Ch.8 a

Q15

a. 1.42
$p - value = 1 - z\ score$
$z\ score\ at\ 1.42 = .9222$
$p - value = 1 - .9222$
$\underline{p - value = .0778}$

b. .90
$p - value = 1 - z\ score$
$z\ score\ at\ .90 = .8159$
$p - value = 1 - .8159$
$\underline{p - value = 0.1841}$

c. 1.96
$p - value = 1 - z\ score$
$z\ score\ at\ 1.96 = .975$
$p - value = 1 - .975$
$\underline{p - value = 0.0250}$

d. 2.48
$p - value = 1 - z\ score$
$p - value = 1 - .9934$
$\underline{p - value = .0066}$

e. -.11
$p - value = 1 - z\ score$
$z\ score\ at - .11 = P(z > -.11) = 1 - P(z < .11) = 1 - 0.4562 = 0.5438$
$\underline{p - value = .5438}$

16.

a) $P - value = P(Z < -2.10\ or\ Z > 2.10)$

$= 2 * P(|z| > 2.10)$

$= 2 * [1 - P(z \leq 2.10)]$

$= 2 * (1 - 0.9821)$

$= 2 * 0.0179$

$= 0.0358$

b) $P - value = P(Z < -1.75\ or\ Z > 1.75)$

$= 2 * [1 - P(z \leq 1.75)]$

$= 2 * 0.0401$

$= 0.0802$

c) $P - value = P(Z < -.55\ or\ Z > .55)$

$= 2 * [1 - P(|z| \leq .55)]$

$= 2 * [1 - 0.7088]$

$= 2 * 1 - 0.2912$

$p - value = 0.5824$

d) $P - value = P(Z < 1.41 \text{ or } Z > 1.41)$

$= 2 * [1 - P(|z| > 1.41)]$

$= 2 * [1 - P(z \leq 1.41)]$

$= 2 * 0.0793$

$p - value = 0.1586$

e) $P - value = P(Z < -5.3 \text{ or } Z > 5.3)$

$= 2 * [1 - P(|z| > 5.3)]$

$= 2 * [1 - P(z \leq 5.3)]$

$= 2 * (1 - 1)$

$p - value = 0$

18.

a) $Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

$Z = \frac{72.3 - 75}{9/\sqrt{25}}$

$Z = \frac{-2.7}{1.8}$

$Z = -1.5$

b) $P - value = P(Z < -1.5)$

$= 1 - P(Z < 1.5)$

$= 1 - 0.9332$

$= 0.0668$

$\therefore Since, .0668 \text{ is greater than } .002 \text{ we reject the null hypothesis}$

19.

a) $Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

$Z = \frac{94.32 - 95}{1.2/\sqrt{16}}$

$Z = -2.267$

$P(Z = -2.267) = .0234$

p-value is greater than 0.01 hence we don't not reject H_0

24.

n = 58

$\bar{x} = 191$

S = 89

$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

$Z = \frac{191 - 153}{89/\sqrt{58}}$

$$Z = \frac{38}{11.6863}$$

$$Z = 3.25$$

$$P - value = P(Z > 3.25)$$

$$= 1 - P(Z \leq 3.25)$$

$$= 1 - 0.9994$$

$$= .0006$$

Since P-value is less than significance we reject the null hypothesis

25.

$$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$$

$$Z = \frac{1.95 - 2}{.2/\sqrt{52}}$$

$Z = -1.80$ -> it is greater than -2.33 thus we do not reject the null hypothesis

$$P - value = P(Z \leq z)$$

$$= P(Z \leq -1.80)$$

$$= 0.0359$$

The P-value is greater than the level of significance (0.01) thus we do not reject the null hypothesis

29.

a) N = 13 t = 1.6 $\alpha = 0.05$
$\frac{\alpha}{2} = \frac{0.05}{2}$
$\alpha = .025$
The t significant value from the table A corresponding to row 12 degrees of freedom and column
$\alpha = .025$ is 2.179. Since t-calculated value (1.6) is less than t-significant value (2.179), the Null hypothesis is not rejected.

b) N = 25 t = -1.6 $\alpha = 0.01$
$\frac{\alpha}{2} = \frac{0.01}{2}$
= 0.005
$\alpha = .025$ is 2.179. Since t-calculated value (1.6) is less than t-significant value (2.179), the Null hypothesis is not rejected.

c) N = 13 t = -2.6 $\alpha = 0.01$
$\frac{\alpha}{2} = \frac{0.01}{2}$
= 0.005
$\alpha = .005$ is 2.797. Since t-calculated value (-2.6) is less than t-significant value (2.179), the Null hypothesis is not rejected.

d) N = 25 t = -3.9

$\alpha = .0005$ is 3.745. Since t-calculated value (3.9) is greater than t-significant value (3.745), the Null hypothesis is rejected.

30.

b.

$n = 15, t = -3.1, \alpha = 0.01$

$\therefore p - value = P(t < -3.1) = 0.0039$

Since the p value is less than significance level, we reject the null hypothesis and conclude that the true average is less than 7.0

c.

$n = 12, t = -1.3, \alpha = 0.05$

$\therefore p - value = P(t < -1.3) = 0.1101$

Since the p value is greater than the significance level we fail to reject the null hypothesis

e.

$n = 6, \bar{x} = 6.68, \frac{s}{\sqrt{n}} = 0.0820$

$\therefore p - value = P\left(t < \frac{6.68 - 7}{0.0820}\right) = P(t < -3.90) = 0.0057$

Since the p-value is less than the significance level, we therefore, reject the null hypothesis and conclude that the average pH is less than 7.0

34.

a)

30.0000 hypothesized value
31.23 mean
.6890 standard deviation
.2813 standard error
6 n
5 df
4.38 t
.0036 is the p-value
30.0992 confidence interval 99% lower
32.3674 confidence interval 99% upper
1.1341 margin of error
$\alpha = 0.01$
$p - value = (0.0036) < \alpha (= 0.01)$
$\therefore$ *The true average stopping distance exceeds the maximum value.*