

Class: X
Subject: Math's
Topic: Probability
No. of Questions: 20

Q.1 Two dice are thrown, what is the probability of getting a multiple of 3.

Sol: Sample space = $\{(1,1) \dots (1,6) ; (2,1) \dots (2,6) ; (3,1) \dots (3,6) ; (4,1) \dots (4,6) ; (5,1) \dots (5,6) ; (6,1) \dots (6,6)\}$

Let A=Getting a multiple of 3.

$A = \{(1,2); (1,5); (2,1); (2,4); (3,3); (3,6); (4,2); (4,5); (5,1); (5,4); (6,3); (6,6)\}$

$P(A) = 12/36 = 1/3$

Q.2 An unbiased die is thrown. What is the probability of getting an even number or a multiple of 3? (CBSE-2013)

Sol: $S = \{1, 2, 3, 4, 5, 6\}$

A= getting a multiple of 3 or an even number

$A = \{2, 3, 4, 6\}$

$P(A) = 4/6 = 2/3$

Q.3 Two unbiased coins are tossed simultaneously. Find the probability of getting at least one head. (CBSE-2010)

Sol: $S = \{HH, HT, TH, TT\}$

A= getting at least one head

$P(A) = 3/4$

Q.4 Two dice are thrown simultaneously. Find the probability of getting a doublet. (CBSE- 2013)

Sol: Total number of outcomes= 36

A= getting a doublet

$A = \{(1,1), (2,2), (3,3), (4,4), (5,5), (6,6)\}$

$P(A) = 6/36 = 1/6$

Q.5 Tickets numbered from 1 to 20 are mixed up together and then a ticket is drawn at random. What is the probability that the ticket has a number which is a multiple of 3 or 7.

Sol: Total number of outcomes= 20

A= getting a number which is a multiple of 3 or 7
 $A=\{3, 6, 7, 9, 12, 14, 15, 18\}$
 $P(A)= 8/20= 2/5$

Q.6 One card is drawn from a pack of 52 cards, each of the 52 cards being equally likely to be drawn. Find the probability that the card drawn is a 10 of a black suit.

Sol: Total number of outcomes= 52
Two suits of black cards are spades and clubs.
Favorable outcomes= 2
 $P(\text{getting 10 of a black suit})= 2/52= 1/26$

Q.7 The king, queen and jack of clubs are removed from a deck of 52 playing cards and the well shuffled. One card is selected from the remaining cards. Find the probability of getting a club.

Sol: After removal of king, queen and jack of clubs from 52 cards only 49 cards are left in the deck.
Total number of outcomes=49
A= getting a club
Cards left in club= $13 - 3=10$
 $P(A)= 10/49$

Q.8 It is known that a box of 600 electric bulbs contains 12 defective bulbs. One bulb is taken out at random from this box. What is the probability that it is a non-defective bulb?

Sol: Total number of outcomes= 600
Number of non-defective bulbs= $600 - 12= 588$
 $P(\text{getting a non-defective bulb})= 588/600= 49/50= 0.98$

Q.9 Cards marked with the numbers 2 to 101 are placed in a box and mixed thoroughly. One card is drawn from this box. Find the probability that the number on the card is a perfect square.

Sol: Total number of outcomes= 100
A= getting a perfect square
 $A=\{ 4, 9, 16, 25, 36, 49, 64, 81, 100\}$
 $P(A)= 9/100$

Q.10 A letter is chosen at random from the letters of the word 'ASSASSINATION'. Find the probability that the letter chosen is a vowel.

Sol: Total number of letters= 13
A= getting a vowel
 $A = \{A, A, I, A, I, O\}$
 $P(A) = 6/13$

Q.11 Gopi buys a fish from a shop for his aquarium. The shopkeeper takes out one fish at random from the tank containing 5 male and 8 female fishes. What is the probability that the fish taken out is a male fish?

Sol: Total number of outcomes= $5 + 8 = 13$
A= getting a male fish
 $P(A) = 5/13$

Q.12 If a number x is chosen at random from the numbers -2, -1, 0, 1, 2. What is the probability that $x^2 < 2$?

