MATHS

BOOKS - KUMAR PRAKASHAN KENDRA MATHS (GUJRATI ENGLISH)

PROBABILITY

Exercise 16 1

1. 1 to 7, describe the sample space for the indicated experiment. A coin is tossed three items.

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2. 1 to 7, describe the sample space for the indicated experiment.

A die is thrown two times.

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3. 1 to 7, describe the sample space for the indicated experiment.

A coin is tossed four times.

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4. 1 to 7, describe the sample space for the indicated experiment.

A coin is tossed and a die is thrown.

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5. 1 to 7, describe the sample space for the indicated experiment.

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

6. 1 to 7, describe the sample space for the indicated experiment.

2 boys and 2 girls are in Room X and 1 boy and 3 girls in Room Y. Specify the sample space for the experiment in which a room is selected and then a person.

7. 1 to 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. Describe the sample space.

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 interested in the number of girls in the family ?

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

10. An experiment consists of tossing a coin 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.

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

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12. A coin is tossed. If the out come 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 and 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 then tossing a coin once if the number on die is even. If the number on die is odd, the coin is tossed twice. Write the sample space for this experiment.

15. A coin is tossed. If it shows a tail, we draw a balls 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.

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

Exercise 16 2

1. 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 ?

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

(i) A: a number less then 7

(ii) B : a number greater then 7

(iii) C: a multiple of 3.

(iv) D : a number less then 4

(v) E : an even number greater then 4

(vi) F : a number not less then 3

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

3. An experiment involves rolling a pair of dice and recording the numbers that come up. Describe the following events :

A : the sum is greater then 8.

B : 2 occurs on either die

C : the sum is at least 7 and a multiple of 3.

Which pairs of these events are mutually exclusive ?

4. Three coins are tossed once. Let A denote the event three heads show", 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 exclusive ? (ii) simple ? (iii) Compound ?

5. Three coins are tossed . Describe

Two events which are mutually exclusive.

6. Three coins are tossed . Describe

Three events which are mutually exclusive and exhaustive.

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7. Three coins are tossed . Describe

Two events which are not mutually exclusive.

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8. Three coins are tossed . Describe

Two events which are mutually exclusive but not exhaustive.

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9. Three coins are tossed. Describe

Three events which are mutually exclusive but not exhaustive.

10. 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 numbers on the dice $\leq$ 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) $A' \cap B' \cap C'$

11. Refer to question 6 above, state true or false : (give reason for your answer)

A and B are mutually exclusive.

12. Refer to question 6 above, state true or false : (give reason for your answer)

A and B are mutually exclusive and exhaustive

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13. Refer to question 6 above, state true or false : (give reason for your answer)

A=B'

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14. Refer to question 6 above, state true or false : (give reason for your answer)

A and C are mutually exclusive

15. Refer to question 6 above, state true or false : (give reason for your answer)

A and B are mutually exclusive.

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Exercise 16 3

1. Refer to question 6 above, state true or false : (give reason for your answer)

A', B', C are mutually exclusive and exhaustive.

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2. Which of the following can not 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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3. A coin is tossed twice, what is the probability that at least one tail occurs?

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

A prime number will appear.

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

A number greater than or equal to 3 will appear.

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

A number less than or equal to one will appear,

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

A number more than 6 will appear,

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

A number less then 6 will appear.

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

How many points are there in the sample space ?

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

Calculate the probability that the card is an ace of spades.

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

Calculate the probability that the card is

(i) an ace (ii) black card.

12. 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.

13. 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?

14. A fair coin is tossed four times and a person win R1 for each head and lose R1.50 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 the amounts.

15. Three coins are tossed once. Find the probability of getting

(i) 3 heads

(ii) 2 heads

(iii) at least 2 heads

(iv) at most 2 heads

(v) no head

(vi) 3 tails

(vii) exactly two tails

(viii) no tail

(ix) at most two tails

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

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

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18. In a lottery, a person chosen 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 game ?

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

20. Find in the blanks in following table :

	P(A)	P(B)	P(A ∩ B)	P(A ∪ B)
(I)	$\frac{1}{3}$	$\frac{1}{5}$	$\frac{1}{15}$	-
(II)	0.35	-	0.25	0.6
(III)	0.5	0.35	-	0.7

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

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

24. A and B are events such that P(A)=0,42, P(B) =0.48 and P(A and B) =0.16. Determine (i) P(not A), (ii) P(not B) and (iii) P(A or B)

25. 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.

26. 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 at least one of them is 0.95. What is the probability of passing both ?

27. The probability that a student will pass the final examination in both English and Hind 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 ?

