Answer on Question #44855 – Math - Statistics and Probability

Credit scorecards are used by financial institutions to help decide to whom loans should be granted (see the Applications in banking: Credit Scorecards summary on page 63). An analysis of the records of a random sample of loans at one bank produced the following results:

Score below 600 Score 600 or More

Sample size 562 804

Number defaulted 11 7

Do these results allow us to conclude that those who score below 600 are more likely to default than those who score 600 or more? Use a 10% significance level.

Solution

$$H_0: p_1 - p_2 = 0 \;\; H_a: p_1 - p_2 > 0$$

$$\widehat{p_1} = \frac{11}{562} = 0.0196; \; \widehat{p_2} = \frac{7}{804} = 0.0087$$

$$\hat{p} = \frac{n_1\widehat{p_1} + n_2\widehat{p_2}}{n_1 + n_2} = \frac{562 \cdot 0.0196 + 804 \cdot 0.140}{562 + 804} = 0.0132$$

$$z = \frac{\widehat{p_1} - \widehat{p_2}}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} = \frac{0.0196 - 0.0087}{\sqrt{0.0132(1-0.0132)\left(\frac{1}{562} + \frac{1}{804}\right)}} = 1.70.$$

$$p - value = P(Z > 1.74) = 1 - 0.9591 = 0.0409 < 0.05.$$

We reject H_0.

There is enough evidence to conclude that those who score under 600 are more likely to default than those who score 600 or more.