MATHS

BOOKS - NAGEEN MATHS (HINGLISH)

PROBABILITY

Solved Example Type

1. Find the probability of getting head in a toss of one coin:

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2. If two coins are tossed simultaneously, find the probabilities of the following events:

(i) two heads

(ii) at least one head

(iii) at most one head.

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3. If three coins are tossed simultaneously, find the probability of getting:

(i) two heads

(ii) one head and two tails

(iii) at least one head

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4. In a throw of a dice, find the probability of:

(i) getting a multiple of 3

(ii) getting a number which is not a multiple of 3.

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5. A card is drawn at random from a well shuffled pack of 52 cards. Find the probability that card drawn is:

(i) an ace

(ii) a heart

(iii) black

(iv) either an ace or black.

6. There are 30 tickets numbered from 1 to 30. A ticket is drawn at random, find the probability of getting a ticket whose number is:

(i) multiple of 3

(ii) multiple of 7

(iii) multiple of 3 or 7

7. There are 5 red and 3 black balls in a bag. A red ball is drawn at random. Find its probability.

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8. There are 5 black and 4 red balls ina bag. Two balls are drawn at random. Find the probability that both balls are red.

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9. Find the probability of getting the same number of two dice in a single throw of two dice.

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10. The probability of the occurrence of an event is $\frac{3}{7}$. Find the probability of the non occurrence of the event.

11. The odds in favour of an event are $3:2$. Find the probability of the occurrence of the event.

12. The odds against of an event are $3:4$. Find the probability of the occurrence of the event.

13. Find the probability of 53 Sundays in an ordinary year.

A. $1/7$

B. $2/7$

C. $3/7$

D. $4/7$

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14. In a horse -race, the probabilities to win the race for three horses A,B and C are $\dfrac{1}{4}, \dfrac{1}{5}$ and $\dfrac{1}{6}$ respectively. Find the probability to win the race of any one horse.

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15. Find the probability of getting a sum of 9 or 10 in a throw of two dice.

A. $\dfrac{7}{18}$

B. $\dfrac{7}{24}$

C. $\dfrac{7}{36}$

D. $\dfrac{7}{42}$

Answer: C

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16. The probability of apointment of A at a post is $\dfrac{1}{2}$ and probability of appointment of A at a post is $\dfrac{1}{2}$ and probability of appointment of B is $\dfrac{1}{3}$. If only one can be appointment, then find its probability.

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17. Find the probability of getting two heads in two tosses of a coin.

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18. The probability of solving a problem of mathematic for A and B are $\dfrac{1}{3}$ and $\dfrac{1}{5}$ respectively. If both try the problem, find the probability that the problem will be solved.

19. There are 4 red and 5 white balls in a bag. A ball is drawn at random and then again a ball is drawn from the remaining balls. Find the probability that both drawn balls are red.

20. Four cards are drawn from a pack of 52 cards without replacement. Find the probability that all of them are jack.

21. Find the probability of getting 5 at least once in there throws of a dice.

22. There are 8 white and 7 black balls in first bag and 9 white and 6 black balls are in second bag. One ball is drawn from each bag. Find the probability that both are of the same colour.

23. There are 6 red and 4 white balls in a bag. Two-Two balls are drawn two times from this bag such that before drawing the balls second time the balls replaced in the bag which were drawing first time. Find the probability of getting 2 red balls in first time and 2 white in second time.

24. There are 5 red and 3 black balls in first bag and 4 red and 5 black balls i second bag. A ball is drawn from one of the bags. Find the probability that the ball drawn is red.

25. The probabilities of hitting a target by A, B and C are $\dfrac{3}{5}, \dfrac{3}{4}$ and $\dfrac{1}{3}$ respectively.

If all three hits the target simultaneously then find the probability of hitting the target by the least two of them.

26. Two coins are tosses simultaneously. Find the probability of getting:

(i) one head

(ii) at least one head

(iii) no tail

27. In a throw of one dice the samle space S = { 1 , 2 , 3 , 4 , 5 , 6 } ⇒ n (S) = 6 (i) Let E 1 = event of getting 5 = { 5 } ⇒ n (E 1) = 1 and P (E 1) = n (E 1) n (S) = 1 6 (ii) Let E 2 = event of getting a number greater than 2 = { 3 , 4 , 5 , 6 } ⇒ n (E 2) = 4 P (E 2) = n (E 2) n (S) = 4 6 = 2 3 (iii) Let E 3 = event of

getting $6 = \{\} \Rightarrow n(E3) = 0 \therefore P(E3) = n(E3) n(S) = 2 6 = 0$ (iv) Let E 4

