4.2.18 If $P(X = 0) = e^{-\lambda}\lambda^0/0! = e^{-\lambda} = \dfrac{1}{3}$, then $\lambda = 1.10$. Therefore, $P(X \geq 2) = 1 - P(X \leq 1) =$ $1 - e^{-1.10}(1.10)^0/0! - e^{-1.10}(1.10)^1/1! = 0.301$.

4.2.22 If $P(X = 1) = P(X = 2)$, then $e^{-\lambda}\lambda^1/1! = e^{-\lambda}\lambda^2/2!$, which implies that $2\lambda = \lambda^2$, or, equivalently, $\lambda = 2$. Therefore, $P(X = 4) = e^{-2}2^4/4! = 0.09$.

4.3.10 a) Let X = number of shots made in next 100 attempts.

Since $p = P(\text{attempt is successful}) = 0.70$, $P(75 \le X \le 80) =$

$$\sum_{k=75}^{80} \binom{200}{k} (0.70)^k (0.30)^{200-k}.$$

b) With $np = 100(0.70) = 70$ and $np(1-p) = 100(0.70)(0.30) = 21$, $P(75 \le X \le 80) =$

$$P(74.5 \le X \le 80.5) = P\left(\frac{74.5-70}{\sqrt{21}} \le \frac{X-70}{\sqrt{21}} \le \frac{80.5-70}{\sqrt{21}}\right) = P(0.98 \le Z \le 2.29) =$$

0.1525.

4.3.2 a) $0.9808 - 0.5000 = 0.4808$

b) $0.4562 - 0.2611 = 0.1951$

c) $1 - 0.1446 = 0.8554 = P(Y < 1.06)$

d) 0.0099

e) $P(Z \geq 4.61) < P(Z \geq 3.9) = 1 - 1.0000 = 0.0000$