

Answer Key 11

1.

(1) Since $\frac{\sqrt{n}(\bar{X} - \mu)}{\sigma} \sim N(0, 1)$, reject H_0 if $\bar{X} \geq 1.28 * 2 = 2.56$.

$$(2) P(\bar{X} \geq 2.56 | \mu = 1.5) = P\left(\frac{\sqrt{n}(\bar{X} - \mu)}{\sigma} \geq \frac{5(2.56 - 1.5)}{10}\right) = P(Z \geq 0.53) = 0.298$$

(3) For $\alpha = 0.01$, reject H_0 if $\bar{X} \geq 2.33 * 2 = 4.66$.

$$\text{So, } P(\bar{X} \geq 4.66 | \mu = 1.5) = P\left(\frac{\sqrt{n}(\bar{X} - \mu)}{\sigma} \geq \frac{5 \cdot (4.66 - 1.5)}{10}\right) = P(Z \geq 1.58) = 0.057$$

2.

$$(1) \text{p-value} = 2 \cdot (1 - \Phi(|-2.6|)) = 0.0093.$$

$$(2) \text{p-value} = 2 \cdot (1 - \Phi(1.96)) = 0.05.$$

$$(3) \text{ If test statistic} = -2.6 \text{ as (1), p-value} = 1 - \Phi(-2.6) = 0.995.$$

$$\text{If test statistic} = 1.96 \text{ as (2), p-value} = 1 - \Phi(1.96) = 0.025.$$