University of Arkansas at little Rock
Department of Systems Engineering

SYEN 3314 Probability and Random Signals
Summer 2009

Quiz 2
Wednesday, June 24, 2009

- This is a closed book Quiz.
- Calculators are not allowed.
- The quiz has 3 questions to be answered in 15 mn
- Please be neat, we cannot grade what we cannot decipher.

Name

Question 1

Let X be a noise voltage that is uniformly distributed in $S_X = \{-3, -1, +1, +3\}$ with $p_X(k) = \frac{1}{4}$ for $k \in S_X$. Let $Z = X^2$. Find

1. PMF of Z, $P_Z(z)$
2. E[Z]

Question 2

The cumulative distribution function of the random variable X is

$$F_X(x) = \begin{cases} 0, & x < 0; \\ \text{x}/4, & 0 \leq x \leq 4; \\ 1, & x > 4. \end{cases}$$

Calculate the following probabilities

1. $P[Y \leq 1]$
2. $P[2 < Y \leq 3]$
3. $P[Y \leq 1]$
4. $P[Y > 1.5]$

Question 3

Random variable X has probability density function

$$f_X(x) = \begin{cases} cxe^{-x/2}, & x \geq 0; \\ 0, & \text{otherwise.} \end{cases}$$

Find the following

1. the constant c
2. $P[0 \leq X \leq 4]$
3. The CDF $F_X(x)$
4. $P[-2 \leq X \leq 2]$