

American University of Beirut

STAT 230

*Introduction to Probability and Random Variables
Spring 2010*

quiz # 2

1. It is known that 30% of all calls coming into a telephone exchange are long-distance calls. Find the probability that the first long-distance call is among the first 50 coming calls.
2. A certain typing agency employs two typists. The average number of errors per article is 3 when typed by the first typist and 4.5 when typed by the second typist. If your article is equally likely to be typed by either typist, find the probability that it will have exactly one error.
3. The probability that a machine produces a defective item is 0.01. Each item is checked as it is produced. Approximate the probability that at least 3 items are defective among the next 120 items checked.
4. The number of years a radio functions is exponentially distributed with parameter $\lambda = \frac{1}{8}$. If Sam buys a used radio, find the probability that it will be working after an additional 8 years.
5. A town has 2 fire engines operating independently. The probability that a specific engine is available when needed is 0.96. Find the probability that at least one fire engine is available when needed.
6. You arrive at a bus stop at 10 o'clock, knowing that bus will arrive at some time uniformly distributed between 10 and 10:30. If at 10:15 the bus has not arrived yet, what is the probability that you will have to wait at least an additional 10 minutes ?
7. A roulette wheel has 18 red cases and 20 black cases. Suppose that you continue to make \$5 bet on red until you win 4 of these bets.

- i Find the probability that you place a total of 9 bets.
- ii Find your expected winning when you stop.

8. Let X be a random variable with pdf

$$f(x) = 3x^2, \quad 0 < x < 1$$

- i Find $F(x)$, the cdf of X .
 - ii Find $E(X^n)$.
9. Sam and Jad play a game in which Sam's chance of winning is $\frac{2}{3}$. Suppose that if Jad win a game then Sam must pay him 1 \$, and that if Sam win a game then Jad must pay him 0.75 \$. Find the expected gain of Jad in a series of 50 such games, supposedly independent.