

STAT 100 SUMMER II 2001 (PROFESSOR GREEN)
SOLUTIONS TO ASSIGNED PROBLEMS DUE
AUGUST 14

Problem 42.

- (a) $z = \frac{30.54-30}{\frac{2}{\sqrt{55}}} = 2.002$; $P[Z \geq z] = .0228 < .05 = \alpha$. The null hypothesis is rejected in favor of the alternative hypothesis at significance level .05.
- (b) $z = \frac{.142-.15}{\frac{.085}{\sqrt{125}}} = -1.05$; $P[Z \leq z] = .1469 > .025$. The null hypothesis is *not* rejected at significance level .025.
- (c) $z = \frac{77.35-80}{\frac{8.6}{\sqrt{38}}} = -1.90$; $P[|Z| \geq |z|] = .0574 > .01$. The null hypothesis is *not* rejected at a significance level of .01.
- (d) $z = \frac{-.59-0}{\frac{1.23}{\sqrt{40}}} = -3.03$; $P[|Z| \geq |z|] = .0024 < .06$. The null hypothesis is rejected in favor of the alternative hypothesis at significance level .06.

Problem 46. $Z = \frac{\bar{X}-12}{\frac{.136}{\sqrt{67}}}$. The rejection region is $Z < -z_{.05} = -1.645$. The actual value of the test statistic is -2.41 , which falls in the rejection region. The null hypothesis is rejected in favor of the alternative hypothesis at significance level .05.

Problem 50. The test statistic is $Z = \frac{\bar{X}-85}{\frac{24.73}{\sqrt{50}}}$, which takes the value -2.74 . For a two-sided test, the P -value is $P[|Z| \geq 2.74] = .0062$, which is less than the significance level .01. The null hypothesis is rejected in favor of the alternative hypothesis.

Problem 52.

- (a) Since the null hypothesis was retained at significance level .02, it would also be retained at any lower significance level, such as .01.
- (b) We know the P -value was greater than .02. We cannot tell whether it was greater than .05, so we cannot tell what the result of the test would be at significance level .05.
- (c) No; if it were, the null hypothesis would have been rejected at that level.

Problem 54. The test statistic in this case is $Z = \frac{\bar{X}-25}{\frac{3.1}{\sqrt{35}}}$. The actual value of the test statistic is -2.86 , and the P -value is $P[Z \leq -2.86] = .0021$. This is a very low P -value that strongly supports rejecting the null hypothesis that the mean percentage of cashews is 25% in favor of the alternative hypothesis that it is lower.