HOMEWORK-7

(43)

(a) Sampling Distribution

$n = 50$

Mean = \$6883

S.D. = \$2000

$$S.E = \frac{\sigma}{\sqrt{n}} = \frac{2000}{\sqrt{50}} = 282.84$$

So, The Sample Mean of Sampling Distribution is 282.84 units away from the Popⁿ Mean of 6883

(43)

(b) Let $\bar{x}$ be the Sample Mean

Then $\bar{x}$ is normally distributed with Mean \$6883 and Standard Deviation $\sigma/\sqrt{n} = 2000/\sqrt{50} = 282.84$

Therefore $Z = \frac{(\bar{x} - 6883)}{282.84}$ follows a Std. Normal Distribution

Prob (Sample Mean within +/- 300 of the Popⁿ Mean)

$= P[6583 < \bar{x} < 7183]$

$= P[(6583 - 6883)/282.84 < (\bar{x} - 6883)/282.84 < (7183 - 6883)/282.84]$

$= P[-1.0677 < Z < 1.0677]$

$= P[Z < 1.0677] - P[Z < -1.0677]$

$= 0.8556 - 0.1444$

$= \underline{0.7112}$

43 (c) $P[\bar{X} > 7500]$

$= P(\bar{X} - 6883)/282.84 > (7500 - 6883)/282.$

$= P[Z > 2.1814]$

$= 1 - P[Z < 2.1814]$

$= 1 - 0.9854$

$= \underline{0.0146}$

Yes, I would question the Sample because 7500 is way above = 6883 + (282.84)
Popn Mean. S.E

(47) (a) Firm A =

$$\sigma_{\bar{p}} = \sqrt{\frac{N-n}{N-1}} * \sqrt{\frac{p(1-p)}{n}}$$

FIRM A

$N = 2000, \quad n = 50, \quad \sigma = 144$

$$\sigma_{\bar{x}} = \frac{144}{\sqrt{50}}$$

$$S.E = \frac{\sigma}{\sqrt{n}} \times \sqrt{\frac{N-n}{N-1}}$$

$$\sigma_{\bar{x}} = \frac{144}{\sqrt{50}} \times \sqrt{\frac{2000-50}{2000-1}} = \underline{20.11}$$

FIRM B

$N = \cancel{500}\ 5000, \quad n = 50, \quad \sigma = 144$

$$\sigma_{\bar{x}} = \sqrt{\frac{5000-50}{5000-1}} \left(\frac{144}{\sqrt{50}} \right) = \underline{20.26}$$

FIRM C

$N = 10000, \quad n = 50, \quad \sigma = 144$

$$\sigma_{\bar{x}} = \sqrt{\frac{10000-50}{10000-1}} \left(\frac{144}{\sqrt{50}} \right) = \underline{20.31}$$

(47) (b)

FIRM A

$$z = \bar{A} - \mu_{\bar{A}}$$

$$z = \frac{25}{20.11}$$

$$z = 1.24 \sim P = 0.8925 \sim \underline{89\%}$$

So probability that sample mean of firm A within ± 25 of the population mean $= 0.8925$

FIRM B

$$z = \frac{25}{20.26} = 1.23 \sim \underline{0.8907}$$

FIRM C

$$z = \frac{25}{20.31} = 1.23 \sim P = \underline{0.8907}$$

(53) (a) Mean $= 0.15$

Std. Deviation $= \sqrt{\frac{pq}{n}}$

$= \sqrt{\frac{0.15 \times 0.85}{150}}$

$= \underline{0.0292}$

(53) (b) P (Sample prop. within $\pm$ 0.03 of pop^n prop)

$\Rightarrow \frac{0.03}{0.0292} = \underline{1.0290}$

$\Rightarrow \frac{-0.03}{0.0292} = \underline{-1.0290}$