9.1 Find the appropriate acceptance and rejection regions for the large-sample test statistic $z$ in each case.

(a) right-tailed test with $\alpha = .01$.

(b) two-tailed test at the 5% significance level.

(c) left-tailed test at the 1% significance level.

(d) two-tailed test with $\alpha = .01$.

9.7 A random sample of 100 observations from a quantitative population produced a sample mean of 26.8 and a sample standard deviation of 6.5.

(a) Use the $p$-value approach to determine whether the population mean is different from 28.

(b) Use the acceptance region approach.

9.9 A supermarket packages meat in trays which are supposed to hold exactly 1 lb. of meat. A random sample of 35 packages has an average of 1.01 lb. and a std. dev. of .18 lb.

(a) If you want to make sure that the average amount of meat is indeed 1 lb. what hypotheses would you test?

$H_0$: $\mu = 1$  

$H_a$: $\mu \neq 1$

(b) Find the $p$-value for the test and use it to perform the test in part (a).

$z$-score = $(1-1.01)/(.18/\sqrt{35}) = -.328$

$p$-value = using $z$ instead of $\bar{x}$.

$P(z < -.328) + P(z > .328) = 2(1-.6293) = .7414$

Accept $H_0$. The $p$-value is not $< .05$.

The $p$-value is the probability of $H_0$. We reject $H_0$ iff it is extremely unlikely iff the $p$-value is $< .05$.

(b) Null region: [28].

Acceptance region = $\mu_0 \pm SE \sqrt{a/2}$

$= [28 \pm (.65)(1.96)] = [26.73, 29.27]$  

Accept $H_0$ since $\bar{x} = 26.8 \in [26.73, 29.27]$ = acceptance.

9.11 A drug manufacturer claims that the mean potency of one of its antibiotics is 80%. A random sample of $n = 100$ capsules are tested and found to have a mean of $\bar{x} = 79.7\%$ with a std. dev. of $s = .8\%$. Do the data present sufficient evidence to refute the manufacturer's claim at the 5% significance level?

(a) State the null hypothesis.

$H_0$: $\mu = 80\%$

(b) State the alternative hypothesis.

$H_a$: $\mu \neq 80\%$

(c) Should you accept or reject the null hypothesis.

$SE = \frac{s}{\sqrt{100}} = .08$  

$z_{a/2} = 1.96$

Null region: [80]

Acceptance region for $H_0 = $ $\mu \pm (1.96)SE = 80 \pm (1.96)(.08) = [79.8432, 80.1568]$  

79.7 $\not\in$ acceptance interval for $H_0$: reject $H_0$.  

$p$-value $\approx 0$