Assignment #10

6.24 $n = 64$, $\bar{x} = 0.323$, $s^2 = 0.034$

a. H_0: $\mu = 0.36$
   H_a: $\mu < 0.36$
   $\alpha = 0.10$
   Rejection Region: $z < z_{0.10} = -1.28$
   $$z = \frac{0.323 - 0.36}{(\sqrt{0.034})/(\sqrt{64})} \approx -1.605$$
   z is in the rejection region; so we reject H_0 at the 0.10 level of significance. There is sufficient evidence to suggest the mean is less than 0.36 at the $\alpha = 0.10$ level.

b. H_0: $\mu = 0.36$
   H_a: $\mu \neq 0.36$
   Rejection Region: $z < z_{0.05} = -1.645$ or $z > z_{0.05} = 1.645$
   $$z = \frac{0.323 - 0.36}{(\sqrt{0.034})/(\sqrt{64})} \approx -1.605$$
   z is not in the rejection region; so we cannot reject H_0 at the 0.10 level of significance. There is insufficient evidence to suggest the mean is different from 0.36 at the $\alpha = 0.10$ level.

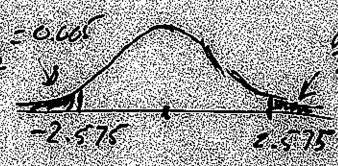
6.26

a. The rejection for this the one-tailed test at a significance level of $\alpha = 0.01$ is $z < -2.33$.

b. The test statistic is $z = \dfrac{19.3 - 20}{11.9/\sqrt{46}} \approx -0.399$

c. z is not in the rejection region; so we cannot reject the null hypothesis. We cannot reject the claim that the mean number of gloves used per week is 20; nor do we have sufficient evidence to accept that the mean number of gloves used per week is less than 20.

6.30 H_0: $\mu = 0$
H_a: $\mu \neq 0$ $\alpha = 0.01$
$\alpha/2 = 0.005$



Our rejection region is
$z \geq 2.575$ or $z \leq -2.575$

Our test statistic is $z = \dfrac{\bar{x} - \mu_0}{\sigma_{\bar{x}}} \approx \dfrac{-1.6 - 0}{13.3/\sqrt{246}} \approx -1.86$

Since the value of the test statistic does not fall in the rejection region, Ho is not rejected. There is insufficient to indicate the true mean error is different from 0 at $\alpha = 0.01$.

6.3 #6.38 Reject H_0 for (c), (d), (f)

6.3 #6.40 H_0 would be rejected for $\alpha \geq 0.061$

6.3 #6.44

$H_0: \mu = 10$
$H_a: \mu \neq 10$
$n = 50$
$\bar{x} = 10.7$
$s = 3.1$

$$z = \frac{\bar{x} - \mu_0}{\sigma_{\bar{x}}} \approx \frac{\bar{x} - 10}{s/\sqrt{n}} \approx \frac{10.7 - 10}{3.1/\sqrt{50}}$$

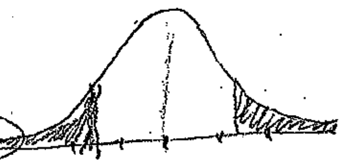
$z \approx 1.5967$

p-value $= P(z < -1.5967$ or $z > 1.5967)$

p-value $\approx 2(0.0552)$

p-value ≈ 0.1104

No evidence to reject H_0 at $\alpha = 0.10$ level.



6.3 #48 $H_0: \mu = 25000$

a) $H_a: \mu \neq 25000$

b) p-value = 0.014. If H_0 is true the probability we would obtain a sample with $\bar{x} = 9.26$ and $s = 1.2$ is 0.014.

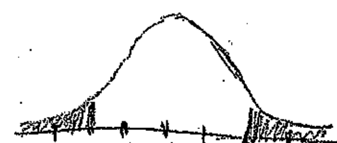
c) Since p-value $< \alpha = 0.05$ we reject the null hypothesis. Hence we have sufficient evidence to accept that the mean price differs from \$25,000 at the 0.05 level.

d) Since p-value $> \alpha = 0.01$ we would not reject H_0. We would have insufficient evidence to conclude $\mu \neq 25000$.

6.4 #56

a) 

b) 

c) 

a) $P(t > 1.44) = 0.10$, df = 6

b) $P(t < -1.782) = 0.05$, df = 12

c) $P(t < -2.06) = P(t > 2.06) = 0.025$, df = 25

6.4 #60

7, 3, −1, 5, 1, 2

a) $H_0: \mu = 3$ $\quad \alpha = 0.05$ $\quad t = -1.40$

$H_a: \mu < 3$ $\quad \bar{x} = 1.8333$ $\quad p = 0.1102$

$\alpha = 0.05$ $\quad s = 2.0412$

$n = 6$ $\quad$ (Rejection Region: $t < -2.105$)

Since p-value = 0.1102 > α = 0.05 ⇒ Don't reject H_0.

b) p-value = 0.2204 > α = 0.05. So, we don't reject H_0 (Rejection Region: $t < -2.571$ or $t > 2.571$)

6.4 #64

a) $H_0: \mu = 2.5$ $\quad t = -2.46$

$H_a: \mu \neq 2.5$ $\quad p = 0.023$

$\alpha = 0.10$

Since the p-value = 0.023 < α = 0.10 we reject H_0. Hence we can conclude, at the 0.10 level, that the true mean number of suicide bombings for Al Qaeda againsts the US differs from 2.5

b) The 90% CI is (1.407, 2.307) and that interval does not include 2.5. So, we reject H_0. Hence, we can conclude at the $\alpha = 0.10$ level that the true mean number of sucide bombings for Al Qaeda attacks on the US differs from 2.5

c) Yes, the inferences in parts (a) and (b) agree. We used the same significance level and the same statistics in each case.

d) We must assume the population distribution is approximately normal.

e) The graph is skewed to the right and the normal probability plot looks suspicious. The sampling distribution might be normal.