

5.28

$$p = .5 \quad \sigma^2 = (.5)(.5)(6,000,000) = 1,500,000$$

$$\mu = (.5)(6,000,000) = 3,000,000$$

$$\sigma = 1,224.74$$

$$P(|X - \mu| \leq 300) = P\left(\frac{-300}{1,224.74} \leq Z \leq \frac{300}{1,224.74}\right)$$

$$= P(-.25 \leq Z \leq .25)$$

$$= (1 - .4013) - .4013 = .1974$$

$$p = .501$$

$$\sigma^2 = (.501)(.499)(6,000,000) = 1,499,994$$

$$\sigma = 1,224.74$$

Approx. same as when $p = .5$

5.16, 5.18, 5.20, 5.22, 5.24, 5.28

Tjims

5.16

$$p = \frac{18}{178}$$

$$\mu = \left(\frac{18}{178}\right)(2,500) = 1,184$$

$$\sigma^2 = \left(\frac{18}{178}\right)\left(\frac{20}{178}\right)(2,500) = 623.27$$

$$\sigma = 24.965$$

$$P(X \leq 1,105) = 1 - P(X > 1,105) = 1 - P\left(Z > \frac{1,105 - 1,184}{24.965}\right)$$

$$= 1 - P(Z > -3)$$

$$= \Phi(3) = \boxed{.0044}$$

5.18

$$\mu = 1,050 \quad \sigma^2 = 1,050 \quad \sigma = 32.404 \quad X = 920$$

$$P(X \leq 920) = P\left(Z \leq \frac{920 - 1,050}{32.404}\right) = P(Z \leq -4.0118)$$

$$= P(Z \geq 4.0118)$$

$$\approx \boxed{.0001}$$

5.20

$$p = \frac{10}{6\pi} \quad \mu = \left(\frac{10}{6\pi}\right)(3,408) = 1808.02$$

$$P(X \geq 1808.02) = P\left(Z \geq \frac{1808.02 - 1808}{\sigma}\right) = P\left(Z \geq \frac{.02}{\sigma}\right)$$

This is very accurate unless the variance is very small.

5.22

$$\mu = (52)(2.93333) = 152.53 \quad X = 162$$

$$\sigma^2 = (1.32879)^2(52) = 91.83 \quad \sigma = 9.58$$

$$P(X \geq 162) = P\left(Z \geq \frac{162 - 152.53}{9.58}\right) = P(Z \geq .99)$$

$$= \boxed{.1611}$$

5.24

The small hospital will be smaller because the variance

Small Hospital

$$25 \cdot .6 = 15$$

$$\mu = 12.5$$

$$\sigma^2 = 12.5 \quad \sigma = 3.536$$

$$P(X \geq 15) = P\left(Z \geq \frac{15 - 12.5}{3.536}\right)$$

$$= P(Z \geq .71)$$

$$= .2389$$

Large hospital

$$75 \cdot .6 = 45 = X$$

$$\mu = 37.5$$

$$\sigma^2 = 37.5 \quad \sigma = 6.124$$

$$P(X \geq 45) = P\left(Z \geq \frac{45 - 37.5}{6.124}\right)$$

$$= P(Z \geq 1.22)$$

$$= .112$$