= event of getting and odd number = $\{1,3,5\} \Rightarrow n(E4) = 3 \therefore P(E4) = n$

$(E4) n(S) = 3 6 = 1 2$

28. In one throw of a pair of dice, the sample space $n(S) = 36$ (i) Let E 1 =

event of getting the sum of numbers on two dice $9 = \{(3,6),(4,5),(5$

$,4),(6,3)\} \Rightarrow n(E1) = 4$ and $P(E1) = n(E1) n(S) = 4 36 = 1 9$ (ii) Let

E 2 = event of getting the sum of numbers on two dice at least $9 = \{(3,6$

$),(4,5),(5,4),(6,3),(4,6),(5,5),(6,4),(5,6),(6,5),(6,6$

$)\} \Rightarrow n(E2) = 10$ and $P(E2) = n(E2) n(S) = 10 36 = 5 18$

29. There are 6 red and 4 black balls in a bag. A ball is drawn at random.

Find the probability that the ball drawn is red.

30. There are 5 white and 4 red balls in a bag. Two balls are drawn at random. Find the probability that both balls are white.

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31. A card is drawn a from a well shuffled pack of 52 cards. Find the probability that card drawn is:

(i) black

(ii) black jack

(iii) black or a king

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32. The probability of happening of an event is $\frac{3}{5}$. Find the probability of not happening the event.

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33. The odds in favour of an event are $2:3$. Find the probability of the occurrence of the event.

34. Two dice are thrown simultaneously find:

(i) Odds in favour of getting the sum of numbers

9 on two dice,

(ii) odds against of getting the sum of numbers 8 on two dice.

35. Find the probability of getting a sum at least 5 on three dice in one throw three dice.

36. Here n (S) = . 25 C 1 = 25 Let E = event of getting a ticket whose number is either a multiple of 2 or multiple of 3 = { 2 ,3 ,4 ,6 ,8 ,9 ,10 ,12 ,14 ,15 ,16 ,18 ,20 ,21 ,22 ,24 } ⇒ n (E) = 16 ∴ P (E) = n (E) n (S) = 16 25

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37. For two events E_1 and $E_2, P(E_1) = \dfrac{1}{2}, P(E_2) = \dfrac{1}{3}$ and $P(E_1 \cap E_2) = \dfrac{1}{10}$. Find:

(i) $P(E_1 \text{ or } E_2)$

(ii) $P(E_1 \text{ but not } E_2)$

(iii) $P(E_2 \text{ but not } E_1)$

(iv) P (neithter E_1 not E_2)

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38. The probabilities of the occurrence of two events E_1 and E_2 are 0.25 and 0.50 respectively. The probability of their occurrence simultaneously is 0.15, find the probability that neither E_1 nor E_2 will occur.

39. The Probability that at least one of the events E_1 and E_2 will occur is 0.6. If the probability of their occurrence simultaneously is 0.2, then find $P(\overline{E}_1) + P(\overline{E}_2)$

40. If E_1 and E_2 be two events such that $P(E_1) = 0.3, P(E_2) = 0.2$ and $P(E_1 \cap E_2) = 0.1,$ then find:

(i) $P(\overline{E}_1 \cap E_2)$ (ii) $P(E_1 \cap \overline{E}_2)$

41. A card is drawn from a well shuffled pack of 52 cards. Find the probability that it is heart or a king .

42. Let S be the sample space. $\therefore$ n (S) = 36 Let E = event of getting a doublet = { (1 ,1) , (2 , 2) , (3 , 3) , (4 , 4) , (5 , 5) , (6 , 6) } $\Rightarrow$ n (E) = 6 Let F = event of getting a sum of 10 = { (4 , 6) , (5 , 5) , (6 , 4) } $\Rightarrow$ n (f) = 3 Now E $\cap$ F = { (5 , 5) } $\Rightarrow$ n (E $\cap$ F) = 1 $\therefore$ P (E U F) = P (E) + P (F) − P (E $\cap$ F) − 6 36 + 3 36 − 1 36 = 8 36 = 2 9 Now the probability that neither a doublet nor a sum of 10 will appear = P ($\overline{}$ E $\cap$ $\overline{}$ F) = P ($\overline{}$ E U F) = 1 − P (E U F) = 1 − 1 9 = 7 9

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43. In a town of 6000 people 1200 are over 50 years old and 2000 are female. It is known hat 30% of the females are over 50 years. What is the probability that a random chosen individual from the town either female or over 50 year?

