



## 8. Exercise: PDF of a general function

Exercises due Mar 25, 2020 05:29 IST Completed

### Exercise: PDF of a general function

0/2 points (graded)

The random variable  $X$  has a PDF of the form

$$f_X(x) = \begin{cases} \frac{1}{x^2}, & \text{for } x \geq 1, \\ 0, & \text{otherwise.} \end{cases}$$

Let  $Y = X^2$ . For  $y \geq 1$ , the PDF of  $Y$  it takes the form  $f_Y(y) = \frac{a}{y^b}$ . Find the values of  $a$  and  $b$ .

$a =$   ✖ Answer: 0.5

$b =$   ✖ Answer: 1.5

#### Solution:

For any  $y \geq 1$ , we have

$$F_Y(y) = \mathbf{P}(Y \leq y) = \mathbf{P}(X^2 \leq y) = \mathbf{P}(X \leq \sqrt{y}) = F_X(\sqrt{y}).$$

By differentiating and using the chain rule, we have



$$f_Y(y) = \frac{1}{2\sqrt{y}} f_X(\sqrt{y}) = \frac{1}{2y^{1.5}}.$$

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You have used 3 of 3 attempts

**i** Answers are displayed within the problem

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**💬** Step-by-step hints to the algebra/differentiation of the solution

1 new\_ 6

**💬** If you have a book

If you have a book, it's similar to an example 3.23

2

**?** Why is this wrong?

6

**✓** Finding the CDF

I am using (...) to avoid breaking the code of conduct. After we figure out the probability statement  $P(X \leq \dots)$

4 new\_

**💬** ok i just don't get the math behind the answer b

I've been looking at this question way too long and I am probably missing the simplest thing. Please do n...

3

**?** Are there going to be any changes to the schedule due to National Emergency.

Hi Staff, I live in Massachusetts where there is a statewide emergency in effect. I am also a mom to a yea...

10

**💬** [STAFF] exercise should be placed after next video

After scratching my head, I got 1/2 points here. I saw and understood the correct answer. Then I procee...

4

**✓** What's wrong with this approach?

4 new\_ 8

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