

ASSIGNMENT 4

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Download all latex-tikz codes from

https://github.com/manik2255/AI1103-PROBABILITY-AND-RANDOM-VARIABLES/blob/main/ASSIGNMENT%205/ASSIGNMENT_5.tex

1 GATE 2015 MA PROBLEM.9

Let the random variable X have the distribution

$$\text{function } F(x) = \begin{cases} 0 & \text{if } x < 0 \\ \frac{x}{2} & \text{if } 0 \leq x < 1 \\ \frac{3}{5} & \text{if } 1 \leq x < 2 \\ \frac{1}{2} + \frac{x}{8} & \text{if } 2 \leq x < 3 \\ 1 & \text{if } x \geq 3 \end{cases}$$

Then $\Pr(2 \leq x < 4)$ is equal to

2 SOLUTION

Given,

$$F(x) = \begin{cases} 0 & \text{if } x < 0 \\ \frac{x}{2} & \text{if } 0 \leq x < 1 \\ \frac{3}{5} & \text{if } 1 \leq x < 2 \\ \frac{1}{2} + \frac{x}{8} & \text{if } 2 \leq x < 3 \\ 1 & \text{if } x \geq 3 \end{cases} \quad (2.0.1)$$

We need to find $\Pr(2 \leq x < 4)$, which is also can be written as

$$\Pr(2 \leq x < 4) = \Pr(x < 4) - \Pr(x < 2) \quad (2.0.2)$$

$$= F(X = 4^-) - F(X = 2^-) \quad (2.0.3)$$

Using (2.0.1) in (2.0.3),

$$\Pr(2 \leq x < 4) = 1 - \frac{3}{5} \quad (2.0.4)$$

$$= \frac{2}{5} \quad (2.0.5)$$

$$= 0.4 \quad (2.0.6)$$