Sol: Total number of outcomes= 5
For $x^2 < 2$
Values are -1, 0, 1
Favorable outcomes= 3
 $P(x^2 < 2) = 3/5$

Q.13 A jar contains 54 marbles each of which is blue, green or white. The probability of selecting a blue marble at random from the jar is $1/3$, and the probability of selecting a green marble at random is $4/9$. How many white marbles does the jar contain?

Sol: Let b = blue, g = green, w = white marbles
 $b + g + w = 54$
 $P(\text{selecting a blue marble}) = b/54$
 $1/3 = b/54$
 $b = 54/3 = 18$
 $P(\text{selecting a green marble}) = 4/9$
 $g/54 = 4/9$
 $g = 24$
 $18 + 24 + w = 54$
 $w = 12$

Q.14 A number x is selected from the numbers 1,2,3 and then a second number y is randomly selected from the number 1, 4, 9. What is the probability that the product xy of the two numbers will be less than 9?

Sol: $S = \{(1,1); (1,4); (1,9); (2,1); (2,4); (2,9); (3,1); (3,4); (3,9)\}$
Numbers xy having product less than 9= $\{(1,1); (1,4); (2,1); (2,4); (3,1)\}$
 $P(\text{getting product less than 9}) = 5/9$

Q.15 A box contains cards numbered 3, 5, 7, 9, ..., 35, 37. A card is drawn at random from the box. Find the probability that the number on the drawn card is a prime number.

(CBSE-2013)

Sol: Total number of outcomes= 18
A= getting a prime number= {3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37}
 $P(A) = 1/18$

Q.16 A bag contains 6 red balls and some blue balls. If the probability of drawing a blue ball is twice that of the red ball, find the number of blue balls in the bag. (CBSE-2007)

Sol: Number of red balls= 6
Let the number of blue balls be x
Total number of outcomes= $6 + x$
 $P(\text{blue balls}) = x/(6+x)$
 $P(\text{red balls}) = 6/(6+x)$
 $2(6/(6+x)) = x/(6+x)$
 $12/(6+x) = x/(6+x), x=12$

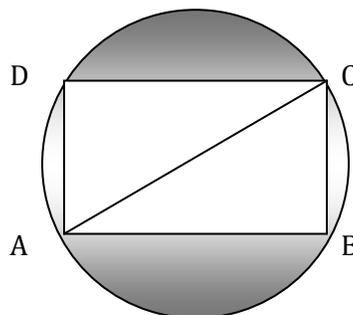
Q.17 What is the probability that a number selected at random from the numbers 1, 2, 2, 3, 3, 3, 4, 4, 4, 4 will be their average?

Sol: Total number of outcomes= 10
Average= $30/10=3$
So, favorable outcomes= 3
 $P(\text{average}) = 3/10$

Q.18 It is given that in a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability that the 2 students have the same birthday?

Sol: $P(2 \text{ students not having the same birthday}) = 0.992$
 $P(2 \text{ students having same birthday}) = 1 - 0.992 = 0.008$

Q.19 A dart is thrown and lands in the interior of the circle. What is the probability that the dart will land in the shaded region?



AD= 6 units, CD= 8 units

Sol: $AB=CD= 8$ units and $AD= BC= 6$ units
Using Pythagoras theorem in ΔABC ,

$$AC^2= AB^2 + BC^2$$

$$AC^2= 8^2 + 6^2 = 100$$

$$AC= 10$$

$$\text{Radius}= 5 \text{ units}$$

$$\text{Area of circle}= \pi r^2= 25\pi \text{ sq. units}$$

$$\text{Area of rectangle}= 8 * 6= 48 \text{ sq. units}$$

$$\text{Area of shaded region}= (25\pi - 48) \text{ sq. units}$$

$$P(\text{dart lands in the shaded region})= (25\pi - 48)/ 25\pi$$

Q.20 A bag contains 5 red, 8 white and 7 black balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is neither white nor black.

Sol: Total number of outcomes= 20
Ball drawn is neither white nor black means ball drawn is red.
 $P(\text{Drawing a red ball})= 5/20= 1/4$