A. $\dfrac{13}{30}$

B. $\dfrac{13}{60}$

C. $\dfrac{13}{90}$

D. $\dfrac{26}{30}$

Answer: A

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44. If A and B are two mutually exclusive and exhaustive events and $P(B) = \dfrac{3}{2}P(A)$, then find $P(A)$.

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45. A and B are two events such that $P(A) = 0.54$, $P(B) = 0.69$ and $P(A \cap B) = 0.36$, then evaluate:

(i) $P(A \cup B)$ (ii) $P(A' \cap B')$

(iii) $(A \cap B')$ (iv) $P(B \cap A')$

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1. In a throw of a single dice, find the probability of getting:

(i) a multiple of 2

(ii) an odd number

(iii) a number greater than 3.

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2. In two throw of a dice find the probability of getting:

(i) a sum of 9

(ii) a sum of at least 9

(iii) a number 5 on at least on throw.

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3. Find the probability of getting one head and one tail in one toss of two

coins.

4. Find the probability of 53 Mondays in a leap year.

5. Find the probability of 53 Sundays and 53 Mondays in a leap year.

6. Find the probability of drawing a king from a well shuffled pack of 52 cards.

7. A card is drawn from a sell shuffled pack of 52 cards. Find the probability of getting:

(i) a red card

(ii) a diamond

(iii) a red card or a jack.

8. There are 20 tickets numbered 1 to 20. A ticket is drawn. Find the probability of drawing a ticket whose number is:

(i) a multiple of 3

(ii) a multiple of 5

(iii) a multiple of 3 or 5.

9. There a 9 red and 5 black balls in a bag. A black ball is drawn at random. Find its probability.

10. There are 5 red, 4 black and 3 blue balls in bag. A ball is drawn at random. Find the probability that the ball drawn is:

(i) black

(ii) red or black.

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11. There are 4 white and 6 black balls in a bag. Two balls are drawn at random. Find the probability that both balls drawn are black.

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12. There are 5 black and 6 red balls in a bag. If 3 balls are drawn at random, find the probability that these balls are black.

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13. The odds in favour of occurrence of an event are $2:5$. Find the probability of the occurrence of the event.

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14. The odds in favour of the occurrence of an event are $3:5$. Find the probability of the non-occurrence of the event.

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15. The odds against of the occurrence of an event are $4:5$. Find the probability of the occurrence of the event.

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16. The odds against of the occurrence of an event are $6:7$. Find the probability of the non-occurrence of the event.

17. In a class of 50 students, 20 are boys and rest are girls. A student is selected at random. Find the probability of selecting a boy.

18. The probability of the occurrence of an event is $\frac{3}{10}$. Find the probability of non-occurrence of the event.

19. The probability of the non-occurrence of an event is $\frac{2}{7}$. Find the probability of the occurrence of the event.

20. In a horse race, the probability that horse A can win is $\frac{2}{5}$ and the probability that horse B can win is $\frac{1}{4}$. Find the probability that any one can win the race.

21. The probabilities that three children can win a race are $\frac{1}{3}, \frac{1}{4}$ and $\frac{1}{5}$. Find the probability that any one can win the race.

22. The odds in favour for three horses participating in a house-race are $1:3$, $2:5$ and $3:7$. Find the probability that any one can win the race.

23. In two independent events the probability of happening one event is $\frac{2}{7}$ and probability of happening of second event is $\frac{1}{5}$. Find the probability of happening of both events.

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24. Find the probability of getting tail each time in three tosses of a coin.

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25. Find the probability of getting 3 each time in three throws a dice.

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26. Find the probability of getting at least one head in three throws of a coin.

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27. Find the probability of getting 5 at most 3 times in four throws of a dice.

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28. The probability of happening of an event is 0.6 for one experiment. In three such experiments, find the probability of happening the event at least one time.

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29. A can hit a target 4 times out of 5 trial. B can hit 3 times of 4 trials and C can hit 2 times out of 3 trials. If all three hit the target sumultaneously, find the probability of hitting the target.

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30. A,B and C can hit a target 3 times out of 5 trials, 4 times out of 5 trials and 2 times out of 5 trials. Find the probability that:

(i) exactly two can hit the target

(ii) at least two can hit the target.

31. The probability to pass in an examination of mathematics for three students are $\dfrac{1}{4}, \dfrac{1}{5}, \dfrac{1}{6}$. Find the probability that at least two students will pass in this examination.

