Homework 6 – Due 5/11 at 9 AM Eastern Time – Prepared by Michael Wacey

Note that Var(aX+b)=a^2 \* Var(X)

Problem 4 – not converging is valid

1. Let X be a continuous random variable with PDF given by
3. 𝑓𝑋(𝑥) = { 𝑐 2 𝑥 2 ,|𝑥| ≤ 2 0, otherwise a. Find the constant c. b. Find E(X) c. Find 𝑃(𝑋 ≥ 1).

2. Let X be a continuous random variable with PDF given by 𝑓𝑋(𝑥) = 𝑒 −|𝑥| , 𝑓𝑜𝑟 𝑎𝑙𝑙 𝑥 ∈ 𝑅 𝑌 = 2𝑋 Find the CDF of Y

3. Let X be a continuous random variable with PDF given by 𝑓𝑋(𝑥) = { 3𝑥 2 , 0 ≤ 𝑥 ≤ 2 0, otherwise Find 𝑃(𝑋 ≤ 1 |𝑋 > 1 2 )

4. Let X be a continuous random variable with PDF 𝑓𝑋(𝑥) = { 𝑥(2𝑥 + 5), 0 ≤ 𝑥 ≤ 1 0, otherwise If 𝑌 = 3 𝑋 + 2, find 𝑉𝑎𝑟(𝑌)

5. Let 𝑋~𝑈𝑛𝑖𝑓𝑜𝑟𝑚 ( 𝜋 2 , 𝜋) and 𝑌 = sin(𝑋). Find 𝑓𝑌 (𝑦).

\[ f(n) = \begin{cases} n/2 & \quad \text{if } n \text{ is even}\\ -(n+1)/2 & \quad \text{if } n \text{ is odd} \end{cases}\]