Definition: Let X be the number of letter's addresses that the machine fails to correctly read.
Distribution: $X \sim$ Binomial (n=4000, p=0.0021)
Probability: $P\ (X \geq 10)$

a) **Justification:** The Poisson approximation is appropriate when n is large, and p is small such that λ=np is moderate. Here, n=4000 and p=0.0021, giving λ=4000×0.0021=8.
   Probability Calculation: $P\ (X \geq 10) \approx 1 - P\ (X \leq 9)$

   ```
   lambda <- 4000 * 0.0021
   prob <- 1 - ppois(9, lambda=lambda)
   prob
   [1] 0.3340803
   ```

   Poisson Approximation: $P\ (X \geq 10) \approx 0.3340803$

b) The normal approximation is appropriate when np > 5 and n(1-p) > 5.
   Checking: np = 4000 * 0.0021 = 8.4 (which is > 5)
   n(1-p) = 4000 * 0.9979 = 3991.6 (which is > 5)
   Therefore, the normal approximation is appropriate.
   Mean (μ) = np = 8.4

   $$\sqrt{np(1-p)} = \sqrt{(4000 * 0.0021) * (1 - 0.0021)}$$

   Standard deviation (σ) = √(np(1-p)) = √ (8.4 * 0.9979) ≈ 2.895230

   With continuity correction, we calculate P (X ≥ 9.5) instead of P(X ≥ 10):

   ```
   > 1 - pnorm(9.5, mean = 8.4, sd = 2.895230)
   > [1] 0.3519967
   ```
   Normal Approximation with Continuity Correction: $P\ (X \geq 9.5) \approx 0.3519967$

c) Using the same mean and standard deviation as in (b), but without continuity correction:

   ```
   > 1 - pnorm(10, mean = 8.4, sd = 2.895230)
   > [1] 0.2902573
   ```

   Normal Approximation without Continuity Correction: $P\ (X \geq 10) \approx 0.2902573$

d) Calculating the true probability using R's binomial CDF:
   ```
   > 1 - pbinom(9, size = 4000, prob = 0.0021)
   > [1] 0.3339988
   ```

   True Probability (Binomial CDF): $P\ (X \geq 10) = 0.3339988$

   Therefore, by comparison of the values from a,b and c that the value from (a) or Poisson approximation (0.3340803) was the closest to the true value (d) (0.3339988).