

COMER
November 10, 2015

ECE 600 Exam 2

1. Enter your name and signature in the space provided below. Your signature indicates that you have not received any assistance from notes or other references, or from other students, during the exam.
2. You may not use a calculator or any other reference materials.
3. Partial credit will be given, at the discretion of the instructor. You must clearly justify your solution to receive full credit.

Name:

Signature:

1. (25 points) Let Θ be a continuous random variable that is uniformly distributed on $[-\pi, \pi]$ and let $X = \sin \Theta$. Find the cdf of X .

2. (25 points) If X and Y are independent exponential random variables with means μ_X and μ_Y , find $E[|X - Y|]$. Note that an exponential random variable X with mean μ has probability density function $f_X(x) = \frac{1}{\mu} \exp(-\frac{x}{\mu})$.

3. (25 points) Let X and Y be independent random variables that are uniformly distributed in $[-1, 1]$. Find the following probabilities:
- (a) $P(XY < 1/2)$.
 - (b) $P(\max(X, Y) < 1/3)$.

4. (25 points) Let X and Y be two discrete random variables with joint probability mass function $p_{XY}(x_k, y_j)$ for $k = 0, 1, \dots; j = 0, 1, \dots$. We say that $X \geq Y$ if $P(X \geq Y) = 1$. Show that if $X \geq Y$, then $E[X] \geq E[Y]$.

SCRAP PAPER