

Intro to Stats

Exam 1: Review/Summary

General Information about the exam

- This one-hour exam consists of 9 problems (19 parts) and is worth 80 points.
- You may use a calculator on this exam. However, if your calculator does statistics functions, you are not allowed to use those functions. I have ways to make certain those functions are not used, but I prefer to trust you to not use those functions so you can use the calculator you are familiar with. **Note: You may not use a smart phone or tablet for your calculator. You need a dedicated calculator.**
- Please do not be surprised or upset if, at the start of the exam, I arrange the seating of the class to minimize distractions.
- Please do not be surprised at the apparent length of the exam when you get it. I like to leave lots of empty space for you to do scratch work. The exam is about 8 pages long, but about 1 page of that is questions. The rest is blank space.
- Some problems on this exam are labelled “**Show something pre-calculator.**” That means you should be able to show (and I want to see) some form of your answer prior to you using your calculator. A final answer alone will not be sufficient.
- Some problems on this exam are labelled “**Show all of your work.**” That means you should lay out all of the calculation pieces for me to see, though you may use your calculator for the actual calculation.
- An excellent way to prepare for this exam (besides going over the returned homework) is to try the Cumulative Review Exercises at the end of each chapter.
- This box will be on the exam for you to refer to:

Promised formulas	$\sigma = \sqrt{\frac{\sum (X - \mu)^2}{n}}$	$s = \sqrt{\frac{\sum (X - \bar{X})^2}{n-1}}$
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FMI (For MY information): If you have a circumstance that makes it necessary for you to have exam adjustments (such as a need to take your exam in the CAS), please do two things for me.

- 1) Make sure the CAS Director contacts me with the necessary info. I am not able to make accommodations without the proper paperwork on file in the CAS office.
- 2) Email me ASAP with a specific request of what you would like to do. I'll then be able to consider if that is necessary or appropriate, in consultation with the CAS Director.

Note: If you do not give me at least 48 hours before the exam to make accommodations for you, it will not be possible for me to get your exam to CAS.

Topics:

Know the main definitions of statistics (posted on the class website)

Know the main kinds of data we run into (discrete/continuous, nominal/ordinal/interval/ratio)

Be able to build and read from:

frequency charts

Also relative/cumulative

Histogram/Bar/Pareto/Pie/Stem&Leaf

Also know when these are appropriate

Be able to find:

Mean/Median

Including finding/approximating these from a frequency table

Also have a layman's sense of these, & some advantages/disadvantages

Range

Standard Deviation/Variance:

Also know a layman's definition of these

I'll give you the formulas if you need to calculate these.

z-score from a raw score

raw score from a z-score

quartiles

percentile of score x

the score with percentile k

Know the main definitions related to probability

e.g. Experiment, Outcome, Sample Space, Event, Simple Event, Mutually exclusive outcomes/events, Independent events, Complement of an event

Be able to calculate simple probabilities using the basic rules of probability, including the addition rule, multiplication rule, and conditional probability.

Be able to find probabilities from:

a contingency table/frequency data

a stated problem that leads to a sample space

a sample space

A reminder and more information regarding missed exams:

As stated in the syllabus, you are not entitled to a makeup exam. However, if you find it necessary to miss an exam, these are the few things that are expected of you, and some things you should expect:

- 1.If you are planning to tell me there was a health emergency, then I will expect to see a note (when you return to class) from the school nurse or some other medical professional.
- 2.Whatever the reason, I will expect to hear from you ON OR BEFORE the day of the exam, preferably via email. You should explain to me why you needed to miss the exam. You should also explain to me what else you did on the exam day. (e.g. Did you go to your other classes? chapel?) From that I will be able to rule if your absence was appropriate or not..
- 3.You should expect that your makeup exam will be more difficult than the regular exam. Regardless of your reason for missing, you will have had extra time to prepare.
- 4.If your reason for missing the exam was too weak, or if you failed to follow the above steps, you may be denied a makeup exam. Or you may be given a exam with lesser value than the rest of the class.
- 5.Regardless of your reason for missing the exam, you will not be eligible for the bonus for perfect exam attendance, and the class will not be eligible for the bonus points on the exam itself.
- 6.Authorized makeup exams will be given near the end of the semester, as described in the syllabus.

