CH7.1 do not due HW

32. a. $E(\bar{p}) = .40$

$$\sigma_{\bar{p}} = \sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{.40(.60)}{200}} = .0346$$

Within $\pm$ .03 means $.37 \le \bar{p} \le .43$

$$z = \frac{\bar{p} - p}{\sigma_{\bar{p}}} = \frac{.03}{.0346} = .87 \qquad P(z \le .87) = .8078$$

$P(z < -.87) = .1922$

$P(.37 \le \bar{p} \le .43) = .8078 - .1922 = .6156$

b. $z = \frac{\bar{p} - p}{\sigma_{\bar{p}}} = \frac{.05}{.0346} = 1.44 \qquad P(z \le 1.44) = .9251$

$P(z < -1.44) = .0749$

$P(.35 \le \bar{p} \le .45) = .9251 - .0749 = .8502$

34. a. $\sigma_{\bar{p}} = \sqrt{\dfrac{(.30)(.70)}{100}} = .0458$

Within ± .04 means $.26 \le \bar{p} \le .34$.

$$z = \frac{\bar{p} - p}{\sigma_{\bar{p}}} = \frac{.04}{.0458} = .87 \qquad P(z \le .87) = .8078$$

$P(z < -.87) = .1922$

$P(.26 \le \bar{p} \le .34) = .8078 - .1922 = .6156$

b. $\sigma_{\bar{p}} = \sqrt{\dfrac{(.30)(.70)}{200}} = .0324$

$$z = \frac{\bar{p} - p}{\sigma_{\bar{p}}} = \frac{.04}{.0324} = 1.23 \qquad P(z \le 1.23) = .8907$$

$P(z < -1.23) = .1093$

$P(.26 \le \bar{p} \le .34) = .8907 - .1093 = .7814$

c. $\sigma_{\bar{p}} = \sqrt{\dfrac{(.30)(.70)}{500}} = .0205$

$$z = \frac{\bar{p} - p}{\sigma_{\bar{p}}} = \frac{.04}{.0205} = 1.95 \qquad P(z \le 1.95) = .9744$$

$P(z < -1.95) = .0256$

$P(.26 \le \bar{p} \le .34) = .9744 - .0256 = .9488$

d. $\sigma_{\bar{p}} = \sqrt{\dfrac{(.30)(.70)}{1000}} = .0145 \quad z = \dfrac{\bar{p} - p}{\sigma_{\bar{p}}} = \dfrac{.04}{.0145} = 2.76 \qquad P(z \le 2.76) = .9971$

$P(z < -2.76) = .0029$

$P(.26 \le \bar{p} \le .34) = .9971 - .0029 = .9942$

e. With a larger sample, there is a higher probability $\bar{p}$ will be within $\pm$ .04 of the population proportion p.

39. a. $np = 200(.80) = 160$ and $n(1 - p) = 200(1 - .80) = 40$, so $\bar{p}$ is normal distributed normal distribution with $E(\bar{p}) = p = .80$ and

$$\sigma_{\bar{p}} = \sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{(0.80)(1-0.80)}{200}} = 0.0283$$

b. $$z = \frac{\bar{p} - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{.84 - .80}{\sqrt{\frac{.80(1-.80)}{200}}} = \frac{0.04}{0.0283} = 1.41$$

$$P(z \leq 1.41) = .9207$$

$$P(z < -1.41) = .0797$$

$$P(.76 \leq \bar{p} \leq .84) = P(-1.41 \leq z \leq 1.41) = .9207 - .0797 = .8410$$

c. $np = 450(.80) = 360$ and $n(1 - p) = 450(1 - .80) = 90$, so $\bar{p}$ is normal distributed normal distribution with $E(\bar{p}) = p = .80$ and

$$\sigma_{\bar{p}} = \sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{(0.80)(1-0.80)}{450}} = 0.0189$$

d. $$z = \frac{\bar{p} - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{.84 - .80}{\sqrt{\frac{.80(1-.80)}{450}}} = \frac{0.04}{0.0189} = 2.12$$

$$P(z \leq 2.12) = .9830$$

$$P(z < -2.12) = .0170$$

$$P(.76 \leq \bar{p} \leq .84) = P(-2.12 \leq z \leq 2.12) = .9830 - .0170 = .9660$$

e. The probability of the sample proportion being within .04 of the population mean is increased .8410 to .9660. The likelihood of the sample proportion being within 0.04 of the population proportion increases by .125 by increasing the sample size from 200 to 450. If the extra cost of using the larger sample size is not too great, we should probably do so.