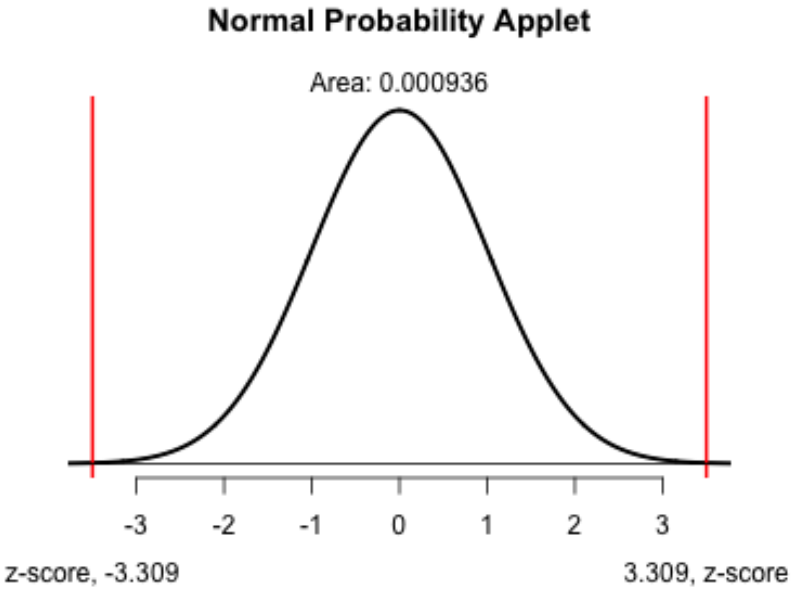
Lesson 18: Inference for Two Proportions

Preparation

Solutions

Please note that the steps show rounded numbers, but that the final answers to the problems are calculated without rounding.

Problem	Part	Solution
1	-	$H_0 : p_1 = p_2$
2	-	$z = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\hat{p}(1-\hat{p})(\frac{1}{n_1} + \frac{1}{n_2})}}$ $\hat{p}_1$ = Sample proportion for group 1 $\hat{p}_2$ = Sample proportion for group 2 $\hat{p}$ = Overall sample proportion n_1 = Sample size for group 1 n_2 = Sample size for group 2
3	-	$(\hat{p}_1 - \hat{p}_2) \pm z^* \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$ $\hat{p}_1$ = Sample proportion for group 1 $\hat{p}_2$ = Sample proportion for group 2 n_1 = Sample size for group 1 n_2 = Sample size for group 2 z^* = z value for a confidence interval
4	A	$296 * 0.213 = 63 > 10$ $251 * 0.108 = 27 > 10$ $296(1 - 0.213) = 233 > 10$ $251(1 - 0.108) = 224 > 10$
4	B	$H_0 : p_1 = p_2$ $H_0 : p_1 \neq p_2$
4	C	$z = 3.309$
4	D	P-value = 0.001

Problem	Part	Solution
		
4	E	Students should include a sketch of normal distribution curve with both to the left and right of the two z-scores shaded.
4	F	reject the null hypothesis
4	G	We have sufficient evidence to say that there is a difference in the proportions of men who use labels and women who use labels.
5	-	(0.045, 0.165)
6	-	We are 95% confident that the true difference in the proportions of men being label users and women being label users is between 0.045 and 0.165.