"RUNNING" EXAMPLE FOR SECTION 8-1
MATH 1401

From October 1-13, 2019, Gallup conducted a public opinion poll on Americans support of impeaching President Trump. In a random sample of 1526 U.S. adults, 794 said they support impeaching President Trump. Suppose a reporter claims that the majority of U.S. adults support impeaching the President. Test the reporter's claim at the 0.05 significance level. (Based on data from https://news.gallup.com/poll/267491/congress-approval-support-impeaching-trump.aspx.)

STEP 1: $p > 0.5$

STEP 2: $p \leq 0.5$

STEP 3: H_0: $p = 0.5$
H_1: $p > 0.5$

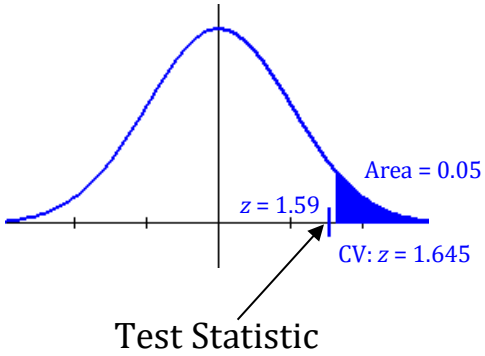
STEP 4: $\alpha = 0.05$

STEP 5: Use the standard normal (z) distribution since we are dealing with proportions.

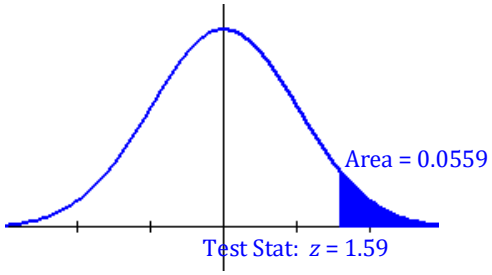
STEP 6: $p = 0.5$; $q = 1 - p = 1 - 0.5 = 0.5$; $n = 1526$; $x = 794$;
$\hat{p} = \frac{794}{1526} = 0.520$
(NOTE: When doing calculations, always use the ***unrounded*** value for $\hat{p}$.)
Test Statistic: $z = \frac{\hat{p}-p}{\sqrt{\frac{p \cdot q}{n}}} = \frac{0.520-0.5}{\sqrt{\frac{0.5 \cdot 0.5}{1526}}} = 1.59$

To find the critical value, shade an area of 0.05 in the right tail. Then find the z score using either Table A-2 or invNorm on the calculator.

Critical Value Method:



P-Value Method:



P-value = 0.0559

STEP 7: *Critical Value Method*: Fail to reject the null hypothesis H_0 because the test statistic does not fall in the critical region. [Since the critical region is composed of values that are significant and the test statistic is NOT in the critical region, we see that nothing significant occurred. When nothing significant occurs, we fail to reject the null hypothesis.]
P-Value Method: Fail to reject the null hypothesis H_0 because the *P*-value is greater than the significance level; that is, *P*-value > α. In this case, $0.0559 > 0.05$. [Since the *P*-value is greater than the significance level, we see that nothing significant occurred. When nothing significant occurs, we fail to reject the null hypothesis.]

STEP 8: There is not sufficient evidence to support the claim that the majority of U.S. adults support the impeachment of President Trump.