



MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

PROBABILITY

Examples Of Sample Spaces

1. A coin is tossed once. Write its sample space.



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2. List the sample space in throwing a die.



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3. Two coins (a one rupee coin and a two rupee coin) are tossed once. Find a sample space.



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4. If a coin is tossed three times (or three coins are tossed together), then describe the sample space for this experiment.



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5. A coin tossed and then a die is thrown. Describe the sample space for this experiment.



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6. Two dice are thrown. Describe the sample space of this experiment.



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7. From a group of 3 boys and 2 girls, we select two children. What would be the sample space for this experiment ?



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8. A coin is tossed twice. If the second throw results in a tail then a die is thrown. Describe the sample space.



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9. A coin is tossed. If it shows 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 sample space for this experiment.



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10. 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.



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11. A bag contains 4 identical red balls and 3 identical black balls. The experiment consists of drawing one ball, then putting it

into the bag and again drawing a ball. What are the possible outcomes of the experiment?



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Examples

1. Two dice are rolled. Let A , B , C be the events of getting a sum of 2, a sum of 3 and a sum of 4 respectively. Then, show that

- (i) A is a simple event
- (ii) B and C are compound events
- (iii) A and B are mutually exclusive



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2. From a group of 2 boy and 3 girls, two children are selected at random. Describe the events. A = both selected children are girls. B= the selected group consists of one boy and one girl. C= at least one boy is selected. Which pairs (s) of events is (are) mutually exclusive?



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3. Two dice are rolled. A is the event that the sum of the numbers shown on the two dice is 5. B is the event that at least one of the two dice shows up 3. Are the two events A and B 'exhaustive' ? Give argument in support of your answer.



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4. Find the probability of getting a head when a coin is tossed once. Also find the probability of getting a tail.



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5. Two coins are tossed once. Find the probability of

(i) getting 2 heads (ii) getting at least 1 head

(iii) getting no head (iv) getting 1 head and 1 tail



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6. Three unbiased coins are tossed once. What is the probability of getting

(i) all head ? (ii) two heads ? (iii) one head ?

(iv) at least 1 head ? (v) at least 2 heads ?



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7. A die is tossed once. What is the probability of getting

(i) the number 4 ? (ii) an even number ?

(iii) a number less than 5 ? (iv) a number greater than 4 ?

(v) the number 8 ? (iv) a number less than 8 ?

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8. In a single throw of two dice, find the probability of obtaining

'a total of 8'.

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9. Two dice are thrown simultaneously. Find the probability of getting

(i) a doublet

(ii) an even number as the sum

(iii) a prime number as the sum

(iv) a multiple of 2 as the sum

(v) a total of at least 10

(vi) a doublet of even numbers

(vii) a multiple of 2 on one die and a multiple of 3 on the other die



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10. 20 cards are numbered from 1 to 20. One card is then drawn at random. What is the probability that the number on the card drawn is

(i) a prime number ? (ii) an odd number ?

(iii) a multiple of 5? (iv) not divisible by 3 ?



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11. From a well - shuffled deck of 52 cards, a card is drawn at random. Find the probability of getting

(i) an ace (ii) a heart (iii) an eight of heart

(iv) a club (v) a red card (vi) a face card

(vii) a diamond (viii) a jack (ix) a black card



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12. From a well - shuffled deck of 52 cards, a card is drawn at random. Find the probability that the card drawn is

(i) red and a king (ii) either red or a king



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13. A bag contains 9 red and 12 white balls. One ball is drawn at random. Find the probability that the ball drawn is red.



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14. The odds in favour of occurrence of an event are 5 : 12. Find the probability of the occurrence of this event.



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15. If the probability of the occurrence of a certain event E is $\frac{3}{11}$, find (i) the odds in favour of its occurrence, and (ii) the odds against its occurrence.



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16. If $\frac{3}{10}$ is the probability that an event will happen, what is the probability that it will not happen



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17. Three dice are thrown together. Find the probability of getting a total of at least 6.



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18. If the odds favour of an event be $\frac{3}{5}$, find the probability of the occurrence of the event.



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19. Two dice are thrown. Find (i) the odds in favour of getting the sum 5, and (ii) the odds against getting the sum 6.



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20. A card is drawn from a well - shuffled deck of 52 cards. Find (i) the odds in favour of getting a face card, and (ii) the odds against getting a spade.



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21. Two cards are drawn at random from a pack of 52 well shuffled playing cards. The probability that the cards drawn are aces is



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22. If E_1 and E_2 are two events associated with a random experiment such that

$$P(E_2) = 0.35, P(E_1 \text{ or } E_2) = 0.85 \text{ and } P(E_1 \text{ and } E_2) = 0.15,$$

then $P(E_1)$ is (A) .25 (B) .35 (C) .65 (D) .75



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23. Two dice are tossed together. Find the probability of getting a doublet or a total of 6.



