

① A random variable has the following distribution,

X	0	1	2	3	4	5	6	7
P(x)	0	k	2k	3k	k	2k	7k	k

Find the value of 'k'

### Exercise 01

exercise 01 | Name: Basil al-shaya

A random variable for the following distribution.

X	0	1	2	3	4	5	6	7
P(x)	0	k	2k	3k	k	2k	7k	k

Find The value of 'K'

→ Solution ←

$$P(x) = \sum_{i=1}^n P(x_i) = 1$$

$$P(x_0) + P(x_1) + P(x_2) + P(x_3) + P(x_4) + P(x_5) + P(x_6) + P(x_7) = 1$$

$$0 + k + 2k + 3k + k + 2k + 7k + k = 1$$

$$\frac{17k}{17} = \frac{1}{17}$$

$$k = 0.0588$$

Exercise  
02

⑥

X	1	2	3	4	5	
p(x)	<del>k</del>	<del>0.1</del>	0.11	0.12	0.5	

Find the value of 'k'

Lect-16 R.V

X	1	2	3	4	5	6
P(x)	0,01	0,5	0,01	0,01	0,02	0,01

② Find  $E(X)$ :

$$\text{Soln} = E(X) = \sum_{i=1}^n X_i \cdot P(X_i) \quad n=6$$

$$X_1 P(X_1) + X_2 P(X_2) + X_3 P(X_3) + X_4 P(X_4) + X_5 P(X_5) + X_6 P(X_6)$$

$$1(0,01) + 2(0,5) + 3(0,01) + 4(0,01) + 5(0,02) + 6(0,01)$$

$$E(X) = 1,24$$

⑥  $P(X \leq 4)$

$$0,01 + 0,5 + 0,01 + 0,01 = 0,53$$

⑦  $P(X \geq 5)$

$$0,02 + 0,01 = 0,03$$

1) Probability of getting a tail in tossing a coin

Exercise  
03

2) Probability of getting 5 in throwing a dice

1) probability of getting tail in tossing a coin

$$\frac{1}{2}$$

2) Probability of getting 5 in tossing a dice

~~1~~  
~~2~~  
~~3~~  
~~4~~  
~~6~~

$$\frac{1}{6}$$

Exercise  
04

7. Prove that  ~~$P(\bar{B}) = 1 - P(B)$~~

$P(\bar{B}) = 1 - P(B)$  by venn diagram

Abdulaziz

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Prove:  $P(\bar{B}) = 1 - P(B)$

$$B \cup \bar{B} = S = 1$$

$$P(S) = 1$$

$S =$

$$B \cup \bar{B} = S$$

$$P(B \cup \bar{B}) = P(S) = 1$$

$$P(B \cup \bar{B}) = 1$$

$$P(B) \cup P(\bar{B}) = 1$$

$$P(B) \cup P(\bar{B}) = 1$$

$$\boxed{P(\bar{B}) = 1 - P(B)}$$



Exercise  
05

1) ~~Derive~~ Derive the theorems of Multiplication (2 theorems).

we know  $P(A/B) = \frac{P(A \cap B)}{P(B)}$

$$\frac{P(A \cap B)}{P(B)} = P(A/B)$$

$$\boxed{P(A \cap B) = P\left(\frac{A}{B}\right) \cdot P(B)}$$

or

$$\boxed{P(A \cap B) = P(A/B) \cdot P(B)}$$

and the opposite

$$\boxed{P(A \cap B) = P(B/A) \cdot P(A)}$$

or

$$\boxed{P(A \cap B) = P\left(\frac{B}{A}\right) \cdot P(A)}$$

By: Abdulmohsen.

