

EX(2) ^{4.5} I the p.m.f. defined on S:-

امثلة (36)

X	-2	-1	0	1	2	3
P(X)	K	2K	3K	5K	7K	2K

Find: ① the constant K

2) $P(0 < X < 4)$

3) $P(X \leq -1)$

4) $P(X > 0)$

Sol $\sum_{\forall x} P(X) = 1$

$$K + 2K + 3K + 5K + 7K + 2K = 1$$

$$20K = 1 \Rightarrow K = \frac{1}{20}$$

X	-2	-1	0	1	2	3
P(X)	$\frac{1}{20}$	$\frac{2}{20}$	$\frac{3}{20}$	$\frac{5}{20}$	$\frac{7}{20}$	$\frac{2}{20}$

$$\begin{aligned} 2) P(0 < X < 4) &= P(X=1) + P(X=2) + P(X=3) \\ &= \frac{5}{20} + \frac{7}{20} + \frac{2}{20} = \frac{14}{20} \end{aligned}$$

$$\begin{aligned} 3) P(X \leq -1) &= P(X=-1) + P(X=-2) \\ &= \frac{2}{20} + \frac{1}{20} = \frac{3}{20} \end{aligned}$$

$$\begin{aligned} 4) P(X > 0) &= P(X=1) + P(X=2) + P(X=3) \\ &= \frac{5}{20} + \frac{7}{20} + \frac{2}{20} = \frac{14}{20} \end{aligned}$$

2- prob. density function (p.d.f.)

(37) المفهوم

If the r.v. X is a C.r.v., then the prob. function of its values is p.d.f. and defined as :-

$$f(x) = P(a \leq x \leq b)$$
$$= \int_a^b f(x) dx$$

where a, b constant.

properties of p.d.f.

① $0 \leq f(x) \leq 1$

② $\int_{-\infty}^{\infty} f(x) dx = 1$

Ex⁽¹⁾ let X be a C.r.v. and p.d.f. defined as :-

$$f(x) = \begin{cases} k e^{-5x} & , x > 0 \\ 0 & , o.w. \end{cases}$$

Find:-

① The constant k

② $P(X > 0)$

3) $P(\frac{1}{3} < X < \frac{2}{3})$