

1. given the density

$$f(x) = \begin{cases} c(2-x) & 0 \leq x \leq 1 \\ 0 & \text{o.w.} \end{cases}$$

- find c
- find the cumulative distribution $F(x)$
- Compute $F(2.6)$ & explain what it means
- Show $F(0) = 0$ & $F(\infty) = 1$
- Compute $P\{1 \leq x \leq 5\}$

2. repeat 1. for $f(x) = \begin{cases} c+x & -1 < x < 0 \\ c-x & 0 \leq x < 1 \\ 0 & \text{o.w.} \end{cases}$

3. Compute μ and σ^2 for 1.

4. Compute μ and σ^2 for 2.

5. Let x and y have the joint density

$$f(x, y) = \begin{cases} c \cdot x \cdot y & 0 \leq x \leq 1, 0 \leq y \leq 1 \\ 0 & \text{o.w.} \end{cases}$$

- Find c
- find the marginal densities $f_x(x)$ & $f_y(y)$
- find the conditional densities $f_x(x|y)$ & $f_y(y|x)$
- are x & y independent?

6. Using the density from #5, find
- $E[X - Y]$
 - $E[3Y]$
 - $E[X]$
 - $E[X + Y]$

7. Using the density from #5, find
- The covariance of X & Y
 - The correlation coefficient ρ .

8. a) Find the moment generating function for

$$f(x) = \begin{cases} e^x & x < 0 \\ 0 & \text{ow} \end{cases}$$

- Find the mean and variance of Y using this moment generating function.
- Verify your result using other methods.