

# Intro to Stats

# Exam 3 Summary

This exam consists of 4 problems and is worth 40 points.

You may use a calculator, your book, your notes, and the lesson notes I provided for you.

Topics on this exam:

Hypothesis tests & confidence intervals involving  $\mu$ ,  $\mu_1 - \mu_2$ ,  $p$ , and  $p_1 - p_2$   
(Classical and p-value approaches)

Your options for submitting your work:

- 1) If you are able, you can write your solutions on other paper and scan/photograph that work to send to me, that is preferred.
- 2) If you are unable to scan/photograph your work, you can either type your work into a Word file or directly into email. Don't worry about perfect notation, just do the best you can.
- 3) If snail mail works best for anyone, let me know and I will give you my home address.

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Intro to Stats  
Fall 2019

Exam 3A  
Open Book Portion

Name: \_\_\_\_\_

Some topics we haven't covered have been removed

1. (12 points) It is known that, in past years, the average height of all third grade students in Quincy was 45 inches. However, we suspect that this is no longer correct. To investigate our claim we randomly select 16 students and measure their heights, yielding a mean of 48.5 inches and a standard deviation of 6 inches. Do a classical hypothesis test to confirm or refute our suspicion. (If you cannot use the classical approach, you may use a p-value for partial credit.)

2. (12 points) It has been reported that 70% of people that use smart phones own an Apple iPhone. I don't think the percentage is that high on campus, so I took a random sample of 40 ENC students that use a smart phone, and found that 25 of those students own iPhones. Test my belief.

(Use a p-value on this one. If you cannot use a p-value, you may use a classical hypothesis test for partial credit.)

3. (12 points) I collected the following data for the first EMES exam in 2000 and the first exam in 2010:

2000	$\bar{X}_1 = 74.3$	$n_1 = 30$	$s_1 = 5.42$
2010	$\bar{X}_2 = 71.0$	$n_2 = 30$	$s_2 = 6.18$

Test the claim that the average scores on the two years are the same. (You may use either the classical approach or the p-value approach, but tell me which one you are doing.)

Some other problems from topics we've covered but that did not make it onto last semester's exam.

4. The Genetics and IVF Institute conducted a clinical trial of its methods for gender selection. Results included 325 babies born to parents using the XSORT method to increase the probability of conceiving a girl, and 295 of those babies were girls. Also, 51 babies were born to parents using the YSORT method to increase the probability of conceiving a boy, and 39 of those babies were boys. Construct a 95% confidence interval estimate of the difference between the proportion of girls and the proportion of boys.

5. People spend huge sums of money for the purchase of magnets used to treat a wide variety of pains. Researchers conducted a study to determine whether magnets are effective in treating back pain. The data below shows the results of the experiment comparing treatment with magnets to treatment with a placebo. Test to see if the average pain reduction with magnets is greater than the average pain reduction with placebos.

magnets	$\bar{X}_1 = 0.49$	$n_1 = 20$	$s_1 = 0.96$
placebo	$\bar{X}_2 = 0.44$	$n_2 = 20$	$s_2 = 1.40$

6. In a study of the accuracy of telephone surveys, 720 people refused to respond when they were among the 1720 people included in a "standard" 5-day survey. In the same study, 429 people refused to respond when they were among the 1640 people included in a rigorous 8-week survey. Test the claim that the refusal rate is lower with the rigorous survey.