

Assignment #5

Name Answer Key

Due 21 October 2009

1. A certain city bases the management of its waste on the assumption that the average weight of weekly household garbage is 32 pounds. A city manager suspects that the true mean weight is greater than 32 pounds. He collects a random sample of the weekly garbage from 30 households, and their weights can be found in the table below:

29.6	36.7	30.1	34	30.6	29.9
32.8	27.3	33.2	35.9	33.5	28
33.7	39	31.8	39.5	32.4	33
26.7	32.9	33	29.3	31.5	33.1
34.6	28.6	34.2	28.1	35.4	28.3

- (a) At the 5% significance level, test the hypothesis that the mean weight of weekly household garbage is greater than 32 pounds.

$$\bar{x} = 32.22$$

$$s = 3.27$$

$$t = \frac{32.22 - 32}{3.27 / \sqrt{30}}$$

$$= .368$$

$$H_0: \mu = 32$$

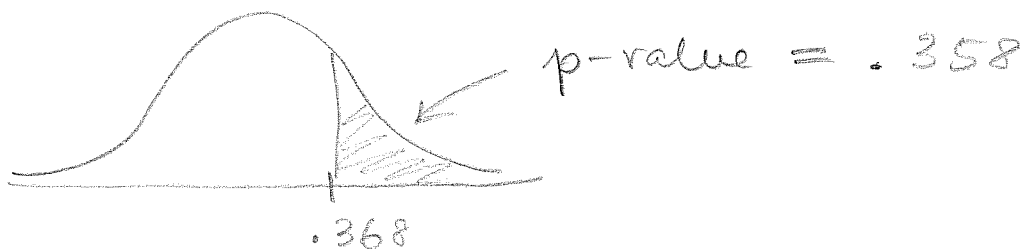
$$H_a: \mu > 32$$

$$d.f. = 29$$

Since $t < 1.69$,
we do not
reject H_0 .



- (b) What is the p -value of the observed sample mean?



2. The mean of a normal population with $\sigma = 2$ is being tested at the 5% significance level. 100 random samples are collected. The null and alternative hypotheses of the test are $H_0 : \mu = 10$, $H_a : \mu \neq 10$. Calculate the power of the test at the following assumed values of the true mean:

(a) $\mu = 10.2$

$$-2.96 \leq z \leq .96$$

$$\text{power} = .17$$

(b) $\mu = 10.4$

$$-3.96 \leq z \leq -1.04$$

$$\text{power} = .516$$

(c) $\mu = 10.6$

$$-4.96 \leq z \leq -1.04$$

$$\text{power} = .851$$

(d) $\mu = 10.8$

$$-5.96 \leq z \leq -2.04$$

$$\text{power} = .979$$

(e) $\mu = 11$

$$-6.96 \leq z \leq -3.04$$

$$\text{power} = .9988$$

(f) Draw the associated power curve on the attached graph paper.