32. The probability of solving a problem by three students are $\dfrac{1}{3}, \dfrac{1}{4}, \dfrac{1}{5}$. Find the probability that the problem will be solved if all three students try the problem simultaneously.

33. There are 5 red and 7 white balls in one bag and 3 red and 8 white balls in second bg. If a ball is drawn at random from one the bags, find the probability that it is red.

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34. There are 5 red and 5 black balls in first bag and 6 red and 4 black balls is second bag. One -one ball is drawn from each bag. Find the probability that:

(i)both balls are of the same colour,

(ii) one ball is red and other is black.

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35. There are 4 white and 3 black balls in a bag. Find the probability of drawing 2 white ball one by one without replacement.

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36. There are 8 white and 7 black balls in a bag . Three-three balls are drawn twice from the bag and balls drawn first time are not being replaced when the balls are drawn second time. Find the probability that first three balls drawn are white and second thre balls drawn are black.

37. Two cards drawn without replacement from a well shuffled pack of 52 cards. Find the probability that cards drawn are aces.

38. There are 10 defective bulbs in a group of 100 bulbs. If a sample of 8 bulbs are selected at random then find the probability that:

(i) in this sample 3 bulbs are defective and 5 are non-defective.

(ii) in this sample at least one bulb is defective.

39. In one toss of a coin, find the probability of getting:

(i) head (ii) tail

40. In one toss of two coins together find the probability of getting:

(i) two tails

(ii) one head and one tail

41. In one toss of three coins together, find the probability of getting:

(i) two heads and one tail

(ii) at least two tails

42. In one throw of a dice, find the probability of getting:

(i) an even number

(ii) a multile of 3

(iii) a number greater than 4

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43. In one throw of two dice together, find the probability of getting:

(i) a sum of 5

(ii) same number on two dice

(iii) a sum less than 5

(iv) a sum at least 8

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44. In one throw of three dice together, find the probability of getting:

(i) same number on three dice

(ii) a sum less than 6

(iii) a sum at least 6

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45. A card is drawn from a well shuffled pack of cards.

Find the probability of getting:

(i) a card of heart

(ii) a king

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46. There are two children in a family. Find the probability that at most one boy is there in the family.

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47. There are 7 red, 5 black and 3 white balls in a bag. A ball is drawn at random. Find the probability that ball drawn is:

(i) white

(ii) not white

(iii) either red or white.

48. There are 12 tickets numbered 1 to 12. A ticket is drawn at random. Find the probability that the number on this ticket is either a multiple of 3 or 4.

49. The probability of the occurrence of an event is $\dfrac{3}{8}$. Find the probability of the non-occurrence of the event.

50. The probability of non-occurrence of an event is $\dfrac{5}{12}$. Find the probability of the occurrence of the event.

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51. The odds in favour of an event are $3:4$. Find the probability of the non occurrence of the event.

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52. The odds against of an event $5:3$. Find the probability of the occurrence of the event.

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53. There are 15 prizes and 25 blaks in a lottery. Find the probability of getting a prize on one ticket.

54. Two dice are thrown. Find the odds in favour of getting the sum i. 4 ii. 5 iii. what are the odds against getting the sum 6?

55. Two letters are drawn from the english alphabets.

Find the probability that both letters are vowels.

56. A and B are two events such that $P(A) = 0.5, P(B) = 0.4$ and $(A \, or \, B) = 0.6,$ then find $P(A \, and \, B)$.

57. A and B are two events such that $P(A) = 0.60$, $P(A \text{ or } B) = 0.85$ and P (A and B $= 0.42$, then find $P(B)$.

58. (i) A and B are two events in a random experiment such that $P(A \cup B) = 0.7$, $(A \cap B) = 0.3$ and $P(\overline{A}) = 0.4$, find $P(\overline{B})$

(ii) If $P(A) = \dfrac{2}{3}P(B) = \dfrac{4}{9}$ and $P(A \cap B) = \dfrac{14}{45}$, then find the value of $P(A \cup B)$ and $P(A' \cap B')$

59. For two mutually exclusive events A and B , $P(A) = \dfrac{1}{3}$ and $P(B) = \dfrac{1}{4}$, find $(A \cup B)$.

60. A, B, C are three mutually exclusive and exhaustive events associated with a random experiment. Fine $P(A)$, it being given that $P(B) = \dfrac{3}{2}P(A) and P(C) = \dfrac{1}{2}P(B).$

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61. A number is selected at random from first 200 natural numbers. Find the probability that it is divisible by either 3 or 5.