1. A Random Variable has the following distribution

X	1	2	3	4	0.5	0.6
$p(x)$	0.01	0.5	0.01	0.01	0.02	0.01

Exercise  
06

find

(a)  $E(x)$

(b)  $p(x \leq 4)$

(c)  $p(x \geq 5)$

4. A random Variable has the following distribution. Find its

Variance

Exercise  
08

X	1	2	3	4	5
$p(x)$	0.1	0.2	0.1	0.01	0.04

Exercise  
09

2. Find the value of 'a' in the following Random Variable.

where  $F(X) = 8ax^2$   $1 < x < 2$

Exercise 9 / total Any any a / 487

الموضوع:

الموضوع:

$$F(x) = 8ax^2 \quad 1 < x < 2$$

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

$$\int_1^2 8ax^2 dx = 1$$

$$a \int_1^2 8x^2 dx = 1$$

$$a \left[ \frac{8x^3}{3} \right]_1^2 = 1$$

$$a \left[ \frac{8(2)^3}{3} - \frac{8(1)^3}{3} \right] = 1$$

$$a 21.33 - 2.66 = 1$$

$$\frac{a 18.67}{18.67} = \frac{1}{18.67}$$

$$a = \frac{1}{18.67}$$

Exercise  
10

Find the value of "m" for the continuous Random Variable where

$$F(x) = 8mx + 4mx^2 \quad 0 < x < 2$$

1. Find the value of 'K' for the following Random variables,

a.  $F(x) = 4k - x \quad 0 < x < 1$

b.  $F(x) = kx^2 (x - 1) \quad 0 < x < 1$

c.  $F(x) = k/3 (x^2 - x) \quad 0 < x < 2$

Lecture 11

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@  $F(x) = 4k - x \quad 0 < x < 1$

$$f(x) = \int_{-\infty}^{\infty} \Delta F(x) \Delta x = 1$$
$$f(x) = \int_0^1 \Delta k - x \Delta x = 1$$
$$f(x) = \int_0^1 \Delta kx - \frac{x^2}{2} = 1$$
$$= \left[ 4kx - \frac{x^2}{2} \right]_0^1 = 1$$
$$\left[ (4k(1) - \frac{1^2}{2}) - (4k(0) - \frac{0^2}{2}) \right] = 1$$
$$4k - \frac{1}{2} = 1$$
$$\frac{4k}{4} = \frac{1.5}{4}$$
$$k = \frac{1.5}{4}$$



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$$\textcircled{b} kx^2(x-1) \quad 0 < x < 1$$

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

$$= \int_0^1 kx^2(x-1) dx = 1$$

$$k \int_0^1 x^3 - x^2 dx = 1$$

$$k \int_0^1 \frac{x^4}{4} - \frac{x^3}{3} dx = 1$$

$$k \left[ \frac{x^4}{4} - \frac{x^3}{3} \right]_0^1 = 1$$

$$k \left[ \left[ \frac{1^4}{4} - \frac{1^3}{3} \right] - \left[ \frac{0^4}{4} - \frac{0^3}{3} \right] \right] = 1$$

$$= \frac{\frac{1}{4}k - \frac{1}{12}k}{-\frac{1}{12}} = \frac{\frac{1}{12}k}{-\frac{1}{12}}$$

$$k = -12$$

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اليوم

$$c) F(x) = \frac{k}{2} (x^2 - x) \quad 0 < x < 2$$

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

$$\int_0^2 \frac{k}{2} (x^2 - x) dx = 1$$

$$k \int_0^2 \frac{x^2}{2} - \frac{x}{2} dx = 1$$

$$k \left[ \frac{x^3}{3} - \frac{x^2}{2} \right]_0^2 = 1$$

$$k \left[ \frac{(2)^3}{3} - \frac{(2)^2}{2} \right] = \left[ \frac{0^3}{3} - \frac{0^2}{2} \right] \quad \left[ \frac{8}{3} - \frac{4}{2} \right] = 1$$

$$\frac{\frac{8}{3}k}{\frac{8}{3}} = \frac{1}{\frac{2}{3}}$$

$$k = \frac{9}{2}$$