Answer on Question #79380 – Math – Statistics and Probability

Question

The claim is that the proportion of adults who smoked a cigarette in the past week is less than 0.35 and the sample statistics include $n = 1230$ subjects with 394 saying that they smoked a cigarette in the past week. Find the value of the test statistic.

Solution

$z -$test for proportion.
The value of the test statistic is

$$z = \frac{\hat{p} - p}{\sqrt{pq/n}},$$

where
$\hat{p} = \dfrac{X}{n} \ (sample\ proportion)$
$p = population\ proportion$
$n = sample\ size$

$p = 0.35, \qquad q = 1 - p = 1 - 0.35 = 0.65$
$n = 1230$
$\hat{p} = \dfrac{394}{1230} \approx 0.32$
$np = 1230 \cdot 0.35 = 430.5 > 5$
$np = 1230 \cdot 0.65 = 799.5 > 5$
$z = \dfrac{\frac{394}{1230} - 0.35}{\sqrt{0.35 \cdot 0.65/1230}} = -\dfrac{36.5}{\sqrt{279.825}} \approx -2.1820.$

Answer: $-2.1820.$