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62. A card is drawn at random from a well shuffled pack of 52 cards. Find the probability that it is either an ace or spade.

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63. A card is drawn at random from a well shuffled pack of 52 cards. Find the probability that it is either red or a king.

64. Two cards are drawn at random from a well shuffled pack of 52 cards. Find the probability that the cards drawn are either red or aces.

65. A pair of dice is thrown once. What is the probability that either an even number of first dice or a sum of 8 will appear.

66. A dice is thrown twice. Find the probability of getting 3 at least one time.

67. A card is drawn from a well shuffled pack of 52 cards. What is the probability that neither a spade nor a king will drawn?

68. The probability of the occurrence of event A is $\dfrac{1}{3}$ and the probability of the occurrence of event B is $\dfrac{1}{4}$. Find the probability that neigher A nor B will occur, it is given that A and B are mutually exclusive events.

69. There are 60% students in Maths and 305 in Biology. If 10% students are in both subjects. Find the probability that a randomly selected student has Maths or Biology.

70. There are 100 bolts and 50 nuts in a box, out of which 50% bolts and 50% nuts are defective. Two items are drawn at random from the box, find the probability that both are either bolts or defective.

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71. Two dice are thrown together. What is the probability that the sum of the numbers on the two faces si neither divisible by 3 nor by 4?

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72. The probabilities of three events A, B, C are such that $P(A) = 0.3, P(B) = 0.4, P(C) = 0.8, P(A \cap B) = 0.09, P(A \cap C) = 0.2$ .Show that $P(B \cap C)$ lies in the interval $[0.21, 0.46]$.

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Mcq Type

1. The one throw of two dice, the probability of getting an even number of first or a tota of 8 is:

A. $\dfrac{2}{9}$

B. $\dfrac{4}{9}$

C. $\dfrac{5}{9}$

D. $\dfrac{7}{9}$

Answer: C

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2. Three coins are tossed together. Find the probability of getting: exactly two heads (ii) at least two heads at least one head and one tail (iv) no tails

A. $\dfrac{1}{2}$

B. $\dfrac{1}{3}$

C. $\dfrac{1}{4}$

D. $\dfrac{1}{6}$

Answer: A

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3. The probability of the occurrence of an event is $\dfrac{3}{7}$

The probability of non-occurrence of the event is:

A. $\dfrac{3}{7}$

B. $\dfrac{4}{7}$

C. $\dfrac{2}{7}$

D. None of these

Answer: B

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4. What is the probability that a leap year has 3 Sundays and 53 Mondays?

A. $\dfrac{2}{7}$

B. $\dfrac{3}{7}$

C. $\dfrac{4}{7}$

D. $\dfrac{5}{7}$

Answer: A

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5. A problem in mathematics is given to 3 students whose chances of solving it are $\dfrac{1}{2}; \dfrac{1}{3}; \dfrac{1}{4}$. What is the probability that the problem is solved?

A. $\dfrac{3}{4}$

B. $\dfrac{1}{2}$

C. $\dfrac{1}{3}$

D. $\dfrac{1}{4}$

Answer: A

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6. There are 5 red and 4 black balls in a bag. The probability of drawing a red ball is:

A. $\dfrac{4}{9}$

B. $\dfrac{5}{9}$

C. $\dfrac{5}{11}$

D. $\dfrac{6}{11}$

Answer: B

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7. A card is drawn at random from a pack of cards. The probability that the card drawn is not diamond, is:

A. $\dfrac{1}{4}$

B. $\dfrac{3}{4}$

C. $\dfrac{1}{13}$

D. $\dfrac{12}{13}$

Answer: B

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8. The favourable chance of drawing a card of diamond from a pack of 52 cards is:

A. $1:3$

B. $3:1$

C. $1:4$

D. $4:1$

Answer: A

9. The probability of getting a sum of atleast 9 in one throw of two dice is:

A. $\dfrac{1}{3}$

B. $\dfrac{11}{36}$

C. $\dfrac{5}{18}$

D. $\dfrac{13}{18}$

Answer: C

10. In a single throw of three dice, determine the probability of getting i. total of 5 ii. total of at most 5 ii. a total of at least 5.

A. $\dfrac{1}{36}$

B. $\dfrac{1}{18}$

C. $\dfrac{1}{12}$

D. $\dfrac{1}{9}$

Answer: A

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11. The probability that at least one of the events A and B occurs is 0.6. If A and B occur simultaneously with probability 0.2, then find $P(A) + P(B)$.

