

$$F_X(x) = \begin{cases} 0 & x < 0 \\ \frac{1}{8} = F_X^{(0)} & 0 \leq x < 1 \\ \frac{1}{2} = F_X^{(1)} & 1 \leq x < 2 \\ \frac{7}{8} = F_X^{(2)} & 2 \leq x < 3 \\ 1 = F_X^{(3)} & x \geq 3 \end{cases}$$



Continuous Random variables and Probability density function

Definition (Continuous random variable)

Let X be a r.v. with CDF $F_X(x)$ if:-

- ① $F_X(x)$ is a continuous function and
- ② $F_X(x)$ is differentiable ($\frac{d}{dx} F_X$ exists)
- ③ the derivative $\frac{d}{dx} F_X$ is continuous except possibly at a discrete set of points.

Then X is called a continuous r.v.

Also, if the range R_X of the r.v. X contains an interval of real numbers, we can say that X is a continuous r.v.

Note:-

if X is a continuous r.v. then $P(X=x) = 0$.