
1. Suppose that a continuous r.v. $X$ has the p.d.f. $f(x) = x/6$ for $2 < x < 4$ and $f(x) = 0$ for other $x$.

(a) Sketch the graph of $f$ on $\mathbb{R}$.
(b) Find $Pr(0 < X < 3)$.
(c) Find a formula for the d.f. $F$, and sketch its graph on $\mathbb{R}$. The formula comes in three different pieces.
(d) Notice that $f(3) = 1/2$. What does this statement signify in terms of the probability of something? Sketches, with appropriate words, will be most welcome.

2. Do Problems 6 and 12 on p.117, but take $F(x) = e^{2x-c}$ for $x \leq 3$, $F(x) = 1$ for $x > 3$, where $c$ is a constant you must specify.

3. Do parts a,c,e,g,i,k of Problem 4, p.117.

4. Problem 8, p.127.

5. Let $T$ be the region bounded by the lines $x = 1, y = 0$ and the parabola $y = x^2$. Suppose that continuous r.v’s $X$ and $Y$ have the joint pdf $f(x,y) = 24xy^2$ if $(x,y) \in T$ and $f(x,y) = 0$ for other values of $(x,y)$. Verify for yourself that $\int_{\mathbb{R}^2} f(x,y) \, dx \, dy = 1$. Then find:

(a) $Pr(Y > \frac{1}{2}X)$. Be sure to draw a sketch of the region of integration.
(b) The marginal pdf’s $f_1(x)$ of $X$ and $f_2(x)$ of $Y$.

In (a), leave your answer in the form $\int_a^b A(x) \, dx$ or $\int_a^b B(y) \, dy$, where $A$ and $B$ are functions of one variable and $a, b$ are constants.

For yourself: For $t \in (0,1)$, use the result of (b) to calculate $Pr(X > t)$, then calculate it again using the method of (a).
Recommended problems. A selection from DeGroot, sections 3.2-3.5, especially problems about discrete or mixed distributions, such as Problems 2 and 7 on p.127.

Here's a retro problem. You don't need Chapter 3 to do it.

Suppose that each day the probability that Godot will come is .006, and that Godot's appearances are independent of each other. What is the smallest number of days we must wait in order that the probability of at least one appearance be at least .3?