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24. Two unbiased dice were thrown. Find the probability that neither a doublet nor a total of 10 will appear.

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

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

C. $\frac{7}{9}$

D. $\frac{2}{9}$

Answer: C



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25. A natural number is chosen at random from amongst first 500. What is the probability that the number so chosen is divisible by 3 or 5?



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26. A card is drawn at random from a well - shuffled deck of 52 cards. Find the probability of its being a spade or a king.



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27. Two cards are drawn from a pack of 52 cards. What is the probability that either both are red or both are kings?



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28. A box contains 100 bolts and 50 nuts. It is given that 50 % bolts and 50 % nuts are rusted. Two objects are selected from the box at random. Find the probability that either both are bolts or both are rusted.



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29. If E_1 and E_2 are two events such that

$P(E_1) = 0.5$, $P(E_2) = 0.3$ and $P(E_1 \text{ and } E_2) = 0.1$, 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) $P(\text{neither } E_1 \text{ nor } E_2)$



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30. 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 $P(\overline{E_1}) + P(\overline{E_2})$



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31. The probabilities of the occurrences of two events

E_1 and E_2 are 0.25 and 0.50 respectively. The probability of

their simultaneous occurrence is 0.14. Find the probability that neither E_1 nor E_2 occurs.



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32. A card is drawn from a deck of 52 cards. Find the probability of getting a king or a heart or a red card.



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Exercise 31 A

1. A coin is tossed once. Find the probability of getting a tail.



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2. A die is thrown. Find the probability of

(i) getting a 5 (ii) getting a 2 or a 3

(iii) getting an odd number (iv) getting a prime number

(v) getting a multiple of 3 (vi) getting a number between 3 and 6



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3. In a single throw of two dice, find the probability of

(i) getting a sum less than 6

(ii) getting a doublet of odd numbers

(iii) getting the sum as a prime number



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4. In a single throw of two dice, find

(i) P (an odd number on the first die and a 6 on the second)

(ii) P (a number greater than 3 on each die)

(iii) P (a total of 10)

(iv) P (a total greater than 8)

(v) P (a total of 9 or 11)



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5. A bag contains 4 white and 5 black balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is white.



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6. An urn contains 9 red, 7 white and 4 black balls. A ball is drawn at random. Find the probability that the ball drawn is

(i) red (ii) white (iii) red or white

(iv) white or black (v) not white



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7. In a lottery, there are 10 prizes and 25 blanks. Find the probability of getting a prize.



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8. If there are 2 children in a family, find the probability that there is at least one boy in the family.



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9. Three unbiased coins are tossed once. Find the probability of getting

(i) exactly 2 tails (ii) exactly one tail (iii) at most 2 tails

(iv) at least 2 tails (v) at most 2 tails or at least 2 heads



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10. In a single throw of two dice, determine the probability of not getting the same number on the two dice.



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11. If a letter is chosen at random from the English alphabet, find the probability that the letter chosen is (i) a vowel, and (ii) a consonant.



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12. A card is drawn at random from a well - shuffled pack of 52 cards. What is the probability that the card bears a number greater than 3 and less than 10 ?



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13. Tickets numbered from 1 to 12 are mixed up together and then a ticket is withdrawn at random. Find the probability that the ticket has a number which is a multiple of 2 or 3.



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14. What is the probability that an ordinary year has 53 Tuesdays ?



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15. What is the probability that a leap year has 53 Sundays ?



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16. What is the probability that in a group of two people, both will have the same birthday, assuming that there are 365 days in a year and no one has his/her birthday on 29th February ?



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17. Which of the following cannot be the probability of occurrence of an event ?

A. 0

B. $\frac{-3}{4}$

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

D. $\frac{4}{3}$

Answer: A::D



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18. If $\frac{7}{10}$ is the probability of occurrence of an event, what is the probability that it does not occur ?



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19. The odds in favour of the occurrence of an event are 8 : 13.

Find the probability that the event will occur.



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20. If the odds against the occurrence of an event be 4 : 7, find the probability of the occurrence of the event.



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21. If $\frac{5}{14}$ is the probability of occurrence of an event, find

(i) the odds in favour of its occurrence

(ii) the odds against its occurrence



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22. Two dice are thrown. Find

(i) the odds in favour of getting the sum 6

(ii) the odds against getting the sum 7



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23. A combination lock on a suitcase has 3 wheels, each labelled with nine digits from 1 to 9. If an opening combination is a particular sequence of three digits with no repeats, what is the probability of a person guessing the right combination ?



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24. In a lottery, a person chooses 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



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25. 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.



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Exercise 31 B

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



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2. Let A and B be two events associated with a random experiment for which $P(A) = 0.4$, $P(B) = 0.5$ and $P(A \text{ or } B) = 0.6$.

Find $P(A \text{ and } B)$.



