

Assignment 17

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Download all python codes from

<https://github.com/ka-raja-babu/Matrix-Theory/tree/main/Assignment17>

and latex-tikz codes from

<https://github.com/ka-raja-babu/Matrix-Theory/tree/main/Assignment17>

1 QUESTION NO. 10.12(GATE PROBABILITY)

The probability density function (PDF) of a random variable X is as shown in fig. 1.1 .

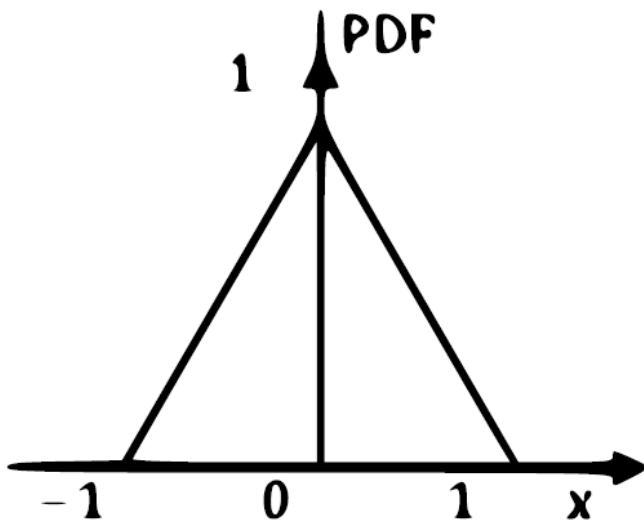


Fig. 1.1

The corresponding cumulative distribution function (CDF) has the form

- | | |
|--------------|--------------|
| 1) Fig. 1.2a | 3) Fig. 1.2c |
| 2) Fig. 1.2b | 4) Fig. 1.2d |

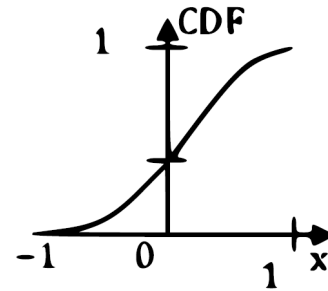


Fig. 1.2a

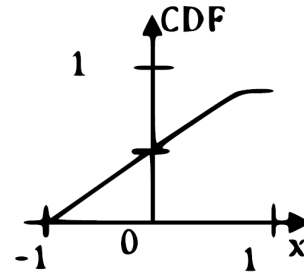


Fig. 1.2b

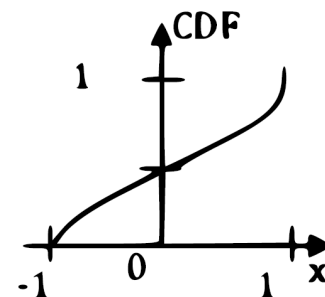


Fig. 1.2c

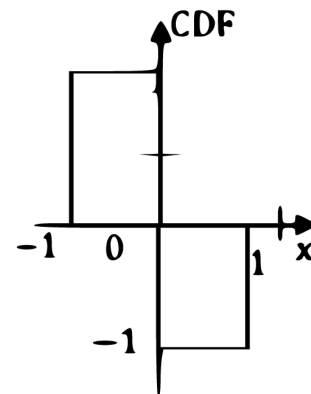


Fig. 1.2d

2 SOLUTION

From fig. 1.1,PDF can be defined as:

$$f(x) = \begin{cases} 0 & |x| > 1 \\ 1 - |x| & |x| \leq 1 \end{cases} \quad (2.0.1)$$

Now, CDF can be defined as:

$$F(x) \quad (2.0.2)$$

$$= \int_{-\infty}^x f(x)dx \quad (2.0.3)$$

$$= \begin{cases} 0 & |x| > 1 \\ \int_{-1}^x (x+1)dx & x \in [-1, 0] \\ \int_0^x (-x+1)dx & x \in [0, 1] \end{cases} \quad (2.0.4)$$

$$= \begin{cases} 0 & |x| > 1 \\ \frac{x^2}{2} + x + \frac{1}{2} & x \in [-1, 0] \\ -\frac{x^2}{2} + x + \frac{1}{2} & x \in [0, 1] \end{cases} \quad (2.0.5)$$

Eq. (2.0.5) is plotted in fig. 2.1 .

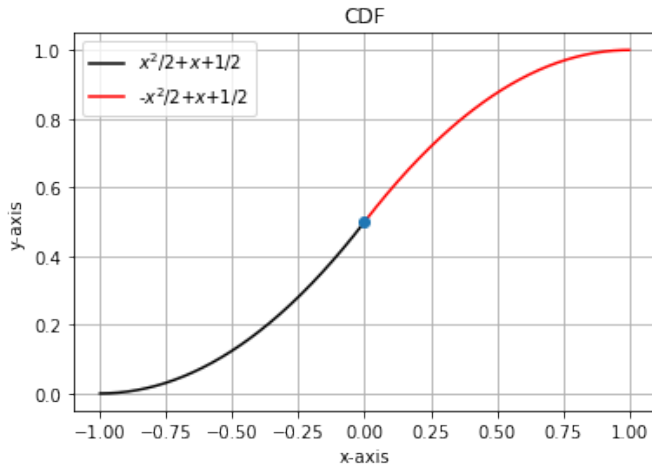


Fig. 2.1: CDF

Hence,by comparing the fig. 2.1 with the given options,the correct option is 1)Fig.1.2a