A. 0.2

B. 0.4

C. 0.8

D. None of these

Answer: D

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12. If there are 6 girls and 5 boys who sit in a row, then the probability that no two boys sit together is

A. $\dfrac{\lfloor 6 \lfloor 6}{\lfloor 2 \lfloor 11}$

B. $\dfrac{\lfloor 7 \lfloor 5}{\lfloor 11}$

C. $\dfrac{\lfloor 6 \lfloor 7}{2 \lfloor 11}$

D. None of these

Answer: C

13. A four digit number is formed using the digits 1, 2, 3, 5 with no repetitions. Write the probability that the number is divisible by 5.

A. $\dfrac{1}{4}$

B. $\dfrac{1}{8}$

C. $\dfrac{3}{4}$

D. $\dfrac{5}{8}$

Answer: A

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14. For two events A and B $P(A) = \dfrac{3}{4}$ and $P(B) = \dfrac{5}{8}$. The false statement is:

A. $P(A \cup B) \geq \dfrac{3}{4}$

B. $\dfrac{1}{8} \leq P(A \cap B') \leq \dfrac{3}{8}$

C. $\dfrac{3}{8} \leq P(A \cap B) \leq \dfrac{5}{8}$

D. $P(A \cup B) \leq \dfrac{1}{2}$

Answer: D

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15. 12 balls are keeped in three bags. The probability that there are 3 balls in first bag is:

A. $\dfrac{110}{9} \left(\dfrac{2}{3} \right)^{10}$

B. $\dfrac{110}{9} \left(\dfrac{3}{2} \right)^{10}$

C. $\dfrac{.^{12}C_3}{3^{12}}$

D. $\dfrac{.^{12}C_3}{12^3}$

Answer: A

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16. In one throw of two dice, the probability of getting a number on first dice smaller than number on second dice, is,

A. $\dfrac{1}{2}$

B. $\dfrac{5}{12}$

C. $\dfrac{1}{3}$

D. $\dfrac{7}{12}$

Answer: B

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17. Two numbers are selected from first 40 natural numbers. The probability that the sum of two number is odd is:

A. $\dfrac{16}{39}$

B. $\dfrac{19}{39}$

C. $\dfrac{20}{39}$

D. None of these

Answer: C

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18. In a single throw of three dice, find the probability of getting the same number on all the three dice.

A. $\dfrac{5}{12}$

B. $\dfrac{17}{72}$

C. $\dfrac{55}{72}$

D. None of these

Answer: A

19. Cards are drawn one by one without replacement from a pack of 52 cards. The probability of the 11th card drawn is first ace,is:

A. $\dfrac{451}{884}$

B. $\dfrac{373}{884}$

C. $\dfrac{164}{4165}$

D. None of these

Answer: C

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20. Three integers are chosen at random from the first 20 integers. The probability that their product is even is:

A. $\dfrac{4}{19}$

B. $\dfrac{17}{19}$

C. $\dfrac{16}{19}$

D. $\dfrac{5}{19}$

Answer: B

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1. The coin is tossed three times.

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2. A dice is thrown two times.

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3. Find the number of possible outcomes of tossing a coin four times.

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4. A coin is tossed and a die is thrown

5. A coin is tossed and then a die is rolled only in case a head is shown on the coin.

6. 2 boys and 2 girls are in room P and 1 boy 3 girls are in room Q. write the sample space for the experiment in which a room is selected and then a person.

7. Describe the sample space for the indicated experiment : One die of red colour, one of white colour and one of blue colour are placed in a bag. One die is selected at random and rolled, its colour and the number on its uppermost face is noted

8. An experiment consists of recording boy-girl composition of families with 2 children. (i) What is the sample space if we are interested in knowing whether it is a boy or girl in the order of their births? (ii) What is the sample space if we are

9. A box contains 1 red and 3 identical white balls. Two balls are drawn at random in succession without replacement. Write the sample space thise experiment.

10. An experiment consists of tossing a con and then throwing it second time if a head occurs. If a tail occurs on the first toss, then a die is rolled once. Find the sample space.

11. Suppose 3 bulbs are selected at random form a lot. Each bulb is tested and classified as defective (D) or non-defective (N). Write the sample space of this experiment.

12. A com is tossed. If the outcome is a head, a die is thrown. If the die shows up an even number, the die is thrown again. What is the sample space for the experiment?

13. The numbers 1,2,3 and 4 are written separately on four slips of paper. The slips are put in a box mixed thoroughly. A person draws two slips from the box, one after the other without replacement. Describe the sample space for the experiment.