This one-hour exam consists of 9 problems (19 parts) and is worth 80 points. Show any relevant work in the space provided. Partial credit will be given on most problems, but only for proper information or work which is shown. You may ask for help or clarification on problems, though I may tell you I cannot give you any more information, or I might tell you that help will cost you points. You may use a calculator on this exam, but not any statistical features that your calculator might have. Good luck!

Note: Some problems on this exam are labeled “Show something pre-calculator.” That means you should be able to show (and I want to see) some form of your answer prior to you using your calculator. A final answer alone will not be sufficient.

Note: Some problems on this exam are labeled “Show all of your work.” That means you should lay out all of the calculation pieces for me to see, though you may use your calculator for the actual calculation.

Promised formulas	$\sigma = \sqrt{\frac{\sum (X - \mu)^2}{n}}$	$s = \sqrt{\frac{\sum (X - \bar{X})^2}{n-1}}$
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1. (4 points each) Define the following Statistics terms:
 - a) parameter
 - b) statistic (Not the field of “Statistics,” but the object “statistic”)
 - c) Statistics (The field, not the object)

2. (4 points) As discussed in class, what is the whole point of statistical inference?

3. (4 points) In words, what is a standard deviation? (I’m not looking for the formula.)

4. (4 points) Find the standard deviation of the following random sample data. Show all of your work!
X: 13 17 24 26

5. (4 points each) A recent Stats homework assignment yielded the following scores (out of 5):
5 2 2 1 5 5 5 4 4 5
 - a) Build a frequency distribution table for the data. (Each score is its own class. That is, a class for 1’s, a class for 2’s, etc.)
 - b) Find the mean. (Show something pre-calculator.)
 - c) Find the median. (Show all of your work.)
 - d) Build a pie chart for the data. (Each possible score gets its own slice.)
 - e) Build a histogram for the data. (Each possible score gets its own “bar.”)

6. (4 points each) The average age of all professors at ENC is 42, with a standard deviation of 14.

- a) If one of your professors has an age of 26, what is their z-score? (Show all of your work.)
- b) If one of your professors has a z-score of 0.7, what is their age? (Show all of your work.)

7. (4 points) The table below shows the prices for houses in Quincy last fall. Find the percentile for \$200,000 houses. (Note: There are 73 total scores.)

Price	Frequency
90,000	1
100,000	9
120,000	20
150,000	22
200,000	10
300,000	9
800,000	2

8. (4 points each) We're holding a fair quarter and a fair 6-sided die. We are going to toss the coin and roll the die at the same time, observing the side of each that shows up. (For example, we might get Heads on the coin and 4 on the die, which we can denote by H4. That is one of our outcomes: H4.)

- a) What is the sample space for this experiment? (List it out.)
- b) How much probability should we assign to each simple event of the sample space? (Final answer in fractional form. Answer alone is sufficient on this one.)
- c) In this experiment, what is the probability we get either Heads and an even number or we get Tails and an odd number? (Final answer in fractional form. Answer alone is sufficient on this one.)

9. (6 points each) Suppose we have a box with 25 wooden cubes in it. Those cubes are colored as follows:

- 12 of them are red
- 8 of them are white
- 5 of them are blue

- a) We draw three cubes from the box at random with replacement (that is, after each draw we put the drawn cube back into the box, and shake up the box before the next draw). What is the probability that all three draws are white cubes?
(Final answer in decimal form, but show something pre-calculator.)
- b) This time we draw three cubes at random without replacement (that is, each drawn cube stays out of the box and is not available to be drawn again). What is the probability that all three draws are white cubes?
(Final answer in decimal form, but show something pre-calculator.)