

Probability (الاحتمالية)

Def (1):-

Random experiment:-

It is describe virtually any process whose outcome is not know in advance with certainly .

Ex:-

- 1- Tow coins are to be tossed once.
- 2- A pair of dice is to be cast once.
- 3- One card is selected from on or denary deck of playing card.

Def(2):-

The set of all possible outcomes of an experiment is called the sample – space for the experiment. The outcomes in the sample – space are called the sample point.

Ex (1):-

Consider the experiment of tossing a die (قطعة زار).

$$S = \{ 1, 2, 3, 4, 5, 6 \} \text{ (فضاء العينة).}$$

Ex (2):-

A light both manufacturers lasts a bulb by lolling it barn until it burns out.

$$S = \{ t / t \geq 0 \}$$

Ex (3):-

A traffic engineer records the number of cars entering a tunnel between 9:00 am and 10:00 am.

$$S = \{ 1, 2, 3, \dots \}$$

Ex (4):-

A Stock market analyst observes general electrics common stack for one market day and records whether the stock increases in value decreases in value or undergoes no change in value.

(Increase, decreases, no change)

$$S = \{ i, d, n \}$$

Def (3):-

An event is a subset of the sample – space of experiment. (تجارب)

Ex (1):-

Consider the experiment of tossing (رمي) a die.

- Let E is the even that an odd number occurs.

$$E = \{1, 3, 5\} \text{ (يمثل حدث الارقام الفردية)}$$

- Let F is the even that number larger than 4 occurs.

$$F = \{5, 6\} \text{ (يمثل حدث الارقام الاكبر من 4)}$$

Ex (2):-

Consider the light bulb (مصباح ضوئي) testing experiment.

Let E is the event that the life of the bulb is between 10 and 20 hours an elusive.

$$E = \{t / 10 \leq t \leq 20\}$$

Def (4):-

The set of the sample space of experiment not contained in an event E is called the complementary event to E and is denoted by E^c

Ex:-

$$\text{For Ex (1) } E^c = \{2, 4, 6\}$$
$$F^c = \{1, 2, 3, 4\}$$

Def (5):-

The set of all out comes that belong to both of the events E_1 and E_2 of a sample space is called the intersection (التقاطع) of E_1 and E_2 and is denoted by $E_1 \cap E_2$

Ex:-

An experimenter tosses a die.

Let E be the event that the is divisible by 3

F be the event that the is odd that 3

$$E = \{3, 6\}$$
$$F = \{1, 3, 5\} \implies E \cap F = \{3\}$$

Def (6):-

The set of all out comes that belong to at least one of the events E_1 and E_2 of a sample space is called the union (الاتحاد) of E_1 and E_2 and is denoted by. $E_1 \cup E_2$

Ex: - for the same example above

$$E \cup F = \{1,3,5,6\}$$

Def(7):-

If tow event (حدثين) have no common sample point. Then the tow events can not occur simultaneously, such events, one said to be mutually exclusive (الحدث المستبعد أو المستحيل).

Ex:-

Consider the die tossing experiment

E is the event that an even number is tossed

F is the event that an odd number is tossed.

Then E and F are mutually exclusive $E \cap F = \phi$

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