14. An experiment consists of rolling a die and the tossing a coin once if the number on the die is even.If the number on the die is odd, the coin is tossed twice. Write the sample space for this experiment.

15. A coin is tossed. If it showsf a tail, we draw a ball from a box which contains 2 red and 3 black balls. If it shows head, we throw a die. Find the samle space for this experiment.

16. A die is thrown repeatedly untill a six comes up. What is the sample space for this experiment?

17. A die is rolled. Let E be the event die shows 4 and F be the event die shows even number. Are E and F mutually exclusive?

18. A die is thrown. Describe the following events:

(i) A: number less than 7

(ii) B: a number greater than 7

(iii) C: a mutiple of 3

(iv) D: a number less than 4

(v) E: an even number greater than 4

(vi) F: a number not less than 3

Also find

$A \cup B, A \cap B, B \cup C, E \cap F, D \cap E, A - C, D - E, E \cap F', F'$

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19. An experiment involves rolling a pair of dice and recording the numbers that come up. Describe the following events: A: the sum is greater than 8, B: 2 occurs on either die C: the sum is at least 7 and a multiple of 3. Which pairs of these events

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20. Three coins are tossed once. Let A denote the event "three heads snow", B denote the event "two heads and one tail show", C denote the event three tails show and D denote the event "a head shows on the first coin". Which events are (i) mutually e

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21. Three coins are tossed. Describe (i) Two events which are mutually exclusive. (ii) Three events which are mutually exclusive and exhaustive. (iii) Two events, which are not mutually exclusive. (iv) Two events which are mutually exclusive but not exhaustiv

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22. Two dice are thrown. The events A, B and C are as follows:

A: getting an even number on the first die.

B: getting an odd number on the first die.

C: getting the sum of the number on the first dice ≤ 5.

Describe the events

(i) A' (ii) not B (iii) A or B

(iv) A and B (v) A but not C (vi) B or C

(vii) B and C (viii) $A \cap B' \cap C'$

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23. Which of the following cannot be valid assignment of probabilities for

outcomes of sample space $S = \{W_1, W_2, W_3, W_4, W_5, W_6, W_7\}$

Assignment	W_1	W_2	W_3	W_4	W_5	W_6	W_7
(a)	0.1	0.01	0.05	0.03	0.01	0.2	0.6
(b)	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$
(c)	0.1	0.2	0.3	0.4	0.5	0.6	0.7
(d)	–0.1	0.2	0.3	0.4	–0.2	0.1	0.3
(e)	$\frac{1}{14}$	$\frac{2}{14}$	$\frac{3}{14}$	$\frac{4}{14}$	$\frac{5}{14}$	$\frac{6}{14}$	$\frac{15}{14}$

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24. A coin a tossed twice, that is the probability that at least one tail

occurs?

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25. A die is thrown, find the probability of following events:

(i) A prime number will appear,

(ii) A number greater than or equal to 3 will appear,

(iii) A number less than or equal to one will appear,

(iv) A number more than 6 will appear,

(v) A number less than 6 will appear.

26. A card is selected from a pack of 52 cards.

(a) How many points are there in the sample space?

(b) Calculate the probability that the card is an ace of spades.

(c) Calculate the probability that the card is (i) an ace (ii) black card.

27. A fair coin with 1 marked on one face and 6 on the other and a fair die are both tossed. Find the probability that the sum of numbers that turn up is (i) 3 (ii) 12.

28. There are four men and six women on the city council. If one council member is selected for a committee at random how likely is it that it is a woman?

29. A fair coin is tossed four times, and people win Re 1 for each head and lose Rs 1.50 for each tail that turns up. From the sample space calculate how many different amounts of money you can have after four tosses and the probability of having each of these amount

A. $\dfrac{1}{9}$

B. $\dfrac{1}{16}$

C. $\dfrac{1}{8}$

D. $\dfrac{1}{24}$

Answer: C

30. Three coins are tossed once. Fmd the probability of getting (i) 3 heads (ii) 2 heads (iii) atleast 2 heads (iv) atmost 2 heads (v) no head (vi) 3 tails (vii) exactly two tails (vm) no tail (ix) atmost two tails

31. If $\dfrac{2}{11}$ is the probability of an event, what is the probability of the event not A

32. A letter is chosen at random from the word ASSASSINATION. Find the probability that letter is (i) a vowel (ii) a consonant.

