

Probability Exercise 1

Question 1

Complete the following statements:

- (i) Probability of an event E + Probability of the event 'not E' =.....
- (ii) The probability of an event that cannot happen is Such an event is called
- (iii) The probability of an event that is certain to happen is..... . Such an event is called
- (iv) The sum of the probabilities of all the elementary events of an experiment is
- (v) The probability of an event is greater than or equal toand less than or equal to

Solution

i) We know that

The event \bar{A} , representing 'not A', is called the complement of the event A. We also say that \bar{A} and A are complementary events. Also

$$P(A) + P(\bar{A}) = 1$$

So answer is 1

ii) The probability of an event (U) which is impossible to occur is 0. Such an event is called an impossible event

$$P(U) = 0$$

iii) The probability of an event (X) which is sure (or certain) to occur is 1. Such an event is called a sure event or a certain event

$$P(X) = 1$$

iv) An event having only one outcome of the experiment is called an elementary event.

"The sum of the probabilities of all the elementary events of an experiment is 1."

i.e. If we three elementary event A,B,C in the experiment ,then

$$P(A) + P(B) + P(C) = 1$$

v) Probability of any event can be as

$$0 \leq P(E) \leq 1$$

Question 2

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Which of the following experiments have equally likely outcomes? Explain.

- (i) A driver attempts to start a car. The car starts or does not start.
- (ii) A player attempts to shoot a basketball. She/he shoots or misses the shot.
- (iii) A trial is made to answer a true-false question. The answer is right or wrong.
- (iv) A baby is born. It is a boy or a girl

Solution

Not equally likely

Not equally likely

Equally likely as both have equal possibility

Equally likely as the baby born has equal possibility of boy or girl

Question 3

Why is tossing a coin considered to be a fair way of deciding which team should get the ball at the beginning of a football game?

Solution

Since the possibility of getting head and tail are equally likely. It will be unbiased and unpredictable

Question 4

Which of the following cannot be the probability of the event?

- a) $\frac{2}{3}$
- b) -1.5
- c) 15%
- d) .7

Solution (b) as probability cannot be negative

Question 5

If $P(E) = 0.05$, what is the probability of 'Not E'?

Solution

The event \bar{A} , representing 'not A', is called the complement of the event A. We also say that \bar{A} and A are complementary events. Also

$$P(A) + P(\bar{A}) = 1$$

Here $P(E) = .05$

So $P(\text{Not } E) = 1 - P(E)$

$$= 1 - .05 = .95$$

Question 6

A bag contains lemon coloured candies. Malini takes out one candy without looking into the bag.

What is the probability that she takes out

- i) an orange coloured candy

ii) An lemon coloured candy

Solution

The bag does not contain any orange candy
So probability of getting orange candy is zero
Since she will always get lemon candy, probability is 1

Question 7

It is given that in a group of 3 students, the probability of 2 students not having the same birthday is .992. What is the probability that 2 students have the same birthday

Solution

Let A be the event 2 students not having the same birthday

And B be the event 2 students having same birthday

These both the events are complimentary so

$$P(A)+P(B)=1$$

$$P(B)=1-.992=.008$$

Question 8 A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is

a) Red

b) No red

Solution

Total number of balls in the bag $n(B)=5+3=8$

No of ball which are red =3

Let A be event of getting red ball

Probability of getting red ball $P(A)= \text{No of red balls}/\text{Total number of balls}= 3/8$

Let B be the event of getting non red ball

$P(B)=\text{No of black balls}/\text{Total number of balls}=5/8$