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3. In a random experiment, let A and B be events such that $P(A \text{ or } B) = 0.7$, $P(A \text{ and } B) = 0.3$ and $P(\bar{A}) = 0.4$. Find $P(B)$.



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4. If A and B are two events associated with a random experiment such that $P(A) = 0.25$, $P(B) = 0.4$ and $P(A \text{ or } B) = 0.5$, find

the values of

(i) $P(A \text{ and } B)$ (ii) $P(A \text{ and } \bar{B})$



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5. If A and B be two events associated with a random experiment such that $P(A) = 0.3$, $P(B) = 0.2$ and $P(A \cap B) = 0.1$, find

(i) $P(\bar{A} \cap B)$ (ii) $P(A \cap \bar{B})$



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6. Given two mutually exclusive events A and B such that $P(A) = \frac{1}{2}$ and $P(B) = \frac{1}{3}$, find $P(A \text{ or } B)$

A. $\frac{5}{6}$

B. $\frac{1}{6}$

C. $\frac{3}{6}$

D. $\frac{2}{6}$

Answer: A



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7. Let A and B be two mutually exclusive events of a random experiment such that $P(\text{not } A) = 0.65$ and $P(A \text{ or } B) = 0.65$, find $P(B)$.

A. 0.3

B. 0.4

C. 0.5

D. 0.6

Answer: A



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



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9. The probability that a company executive will travel by plane is $\frac{2}{5}$ and that he will travel by train is $\frac{1}{3}$. Find the probability of his travelling by plane or train.

A. $\frac{14}{15}$

B. $\frac{13}{15}$

C. $\frac{11}{15}$

D. $\frac{8}{15}$

Answer: C



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10. When a card is drawn at random from a well shuffled pack of 52 playing cards, the probability that it may be either king or queen is

A. $\frac{2}{13}$

B. $\frac{3}{13}$

C. $\frac{4}{13}$

D. $\frac{5}{13}$

Answer: A



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11. From a well - shuffled pack of cards, a card is drawn at random. Find the probability of its being either a queen or a heart.

A. $\frac{7}{13}$

B. $\frac{6}{13}$

C. $\frac{5}{13}$

D. $\frac{4}{13}$

Answer: D



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12. A card is drawn at random from a well shuffled deck of 2 cards. Find the probability of its being a spade or a king.

A. $\frac{4}{13}$

B. $\frac{5}{13}$

C. $\frac{3}{13}$

D. $\frac{1}{13}$

Answer: A



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13. One number is chosen from numbers 1 to 100. Find the probability that it is divisible by 4 or 6?

A. $\frac{33}{100}$

B. $\frac{31}{100}$

C. $\frac{37}{100}$

D. $\frac{39}{100}$

Answer: A



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14. A die is thrown twice. What is the probability that at least one of the two throws comes up with the number 4?

A. $\frac{11}{36}$

B. $\frac{13}{36}$

C. $\frac{17}{36}$

D. $\frac{19}{36}$

Answer: A



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15. Two dice are tossed once. Find the probability of getting an even number on the first die or a total of 8.

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

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

C. $\frac{7}{9}$

D. $\frac{8}{9}$

Answer: B



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

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

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

C. $\frac{7}{9}$

D. $\frac{8}{9}$

Answer: A



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17. In a class, 30% of the students offered mathematics, 20% offered chemistry and 10% offered both. If a student is

selected at random, find the probability that he has offered mathematics or chemistry.

A. $\frac{1}{5}$

B. $\frac{4}{5}$

C. $\frac{2}{5}$

D. $\frac{3}{5}$

Answer: C



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18. The probability that Hemant passes in English is $\frac{2}{3}$ and the probability that he passes in Hindi is $\frac{5}{9}$. If the probability of his passing both the subjects is $\frac{2}{5}$, find the probability that he will pass in at least one of these subjects.

A. $\frac{31}{45}$

B. $\frac{33}{45}$

C. $\frac{39}{45}$

D. $\frac{37}{45}$

Answer: D



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19. The probability that a person will get an electric contract is $\frac{2}{5}$ and the probability that he will not get plumbing contract is $\frac{4}{7}$. If the probability of getting at least one contract is $\frac{2}{3}$, what is the probability that he will get both.

A. $\frac{16}{105}$

B. $\frac{17}{105}$

C. $\frac{19}{105}$

D. $\frac{13}{105}$

Answer: C



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20. The probability that a patient visiting a dentist will have a tooth extracted is 0.06, the probability that he will have a cavity filled is 0.2, and the probability that he will have a tooth extracted or a cavity filled is 0.23. What is the probability that he will have a tooth extracted as well as a cavity filled ?

A. 0.06

B. 0.05

C. 0.03

D. 0.04

Answer: C



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21. In a town of 6000 people 1200 are over 50 years old and 2000 are female. It is known that 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. $\frac{13}{30}$

B. $\frac{14}{30}$

C. $\frac{17}{30}$

D. $\frac{19}{30}$

Answer: A



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