

HW SOLUTIONS, SIGNIFICANCE TESTS HANDOUT

6.25. If in fact there is no difference in ethnocentrism between church attenders and nonattenders ( $H_0$ ), the chance of obtaining a sample difference as large as was found in this study is less than 5%.

6.26. A p-value less than .05 represents significant evidence against the null hypothesis  $H_0$ : no sex difference. Thus the first p-value indicates that there is a difference, while the second does not.

6.45. Only (b).

6.46. No - the data gives strong evidence that there is an effect, not evidence that there is a strong effect.

6.51.(a) About 5 out of every 500 significance tests will be significant at the 1% level by chance alone (i.e., even if  $H_0$  is true in each case). This is an example of "searching for significance". No evidence for ESP.

6.52.(a)  $X \sim \text{binomial}(n=77, p=.05)$ .

$$(b) P(X \geq 2) = 1 - P(X=0) - P(X=1) \\ = 1 - \binom{77}{0} .95^{77} - \binom{77}{1} .05^1 \cdot .95^{76} = 1 - .019 - .078 = .903.$$

$$6.53. P_{\mu=460} (Z \geq 2.326) = P_{\mu=460} \left( \frac{\bar{X} - 450}{100/\sqrt{500}} \geq 2.326 \right)$$

$$= P_{\mu=460} \left( \bar{X} \geq 450 + 2.326 \left( \frac{100}{\sqrt{500}} \right) \right) = P_{\mu=460} (\bar{X} \geq 460.4)$$

$$= P_{\mu=460} \left( \frac{\bar{X} - 460}{100/\sqrt{500}} \geq \frac{460.4 - 460}{100/\sqrt{500}} \right) = P(Z \geq 0.089) \approx 46\%.$$

The test is not very likely to detect an SAT increase in mean of 10 points (46% chance).