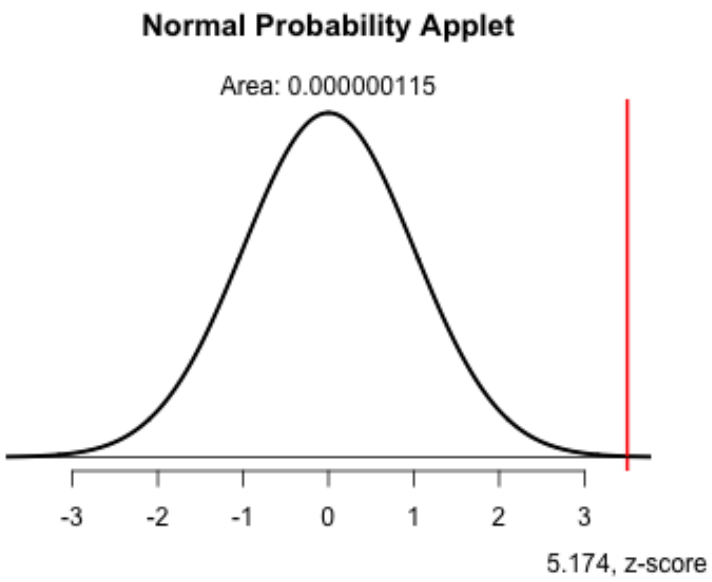
Lesson 17: Inference for One Proportion

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	-	$\hat{p} = \frac{x}{n}$ x = number of successes n = number of trials.
2	-	$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$
3	-	$n\hat{p} \geq 10$ $n(1-\hat{p}) \geq 10$
4	-	$n = (\frac{z^*}{2m})^2$
5	-	$z = \frac{\hat{p}-p}{\sqrt{\frac{p(1-p)}{n}}}$
6	-	$np \geq 10$ $n(1-p) \geq 10$
7	A	$\hat{p} = \frac{x}{n} = \frac{684}{1006} = 0.6799$
7	B	$n\hat{p} \geq 10$ -> $1006 * 0.6799 \geq 10$ -> $684 \geq 10$ $n(1-\hat{p}) \geq 10$ -> $1006(1-0.6799) \geq 10$ -> $322 \geq 10$ The requirements are met.
7	C	$1.96 * \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = 1.96 * \sqrt{\frac{0.6799(1-0.6799)}{1006}} = 0.0288$
7	D	$\hat{p} \pm$ margin of error -> 0.6799 ± 0.0288 -> (0.6511, 0.7087) We are 95% confident that the true population mean, p, is between 0.6511 and 0.7087.
7	E	$n = (\frac{z^*}{2m})^2 = (\frac{1.96}{2 \times 0.015})^2 = 4268.4444$ -> 4269
8	A	$H_0 : p = 0.6$ $H_a : p > 0.6$
8	B	$z = \frac{0.6799-0.6}{\sqrt{\frac{0.6(1-0.6}{1006}}} = 5.174$

Problem	Part	Solution
		
8	C	$p = 0$
8	D	We reject the null hypothesis
8	E	We have sufficient evidence to conclude that the true proportion of students that have been in a car accident within the last 5 years is greater than 0.6.