Section 7.8: One Sample: Test on a Single Proportion

Thursday, March 28, 2019 2:23 PM

note: we are omitting 7.6 and 7.7

test of a population proportion:

$H_0: p = p_0$

p: population proportion

p_0: some value

note: the sample proportion is $\hat{p}$

H_a: one of $p > p_0$, $p < p_0$ } one-tailed test

$p \neq p_0$ — two-tailed test

test statistic: $$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$$

under the conditions

np_0 and nq_0 are both greater than 5

example: A peony plant with red petals was crossed with another plant having streaky petals. A geneticist claims that 75% of the offspring resulting from this cross will have

red flowers. To test this claim, 100 seeds from this cross were collected and germinated: 63 had red petals. Do the data support the geneticist's claim at the 99% level?

a) state the conditions under which you are performing this test

$$np_0 = 100(0.75) = 75$$
$$nq_0 = 100(0.25) = 25$$
} 75 ✓

b) state the null and alternate hypotheses

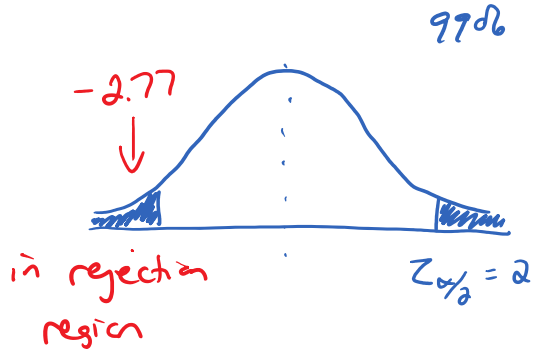
$H_0: \quad p = p_0$
$H_a: \quad p \neq p_0$

c) calculate the test statistic

$$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$$

$$= \frac{0.63 - 0.75}{\sqrt{\frac{(0.75)(0.25)}{100}}}$$

$$= -2.77$$



Conclusion:

With 99% confidence, we can say that the test results do not support the geneticist's claim.