

Assignment 1

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1 Question 1

Random variable assigns numbers to the elements in the sample space hence for an empty set no element in sample space is assigned. i.e. $X^{-1}(\phi) = \phi$ and for set R $X^{-1}(R) = \Omega$

2 Question 2

The support will be the points where probability density function is > 0 i.e. derivative is > 0 . $x > 0$

3 Question 3

We have to minimize

$$\frac{1}{N} \sum_{i=0}^N (y_i - mx_i - c)^2$$

Differentiating by m and c and putting it to 0. We can obtain m and c as

$$m = \frac{N(\sum xy) - (\sum x)(\sum y)}{N(\sum x^2) - (\sum x)^2}$$
$$c = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{N(\sum x^2) - (\sum x)^2}$$

We can check by double differentiating that they are indeed local minimas