

## Answer on Question #82837 – Math – Statistics and Probability

### Question

A researcher claims that the dropout rate at local universities is more than 15%. Last year, 40 individuals from a random sample of 200 local university students withdrew. Is there enough evidence to reject the researcher's claim? Use  $\alpha=0.05$ .

### Solution

One-tailed binomial test:

$H_0$  - the dropout rate  $p < 0.15$

$H_1$  - the dropout rate  $p \geq 0.15$  (researcher's claim)

Find the p-value

$$\begin{aligned} P_{p=0.15}(X \geq 40) &= P_{p=0.15}\left(\frac{X - 200p}{\sqrt{200p(1-p)}} \geq \frac{40 - 200p}{\sqrt{200p(1-p)}}\right) = \\ &= P\left(z \geq \frac{40 - 200 \cdot 0.15}{\sqrt{200 \cdot 0.15 \cdot 0.85}}\right) = 1 - F(1.98) = 1 - 0.976 = 0.024 \end{aligned}$$

We used normal approximation of binomial distribution.

Since p-value is less than the critical level  $\alpha = 0.05$  we reject the null hypothesis and accept the researcher's claim.