Math 373 Hw 21 Recommended problems, don't turn this in.

Hw 351: 9.34, 9.36, 9.38. 373: 10.2. Rec 351: 9.35, 9.37, 9.39. 373: 10.1

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9.35. Independent random samples are selected from binomial populations 1 and 2 respectively. Sample 1 has $n_1 = 140$ elements with $x_1 = 74$ successes. Sample 2 has $n_1 = 140$ elements with $x_2 = 81$ successes.
You know that p_1 cannot be larger than p_2.

(a) What are your null and alternative hypotheses?

H_a H_0

(b) Find the test statistic (use z-scores rather than $\hat{p}_1 - \hat{p}_2$). Find p-value of this statistic.

$z =$

(c) acceptance region (5%):

(d) At 5% significance, should you accept or reject the null hypothesis?

9.37. An experiment was conducted to test the effect of a new drug on a viral infection. The infection was induced in 100 mice, and the mice were randomly split into two groups of 50. The first group, the *control group*, received no treatment for the infection. The second group received the drug. After a 30-day period, the proportions of survivors, $\hat{p}_1$ and $\hat{p}_2$ in the two groups were found to be .36 and .60, respectively.

$p =$

SE $\approx$

$z =$

acceptance region for z-scores:

(a) Is there sufficient evidence to indicate that the drug is effective in treating the viral infection? Use $\alpha = .05$.

(b) Use a 95% confidence interval to estimate the actual difference in the cure rates for the treat versus the control groups.

9.39. You want to know whether or not packages of plain M&Ms have the same proportion of red candies as packages of peanut M&Ms. You randomly sample 56 plain and 32 peanut M&Ms with the following results.

	Plain	Peanut
Sample size	56	32
Number reds	12	8
sample proportion	0.2143	0.25

$p =$

SE $\approx$

$z =$

acceptance region for z-scores:

p-value:

Is there an $\alpha = 5\%$ significant difference?

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10.1. Find the following t-values (see front cover).

(a) $t_{.05}$, $df = 5$.

(b) $t_{.025}$, $df = 8$.

(c) $t_{.10}$, $df = 18$.

(d) $t_{.025}$, $df = 30$.

Answers

9.35.

(a) $H_a: p_1 - p_2 < 0$ $H_0: p_1 - p_2 \geq 0$

(d) $z = -.84$ (c) region = $[-1.645, \infty)$

(d) Accept H_0.

9.37. $p = (18+30)/(50+50) = .48$

SE $\approx \sqrt{(.48)(.52)(\frac{1}{50} + \frac{1}{50})} = .09992$ $z = -2.4019$

acceptance region for z-scores: $[-1.96, 1.96]$

(a) yes (b) $[-.43, -.05]$

9.39. $p = (12+8)/(56+32) = .2273$

SE $\approx \sqrt{(.227)(1-.227)(\frac{1}{56} + \frac{1}{32})} = .0929$ $z = -.3846$

acceptance region for z-scores: $[-1.96, 1.96]$

p-value: $2P(z < -.39) = 2(.5 - P(0 < z < .39)) = .6242$

Is there an $\alpha = 5\%$ significant difference? No.

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10.1. (a) 2.015 (b) 2.306 (c) 1.330 (d) 1.96