C4

$\hat{p}$ = 15% ρ_0 = 20% α = 5%   n = 450

Population   **Voters in the United States**

Focus Proportion   **Adults Who Supported Gingrich**

Step I Identify Procedure:

We want to test the evidence against the claim that the proportion of adults who supported Gingrich in the population of voters in the United States (ρ) is equal to 20% (ρ_0).

The null and alternative hypotheses are:

$$H_0: \rho \; = \; 20\%$$

$$H_A: \rho \; \boxed{<} \; 20\%$$

Step II Check Conditions:

* **Random Sample**: A random sample was conducted to insure every member of the population was equally likely to be selected.

*Normal **Sampling Distribution: The sampling distribution of all possible sample proportions has an approximately normal shape because:**

$$n*p >10 \qquad\qquad n*(1-p) > 10$$
$$450*20\% > 10 \qquad\qquad 450*80\% > 10$$

* **Independence**: The lack of replacement is not a problem in this case because the number of subjects in the population is more than 10 times the sample size.

Step III Perform Procedure:

See "Graph" Tab

Sampling Distribution: Proportion = **20%** Standard Deviation = $\dfrac{\sqrt{\rho(1-\rho)}}{\sqrt{n}}$ $=$ $\dfrac{\sqrt{20\%(1-20\%)}}{\sqrt{450}}=$ **1.9%**

Shape: Approximately **Normal**

P-Value = P($\hat{p}$ $<$ 15% | ρ =**20%**) $=$ **0.4%** compared to the Significance Level (**α**) of **5%**

Step IV Interpretation:

We reject the null hypothesis at the **5%** significance level (**α**). The P-value of **.4%** falls **well below**

the significance level, thus there is **strong** evidence that the alternative hypothesis is true, **adults who**

supported Gingrich in the population of voters in the United States **(p) is less** than **20%.**