4. Let \( V \) be a random variable defined by
\[
V = \begin{cases} 
1 & \text{with probability } p \\
0 & \text{with probability } 1 - p.
\end{cases}
\]
Then,
\[
E(X) = E(V) = \sum_{v=0}^{1} v \cdot P(V = v) = 1 \cdot P(V = 1) + 0 \cdot P(V = 0) = E(V) = P(V = 1).
\]

5. The probability that a page should be retried is
\[
p = 1 - e^{-\lambda T} = 1 - e^{-\lambda T / 2} = e^{\lambda T / 2}.
\]

6. Note that
\[
M_{X}(\theta) = E(e^{\theta X}) = \sum_{x=n}^{\infty} e^{\theta x} P(X = x) = \sum_{x=n}^{\infty} e^{\theta x} \lambda^{x} e^{-\lambda} / x! = \frac{\lambda}{\lambda - \theta}.
\]

7. The probability density function of \( X \) is given by
\[
f(x) = \begin{cases} 
\frac{\theta}{\lambda} e^{-\lambda x} & 0 < x < \lambda \\
0 & \text{otherwise}.
\end{cases}
\]

8. Since \( X + Y \) is in Poisson with parameter \( \lambda + \mu \) and \( X \) and \( Z \) in Poisson with parameter \( \lambda + \mu + \nu \), we have that
\[
P(Y \mid X + Y = z) = \frac{P(Y = y, X + Y = z)}{P(X + Y = z)} = \frac{e^{-\lambda - \mu - \nu} (\lambda + \mu + \nu)^{z-y}}{(z-y)!}.
\]

9. Let \( X \) be the remaining calling time of the person in the booth. Let \( Y \) be the calling time of the person before Mr. Wallace. By the memoryless property of exponential, \( X \) is exponential with parameter \( 1/\lambda \). Since \( X \) is also exponential with parameter \( 1/\lambda \), assuming that \( X \) and \( Y \) are independent, the waiting time of Mr. Wallace, \( X + Y \) is gamma with parameters \( 1/\lambda \) and \( 1/\lambda \). Therefore,
\[
P(X + Y \geq x) = \int_{x}^{\infty} \frac{\lambda e^{-\lambda x}}{x^{2}} dx = \frac{\lambda}{x^{2}} = 0.558.
\]