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 .

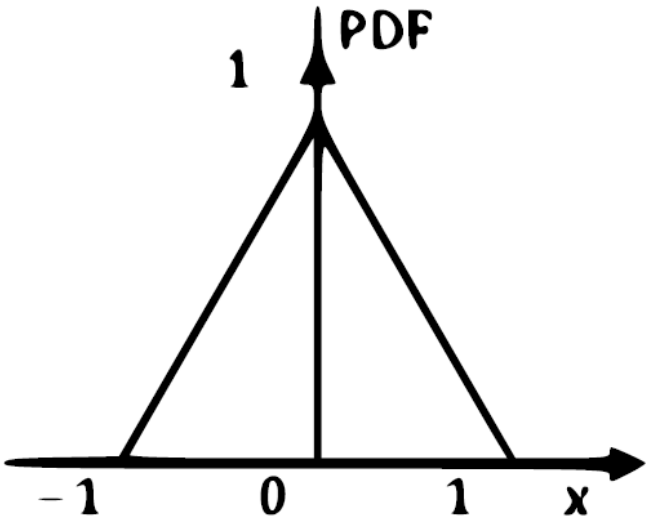

Fig. 1.1

The corresponding cumulative distribution function (CDF) has the form

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

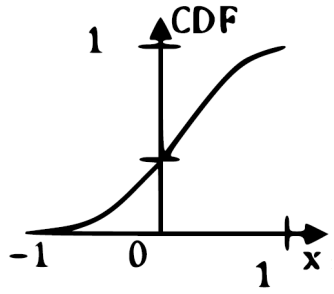

Fig. 1.2a

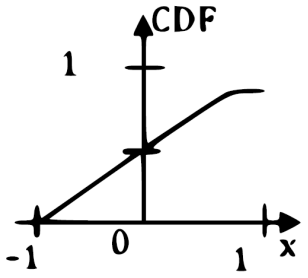

Fig. 1.2b

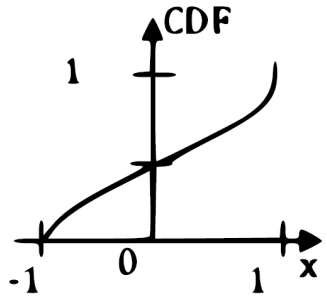

Fig. 1.2c

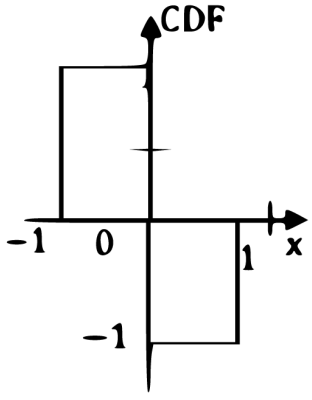

Fig. 1.2d

2 Solution

From fig. 1.1,PDF can be defined as:

$$f(x) = \begin{cases} x+1 & x \in [-1,0] \\ -x+1 & x \in [0,1] \end{cases} \tag{2.0.1}$$

Now, CDF can be defined as:

$$F(x) \tag{2.0.2}$$

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

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

$$= \begin{cases} \frac{x^2}{2}+x+\frac{1}{2} & x \in [-1,0] \\ \frac{-x^2}{2}+x+\frac{1}{2} & x \in [0,1] \end{cases} \tag{2.0.5}$$

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

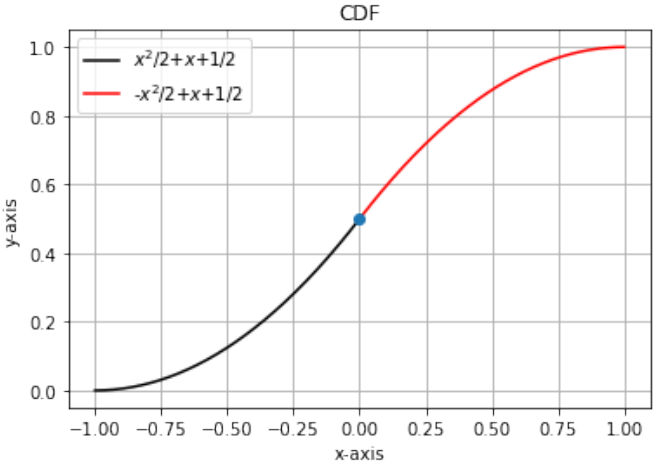

Fig. 2.1: CDF

Hence,by comparing the fig. 2.1 with the given options,the correct option is $\boxed{1) Fig.1.2a}$