Answer on Question #44853 – Math - Statistics and Probability

Many stores sell extended warranties for products they sell. These are very lucrative for store owners. To learn more about who buys these warranties, a random sample was drawn of a store's customers who recently purchased a product for which an extended warranty was available. Among other variables, each respondent reported whether he or she paid the regular price or a sale price and whether he or she purchased an extended warranty.

	Regular Price	Sale Price
Sample size	229	178
No who bought extended warranty	47	25

Can we conclude at the 10% significance level that those who paid the regular price are more likely to buy an extended warranty?

Solution

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

$$\widehat{p_1} = \frac{47}{229} = 0.205; \; \widehat{p_2} = \frac{25}{178} = 0.140$$

$$\hat{p} = \frac{n_1\widehat{p_1} + n_2\widehat{p_2}}{n_1 + n_2} = \frac{229 \cdot 0.205 + 178 \cdot 0.140}{229 + 178} = 0.177$$

$$z = \frac{\widehat{p_1} - \widehat{p_2}}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} = \frac{0.205 - 0.140}{\sqrt{0.177(1-0.177)\left(\frac{1}{229} + \frac{1}{178}\right)}} = 1.70.$$

$$p - value = P(Z > 1.70) = 1 - 0.9554 = 0.0446 < 0.05.$$

We reject H_0.

There is enough evidence to conclude that those who paid the regular price are more likely to buy an extended warranty.