 1-6, 13, 16-23, 26-27, 29, Supplemental Notes pp. 1-8 at UTA!

**MATH 1308 Signature Assignment:**

Exercise #2 from page 391 in the textbook:  
The Residential Energy Consumption Survey found in 2001 that 47% of American households had internet access. A market survey organization repeated this study in a certain town with 25,000 households, using a simple random sample of 500 households: 239 of the sample households had internet access.

(a) The percentage of households in the town with internet access is estimated as________; this estimate is likely to be off by ____ or so. Explain your reasoning.

(b) If possible find a 95%-confidence interval for the percentage of all 25,000 households with internet access. Explain what this
95%-confidence interval means in terms of this situation. If it is not possible to find a 95%-confidence interval, explain why not.

**Critical Thinking Skills:** The student must think about what kind of information the exercise has given him/her. He or she must also think about how to take the given information and turn it into usable information that corresponds to the question that has been posed. (This fulfills the definition of critical thinking skills-to include creative thinking, innovation, inquiry and analysis, evaluation and synthesis of information)

**Communication Skills:** The student must do the necessary calculations, he or she must know what each of these calculations are called, or what they are named, and then, they must be able to use them properly in the two parts of the question. The student must be able to articulate their reasoning. (This fulfills the definition of communication skills-to include effective development, interpretation, and expression of ideas through written, oral, and visual communication)

**Empirical and Quantitative Skills:** The student must make calculations with the given information to answer the posed questions. (This fulfills the definition of empirical and quantitative skills-to include the manipulation and analysis of numerical data or observable facts)