17-11. $n = 977$ adult Americans (sample)

O.U = adult American

Population = Adult Americans

a) Here, since "always" represents 1/3 of the possible responses, 1/3 of the responses being "always" suggests that this response ratio is no better than random

$H_0: \hat{p} = 1/3$

$H_A: \hat{p} > 1/3$

b) two conditions:

1) Was the sample <u>random</u> (we'll assume so)

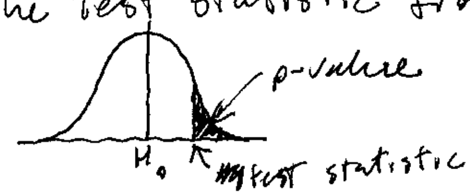
2) $n\pi \geq 10$ and $n(1-\pi) \geq 10$ with $n = 977$, $\pi = 1/3$ so ok

c) $z = \dfrac{\hat{p} - \pi}{\sqrt{\frac{\pi(1-\pi)}{n}}} = \dfrac{304/977 - .33}{\sqrt{\frac{.5(1-.5)}{977}}} = \dfrac{.311 - .33}{\sqrt{.000256}} = \dfrac{.019}{.016} =$

$= 1.1875$

d) $\Phi(1.1875) \sim .8820$ note: we don't really calculate the p-value. We look it up in a table (or 1 minus the value we look up). $1 - .8820 = .198$ p value

e) The null hypothesis is not rejected at any level. p-value = .198 > .1, which is the weakest level. The p-value is the probability of obtaining a test statistic <u>at least</u> as extreme as the one obtained. It represents the region on the opposite side of the test statistic from the null hypothesis value



f) The null hypothesis is not rejected at the .05 level

g) The response "always" could be random or at least not sig diff. from 1/3

18-7 O.U. - American Adult

Population - American Adults

Sample - $n = 1334$ American Adults

$\hat{p} = 1052/1334 = .789$ made contributions in Prev. Year

a) Confidence Interval

$\hat{p} \pm z_{\alpha/2}(SE)_{\hat{p}}$

$\alpha = 1 - .9 = .1$

$\hat{p} = .789$

$z_{.1/2} = z_{.05} = 1.645$

$(SE)_{\hat{p}} = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = .0112$

$.789 \pm 1.645(.011)$

$(.771, .807)$

b) for a 99% confidence interval,

$z_{\alpha/2}$ will be different, but all other values will be the same

$\alpha = 1 - .99 = .01$

$\alpha/2 = .01/2 = .005$

$z_{\alpha/2} = z_{.005} = 2.575$

$\hat{p} \pm z_{.005}(SE)_{\hat{p}}$

$.789 \pm 2.575(.011)$

$.789 \pm .028$

$(.761, .817)$

Notice that as confidence ↑ interval also ↑

c) .75 falls outside the 90% ($\alpha = .01$ level) C.I.,

so it differs significantly at the .01 level

d) No. 80%, or .8, fall within the confidence interval at the $\alpha = .10$, or 10%, level