7.1.2

Random variable - Total number of complaints that are recorded from the Alaska theft records.

Population parameter - Consumer complaint proportion recorded from the Alaska's identity theft records.

<u>hypothesis</u>

$H_0: P = 0.23$ against
$H_a: P < 0.23$.

7.1.6

Type I error in this case would imply that the complaint proportion that involved identity theft in Alaska is less than 23% when the value is actually 23%. This would therefore result in the Federal Trade Commission perceiving identity theft as no problem when it actually is.

Type II error in this case is accepting that the complaints recorded 23% in 2007 involved identity theft when we actually to accept the alternate hypothesis. The effect of type II error is that the Federal Trade Commission would put too much effort to solve the identity theft issue than they actually should.

The appropriate alpha to use is 1%

7.2.4

let X be identity of theft complaints.
K be consumer complaints.

$X = 321$, $P = 23\% = 0.23$ $\alpha = 0.05$ $K = 1432$.

$\hat{P} = X/K = 321/1432 = 0.22416 \simeq 0.2242. \simeq 0.22$

$\mu_{\hat{p}} = 0.23$ $\quad \delta_{\hat{p}} = \sqrt{\frac{(0.23 \times 0.77)}{1432}} = 0.01112.$

$Z = \frac{(P - \hat{p})}{\delta_{\hat{p}}}$ $\quad Z = \frac{\bar{x} - \hat{\mu}}{\delta_{\hat{p}}} = \frac{(0.22 - 0.23)}{0.01112} = 0.522$

$Z_{tab} = 0.301$

0.301 > 0.05. We accept the null hypothesis so there is not enough evidence to support that the identity theft complaints in Alask are below 23%.

7.2.6.

$x = 507$.
$n = 32601$
$\alpha = 0.01$

$\hat{P}_1 = \frac{507}{32601} = 0.0156$.

$\hat{P}_2 = \frac{1}{88} = 0.0114$.

$H_0 : P_1 = P_2$ against
$H_a : P_1 > P_2$.

$$Z = \frac{0.0156 - 0.0114}{\sqrt{0.0156(1-0.0156)\left(\frac{1}{32601} + \frac{1}{88}\right)}} = 0.318.$$

from the statistical tables,

$P(Z > 0.318) = 0.375$

0.375 > 0.01. We accept the null hypothesis

7.3.6.

From excel
$\mu \bar{x} = 43.873$.
$s = 9.071$
$n = 26$.

$H_0 : m = 60.29$ against
$H_a : m < 60.29$

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

$\frac{60.29 - 43.873}{9.071/\sqrt{26}} = -9.3.$

from the statistical tables we get 0.00.

$0.00 < 0.05$. We reject the null hypothesis.

7.3.8.

X	$X-\bar{X}$	$(X-\bar{X})^2$
19	-7.33	53.73
30	3.67	13.47
20	-6.33	40.07
19	-7.33	53.73
29	2.67	7.13
25	-1.33	1.77
21	-5.33	28.41
24	-2.33	5.43
50	23.67	560.27
237		764.01

$237/9 = 26.33$

$\bar{X} = 26.33$

Variance = $Var(X) = \frac{764.01}{9} = 84.89$

$s = \sqrt{84.89} = 9.21$

$H_0: P = 18.125$
$H_a: P > 18.125$.

$$Z = \frac{\bar{X} - \mu}{s/\sqrt{n}} = \frac{26.33 - 18.125}{9.21/\sqrt{9}} = 2.74$$

From the tables $Z_{tab} = 0.9959$.

$0.9959 > 0.05$

We accept the null hypothesis.

8.1.4

Increasing the sample size makes the confidence narrow small and vise versa.

8.1.8

A 95% confidence interval means that ~~at~~ 95% of the American population involved in the poll believe that it is the governments responsibility to provide health care, the level of significance.

8.2.6.

$n = 32601 \quad x = 507$

$$x/n = \frac{507}{32601} = 0.0161 \simeq 0.016.$$

$$= 1 - 0.016 = 0.984.$$

$$E = 2.576\sqrt{\frac{0.016 \times 0.984}{3260}} = 0.00567$$

$$0.016 - 0.00567 = 0.01033.$$
$$0.016 + 0.00567 = 0.02167$$

$$0.01033 < P < 0.02167$$

8.3.6. $\mu = 43.873 \quad s = 9.071 \quad n = 26.$

$$\bar{X} + z \times s/\sqrt{n}$$

$$43.873 \pm \left\{1.96 \times 9.071/\sqrt{26}\right\}$$

$$43.873 \pm 3.486 = 47.359$$
$$43.873 - 3.486 = 40.387$$

$$40.387 < X < 47.359$$