Problem 3.4-6

From the information given in the problem we have

\[
\frac{1}{100} = \frac{\lambda}{50}
\]

which implies that \( \lambda = \frac{1}{2} \). In particular, the probability mass function is

\[
f(x) = \frac{\frac{1}{2} e^{-\frac{1}{2}}}{x!}
\]

for \( x = 0, 1, 2, \ldots \).

To find the probability that there are zero flaws, we compute \( f(0) \).

\[
f(0) = \frac{\frac{1}{2} e^{-\frac{1}{2}}}{0!} = e^{-\frac{1}{2}} = 0.607
\]

Problem 3.4-7

To use the Poisson Distribution to approximate the binomial, we let

\[
\lambda = np = (2000)(0.001) = 2
\]

Then using the cumulative distribution function for the Poisson Distribution (p. 652 or your calculator),

\[
P(Y \leq 4) = F(4) = 0.947
\]

Problem 3.4-9

To use the Poisson Distribution to approximate the binomial, we let

\[
\lambda = np = (100)(0.1) = 10
\]

Then using the cumulative distribution function for the Poisson Distribution (p. 652 or your calculator),

a. \( P(3 \leq X \leq 7) \)

\[
P(3 \leq X \leq 7) = F(7) - F(2) = 0.220225 - 0.002769 = 0.217452 \approx 0.217
\]

b. \( P(X \geq 5) \)

\[
P(X \geq 5) = 1 - P(X \leq 4) = 1 - F(4) = 1 - 0.029253 = 0.971
\]