MATH 4200 – Homework #1

Due Date: Tuesday, January 28st, at the beginning of the lecture

Instructions

Please include the following information on the first page of your completed homework.

1. Your name
2. MATH 4200
3. Homework #1
4. List of students you worked with (if applicable)

Please remember to show your work and explain your answers as necessary. Answers that are not supported by reasoning will not receive full credit. Homework should be stapled if it is longer than one page.

Chapter 6 Textbook Problems:

Section 6.3 Problems: #2 (a)

Section 6.4 Problems: #33

Section 6.5 Problems: #46 #52(a)

Section 6.7 Problems: #74

Chapter 6 Additional Problems:

1. The random variable $Z \sim N(0,1)$, and let $U = Z^2$. Show that $U \sim \chi^2(1)$
2. Let $X \sim Gamma\ (\alpha, \beta)$ and define $Y = \frac{2X}{\beta}$. Show that $Y \sim \chi^2(2\alpha)$.
3. Let $U \sim uniform\ (0,1)$. Define $X = -\log U$ and $Y = -\log(1-U)$. Show that both X and Y are exponential random variables.
4. Let X and Y be independent Gamma random variables with parameters (α_1, β) and (α_2, β), respectively. In other words, they have different values of the first parameter but the same β. Let U=X+Y. Identify the distribution of U and specify its parameter values. Find the pdf of $\frac{X+Y}{\beta}$