Probability

Objective

To set the idea of probability of an event through a double colour cards experiment.

Prerequisite Knowledge

1. Sample space and event.
2. Total number of possible outcomes.
3. Favourable outcomes.
4. Probability of an event = $\frac{No.of favourable \quad outcomes}{Total \quad no.of \quad Possible \quad outcomes}$.

Material Required

A cardboard of size 18 cm x 18 cm, two colour papers say pink and blue, pair of dice, empty box, pair of scissors, sketch pens, fevicol, etc.

Procedure

1. Paste different colour papers, blue and pink on both sides of the board, (such that pink on one side and blue on another side)
2. Divide the board into 36 small squared cards.
3. Write all 36 possible outcomes obtained by throwing two dice, e.g., for the outcome (4,5), write 4 on the blue side and 5 on pink side.
4. Cut and put all the cards into a box.
5. Now take out each card one by one without replacement and write the observation in appropriate column.

Observation

1. Total number of possible outcomes =
2. Total number of favourable outcomes of sum 2 =
3. Total number of favourable outcomes of sum 3 =
4. Total number of favourable outcomes of sum 4 =
5. Total number of favourable outcomes of sum 5=
6. Total number of favourable outcomes of sum 6 =
7. Total number of favourable outcomes of sum 7 =
8. Total number of favourable outcomes of sum 8 =
9. Total number of favourable outcomes of sum 9 =
10. Total number of favourable outcomes of sum 10 =
11. Total number of favourable outcomes of sum 11 =
12. Total number of favourable outcomes of sum 12 =
13. Total number of favourable outcomes (sum ≥11) =

14. Total number of favourable outcomes (sum >12) =
15. Total number of favourable outcomes (sum < 7) =

Using formula calculate the required Probability of each event.
Sample space (when two dice are thrown)

(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

Example: Number of favourable outcomes of sum of numbers 2=1
Total outcomes = 36
∴ Probability of sum of numbers is 2 = $\frac{1}{36}$
Similarly find other probabilities for different outcomes of sum.

Result

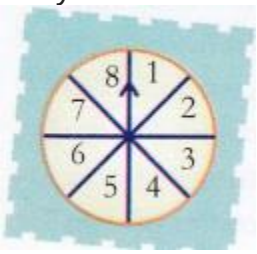
Probability of an event = $\frac{No.of favourable \quad outcomes}{Total \quad no.of \quad Possible \quad outcomes}$

Learning Outcome

Concept of finding the probability of an event is clear through this activity.

Activity Time

1. What is the probability of getting the sum of two numbers more than 17?
2. Write the sample space, when a coin is tossed 3 times.
3. A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 as shown in the fig. and these are equally likely outcomes. What is the probability that it will point at



- 8?
- an odd number ?
- a number greater than 2 ?

- a number less than 9 ?
- a numberless than 1 ?

Viva Voce

Question 1.
What is probability ?
Answer:
The possibility (or possibilites) of occuringornotoccuringof an eventis called probability.
Probability or an event = $\frac{No.of favourable \quad outcomes}{Total \quad no.of \quad Possible \quad outcomes}$

Question 2.
What is a sample space ?
Answer:
It is the set of all possible outcomes of a random experiment.

Question 3.
What is the probability of an impossible event, sure event respectively ?
Answer:
Zero, one.

Question 4.
A dice is thrown twice. How many elements are possible in sample space ?
Answer:
36.

Question 5.
If P(E) = 0.05, what is the probability of 'not E' ?
Answer:
0.95.

Question 6.
What is the sum of the probabilities of all the elementary events of an experiment ?
Answer:
One

Question 7.
A bag contains 3 red and 5 black balls. A ball is drawn at random. What is the probability that the ball is red ?
Answer:
$\frac{3}{8}$

Question 8.
A die is thrown once. What is the probability of getting a prime number ?
Answer:
$\frac{3}{6} = \frac{1}{2}$

Question 9.
One card is drawn from a well shuffled deck of 52 cards. What is the probability of a king of red colour ?
Answer:
$\frac{2}{52} = \frac{1}{26}$

Multiple Choice Questions

Question 1.
A die is thrown twice. What is the probability that 5 will not come up either ?
(Hint: meaning is 5 is not coming in first throw as well as in second throw).
(a) $\frac{25}{36}$
(b) $\frac{17}{36}$
(c) $\frac{15}{36}$
(d) None of these

Question 2.
17 cards numbered 1, 2, 3, … 17 are put in a box and mixed. One person draws a cards. Find the probability that the number on the card is prime.
(a) $\frac{15}{17}$
(b) $\frac{7}{17}$
(c) $\frac{8}{17}$
(d) $\frac{9}{17}$

Question 3.
The king, queen and jack of clubs are removed from a pack of 52 cards and then well shuffled. One card is selected from the remaining cards. Find the probability of getting 'The '10' of heart'.
(a) $\frac{9}{49}$
(b) $\frac{10}{49}$
(c) $\frac{1}{49}$
(d) None of these

Question 4.
A bag contains 5 red and some blue balls. If the probability of drawing a blue ball is double that of a red ball, find the number of blue balls in the bag.

(a) 10
(b) 5
(c) 20
(d) none of these

Question 5.
A coin is tossed three time what is the probability of getting the same result in each trial ?
(a) $\frac{1}{4}$
(b) $\frac{1}{8}$
(c) $\frac{3}{8}$
(d) None of these
(**Hint:** TTT or HHH, $\therefore \frac{2}{8} = \frac{1}{4}$)

Question 6.
If P(E) = 0.65 then P is ($\bar{E}$)
(a) 0.15
(b) 0.30
(c) 0.35
(d) none of these

Question 7.
Which of the following cann't be the event of probability ?
(a) $\frac{2}{3}$
(b) -1.5
(c) 15%
(d) 0.7

Question 8.
If probability of 'not E' is 0.98, then P(E) is
(a) 0.5
(b) 0.02
(c) 0.005
(d) 1

Question 9.
In a non-leap year there are 365 days i.e., 52 weeks and 1 day. Find the probability of getting 53 Sunday.
(a) $\frac{1}{7}$
(b) $\frac{2}{7}$
(c) $\frac{3}{7}$
(d) None of these

Question 10.
Find the probabilitty of getting 53 Mondays in a leap year.
(a) $\frac{1}{7}$
(b) $\frac{2}{7}$
(c) 1
(d) none of these

Answers

1. (a)
2. (b)
3. (c)
4. (a)
5. (a)
6. (c)
7. (b)
8. (b)
9. (a)
10. (b)