

B / 4  
Joseph Drey  
Exam # 2

10-22-86  
Research Methods

1. a) Hypothesis: Our library's percent of accessioned gifts is different from the national average  
b)  $\bar{X}_{us} \neq$  national avg.  
c) Z test of proportions, one sample  
d) random sample, underlying normal dist, pop variance unknown

C.L.T

e) Type I error = .01  
2 tailed test

$$H_0: p_1 = p_0$$

$$H_1: p_1 \neq p_0$$

2.58

D.R. w/ alpha .01 reject  $H_0$  if  $|Z| > Z_{(1-\alpha/2)} = 2.58$

Data

$$N = 32$$

$$p_0 = .10$$

$$p_1 = .135$$

$$Z = \frac{p_1 - p_0}{\sqrt{(p_0 q_0) / N}} \cdot 5$$

$$Z = \frac{10 - 13.5}{\sqrt{[10 \times 90 / 32]}} \cdot 5$$

$$Z = -3.5 / 5.3$$

$$Z = -.66$$

$$|Z| = .66$$

Since  $|Z|$  (.66) is not greater than <sup>but less</sup> 2.58, it follows that the null hypothesis cannot be rejected. Therefore, our library's percentage of the accession of gifts is not significantly different from the national average.



2. national avg = 55%  
our avg = 60%  
N = 20

Hypothesis Our library's % of correctly answered reference questions exceeds the national avg.

$H_0: p_0 = p_1$        $p_0 = \text{nat avg}$   
 $H_1: p_0 < p_1$        $p_1 = \text{our national avg}$

Z test of proportions, 1 sample, 1 tail  
Random sample C.R.T.

D.R. with alpha = .05 reject  $H_0$  if  $|z| >$   
 $z(1-\alpha) = 1.64$

Data

$$N = 20$$

$$p_1 = .60$$

$$p_0 = .55$$

$$z = \frac{60 - 55}{\sqrt{(.55 \cdot .45) / 20}} \cdot 5$$

$$z = \frac{5}{.91} \text{ or } .91 \cdot 449$$

Reject alternative hypothesis Our library's percentage of correctly answered reference questions is not significantly different from the national average

Do not reject  $H_0$ .



Joseph Diaz  
10-22-82

3. Hypothesis: Arizona % of library use exceeds national avg  
 $P_0 = .33$  (proportion of library use in U.S.)  
 $P = .41$  (Arizona libraries sampled)  
 $N = 30$

$$\alpha = .01$$

one tailed test

$$H_0: P_1 = P_0$$

$$H_1: P_1 > P_0$$

Z test, one sample, 1 tail test

Random sample, central limit theorem

D.R. with  $\alpha = .01$  reject  $H_0$  if  $|z|$

$$is > z(1-\alpha) = 2.33$$

$$z = \frac{41 - 33}{\sqrt{[(33 \times 67) / 30]}} = 1.5$$

$$z = 8 / 8.58$$

$$z = .93$$

$$.93 < 2.33$$

Reject alternative hypothesis. The proportion of library use in Arizona is not significantly different from the national average at the .01 level of significance.

Do not reject  $H_0$