

## Elementary Statistics: Solution to Homework 2

### Solution

#### Page 75 Problem 1.34:

- a) Any values that are  $\leq 0.01$  work. For example: 0.005 or 0.001.
- b) Any values that are between 0.01 and 0.05 work. For example: 0.02 or 0.03.
- c) Any values that are  $> 0.10$  work. For example: 0.15 or 0.20.

#### Page 77 Problem 1.40:

- a)  $H_0$  : The mean birth weight for goats is 1600 grams.  
 $H_1$  : The mean birth weight for goats is not 1600 grams.
- b) We support the null hypothesis  $H_0$ .
- c) The  $p$ -value for this test is greater than .01.
- d) The possible  $p$ -value is 0.02.
- e) Any  $p$ -value that is between 0.01 and 0.05 still works. Otherwise you need a new  $p$ -value.
- f) Type II error could have been made.

#### Page 79 Problem 1.46:

- a) F
- b) T since the  $p$ -value is less than  $\alpha$ .
- c) T since the  $p$ -value is less than 0.05.
- d) T since the  $p$ -value is less than 0.1

#### Page 97 Problem 2.4:

- a) Selected senators from 50 states.
- b) 100.
- c) Randomly selected senators.
- d) 10.

Page 107 Problem 2.13: The answer is c).

#### Page 116 Problem 2.22:

- a)  $\frac{1}{2}$ .
- b)  $\frac{1}{10}$ .
- c) The chance is  $\frac{1}{10}$ . However this is not the same as simple random sample. In this stratified random sample, we divide population into two subgroups. As a result, we will

always have 100 male and 20 female as our samples.

**Page 121 Problem 2.30:**

- a) Stratified random sampling.
- b) No, since the number of people whose name starts with different alphabets are different.
- c) Selection bias (convenience bias is fine too).

**Page 122 Problem 2.32:**

- a)  $\frac{1}{14}$ .
- b) Since  $\frac{555}{14} = 39 + \frac{6}{14}$ , if we select the third of every fourteen then the sample size is 40.

**Page 127 Problem 2.38:**

- a) Cluster sampling.
- b) No, the number of classes that each student takes might not be equal.
- c) This is a case of a poor design together with bad luck on the selection.

**Page 136 Problem 2.44:** The answer is c).

**Page 136 Problem 2.48:**

- a) i) selection bias.
- b) ii) nonresponse bias.
- c) iii) response bias.

**Page 137 Problem 2.50:**

- a) Simple random sampling.
- b) The population is from the people who called the national help line.
- c) No, the population is not from all workers in the country. Moreover there is no past data to compare.

Claiming "*more people using drugs at work*" is unjustified.