

## Homework Solutions

### Chapter 10 – Page 633

#### Exercise 4

The problem does not say to test the hypotheses. Instead, it asks specifically for the test statistic, the  $p$ -value, the decision, and the conclusion. Therefore, we need only give those four things (which happen to be steps 4, 5, 6, and 7). However, I will show all seven steps.

1. Let  $\mu$  be the mean IQ score of the girls at the alternative high school. The hypotheses are

$$H_0 : \mu = 100$$

$$H_1 : \mu > 100$$

2.  $\alpha = 0.01$

3. The test statistic is

$$z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}}.$$

4. The value of the test statistic is

$$\begin{aligned} z &= \frac{114 - 100}{15/\sqrt{9}} \\ &= \frac{14}{5} \\ &= 2.8. \end{aligned}$$

5. The  $p$ -value is

$$\text{normalcdf}(2.8, \text{E99}) = 0.002555.$$

6. Reject  $H_0$  (because the  $p$ -value is less than  $\alpha$ ).

7. The mean IQ of the girls at the alternative high school is greater than 100.