33. In a lottery, a person choses six different natural numbers at random from 1 to 20, and if these six numbers match with the six numbers already fixed by the lottery committee, he wins the prize. What is the probability of Winning the prize in the

34. Check whether the following probabilities $P(A)$ and $P(B)$ are consistently defined

(i) $P(A) = 0.5$, $P(B) = 0.7$, $P(A \cap B) = 0.6$

(ii) $P(A) = 0.5$, $P(B) = 0.4$, $P(A \cup B) = 0.8$

35. Fill in the blanks in following table:

	$P(A)$	$P(B)$	$P(A \cap B)$	$P(A \cup B)$
(i)	$\dfrac{1}{3}$	$\dfrac{1}{5}$	$\dfrac{1}{15}$	...
(ii)	0.35	...	0.25	0.6
(iii)	0.5	0.35	...	0.7

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36. Given $P(A) = \dfrac{3}{5}$ and $P(B) = \dfrac{1}{5}$. Find $P(A \, or \, B)$, if A and B are mutually exclusive events.

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37. If E and F are events such that $P(E) = \dfrac{1}{4}, P(F) = \dfrac{1}{2}$ and $P(E and F) = \dfrac{1}{8}$, find (i) $P(E \, or \, F)$ (ii) P (not E and not F).

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38. Events E and F are such that P (not E or not F) $= 0.25$. State whether E and F are mutually exclusive.

39. A and B are events such that $P(A) = 0.42$, $P(B) = 0.48$ and $P(AandB) = 0.16$. Determine (i) P(not A), (ii) P(not B) and (iii) P(A or B)

40. In class XI of a school 40% of the students study Mathematics and 30% study Biology. 10% of the class study both mathematics and biology. If a student is selected at random from the class, find the probability that he will be studying Mathematics or Biology or both.

41. In an entrance test that is graded on the basis of two examinations, the probability of a randomly chosen student passing the first examination is 0.8 and the probability of passing the second examination is 0.7. The probability of passing atleas

42. The probability that a student will pass the final examination in both English and Hindi is 0.5 and the probability of passing neither is 0.1. If the probability of passing the English examination is 0.75. What is the probability of passing the Hindi examination?

43. In a class of 60 students, 30 opted for NCC, 32 opted for NSS and 24 opted for both NCC and NSS. If one of these students is selected at random, find the probability that (i) The student opted for NCC or NSS. (ii) The student has opted neithe

Miscellaneous Exercise

1. A box contains 10 red marbles, 20 blue marbles nad 30 green marbles. 5 marbles are drawn from the box, what is the probability that: (i) all will be blue? (ii) at least one will be green?

2. 4 cards are drawn from a well - shuffled deck of 52 cards. What is the probability of obtaining 3 diamonds and one spade?

3. A die has two faces each with number 1, three faces each with number 2 and one face with number 3. If die rolled once determine: i. P(2) ii. P(1 or 3)

iii. P(not 3)

4. In a certain lottery 10,000 tickets are sold and ten equal prizes are awarded. What is the probability of not getting a prize if you buy (a) one ticket (b) two tickets (c) 10 tickets.

5. Out of 100 students two sections of 40 and 60 are formed If you and your friend are among 100 students what is the probability (i) you both enter the same section (ii) you both enter the different sections.

6. Three letters are dictated to three persons and an envelope is addressed to each of them, the letters are inserted into the envelopes at

random so that each envelope contains exactly one letter. Find the probability that at least one letter is in

7. A and B are two events such that $P(A) = 0.54$, $P(B) = 0.69$ and $P(A \cap B) = 0.535$.

(i) $P(A \cup B)$ (ii) $P(A' \cap B')$

(iii) $P(A \cap B')$ (iv) $P(B \cap A')$

8. From the employees of a company, 5 persons are selected to represent them in the managing committee of the company. Particulars of five persons are as follows:

No.	Name	Sex	Age in year
1.	Harish	M	30
2.	Rohan	M	33
3.	Sheetal	F	46
4.	Alis	F	28
5.	Salim	M	41

A person is selected at random from this group to act as a spokeperson. What is the probability that the spokesperson wil be either male or over 35 years?

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9. If 4-digit numbers greater than 5,000 are randomly formed from the digits 0, 1, 3, 5. and 7. what is the probability of forming a number divisible by 5 when, (i) the digits are repeated? (ii) the repetition of digits is not allowed?

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10. The number lock of a suitcase has 4 wheels, each labelled with ten digits i.e., from 0 to 9. The lock opens with a sequence of four digits with no repeats. What is the probability of a person getting the right sequence to open the suitcase?

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