28. In a class of 60 students, 30 opted for NC C, 32 opted for NSS and 24 opted for both NC C and NSS. If one of these students is selected at random, find the probability that

(i) The student opted for NC C or NSS.

(ii) The student has opted neither NC C nor NSS.

(iii) The student has opted NSS but not NC C.

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Miscllaneous Exercise 16

1. A box contains 10 red marbles, 20 blue marbles and 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 ?

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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 is 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 the 100 students, what is th probability that

(a) you both enter the same section?

(b) you both enter the different sections ?

6. There 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 its proper envelope.

7. A and B are two events such that P(A)=0.54, P(B)=0.69 and P(A,C, B) =0.35. Find

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

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

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

S.No.	Name	sex	age in years
1.	harish	M	30
2.	Rohon	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 spokespersons. What is the probability that the spokespersons will 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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Textbook Based Mcqs

1. A and B are mutually exclusive events. If P(B)=0.4 and P(A) =0.5 then

$P(A' \cap B') = \ldots \ldots$

A. 0.9

B. 0.1

C. 0.2

D. 0.23

Answer: B

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2. The integer is selected at random from 1 to 25. The probability that it is a prime number is

A. $\dfrac{9}{25}$

B. $\dfrac{16}{25}$

C. $\dfrac{7}{25}$

D. $\dfrac{18}{25}$

Answer: A

3. 8 boys and 2 girls sit in a row randomly. The probability that two girls do not sit together is ....

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

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

C. $\dfrac{3}{5}$

D. $\dfrac{2}{5}$

Answer: B

4. A die is tossed. The probability that the number on a die is divisible by 3 is ....

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

B. $\dfrac{2}{3}$

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

D. $\dfrac{5}{6}$

Answer: C

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5. A and B are mutually exclusive events. P(A)=0.38, then $P(A \cap B') = \dots \dots$

A. 0.38

B. 1

C. 0.12

D. 0.62

Answer: A

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6. A, B and C are mutually exclusive and exhaustive events. P(A) = 0.40, P(B) = P(C), then P(B) = ...

A. 0.40

B. 0.60

C. 0.20

D. 0.30

Answer: D

7. Two dice are throw together. The probability that numbers on both

the dice are same is ......

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

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

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

    D. $\dfrac{3}{28}$

Answer: C

8. Two dice are thrown together. The probability that the sum of the

numbers obtained on both the dice is prime is ....

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

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

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

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

Answer: B

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9. Without repetition of the number, two digit numbers are formed with the numbers 1, 2, 3, 4, 5. The probability that such a number is divisible by 4 is ......

A. $\dfrac{1}{30}$

B. $\dfrac{1}{20}$

C. $\dfrac{1}{40}$

D. none of these

Answer: D

10. A box contains 6 nails and 10 nuts. Half of the nails and half of the nuts are rusted. If one item is chosen at random, the probability that is rusted or is a nail is ......

A. $\dfrac{3}{16}$

B. $\dfrac{5}{16}$

C. $\dfrac{11}{16}$

D. $\dfrac{14}{16}$

Answer: C

11. For any event A,

A. $P(A) + P(A') = 0$

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

C. $P(A) > 1$

D. $P(A) = P(A')$

Answer: B

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12. Two dice are thrown. The number on one die is multiple of 2 and the number on other die is multiple of 3. Its probability is ......

A. $\dfrac{5}{36}$

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

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

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

Answer: B

13. If $P(A \cap B) = \dfrac{1}{2}, P(A' \cap B') = \dfrac{1}{3}, P(A) = a$ and $P(B) = 2a$, then a =...........

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

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

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

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

Answer: B

14. A box contains 5 blue and 4 white balls. A person select two balls randomly from it. The probability that both the balls are of same colour is .....

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

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

C. $\dfrac{5}{108}$

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

Answer: A

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15. Three students A, B and C participate in the swimming competition. The probability that A and B win the game is same. The probability of B to win the game is twice the probability of C to win the game. Then the probability to win B or C is ....

A. $\dfrac{3}{5}$

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

C. $\dfrac{1}{5}$

D. 1

Answer: A

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16. Three cards are drawn at random from a pack of 52 cards. The probability of drawing cards which has a king, a queen and a jack is .....

A. $\dfrac{64}{5525}$

B. $\dfrac{16}{5525}$

C. $\dfrac{128}{5525}$

D. none of these

Answer: B

17. Four persons are selected at random out of 3 men, 2 women and 4 children. The probability that there are exactly 2 children in the selection is ....

A. $\dfrac{10}{21}$

B. $\dfrac{8}{63}$

C. $\dfrac{5}{21}$

D. $\dfrac{9}{21}$

Answer: A

18. While dialing a telephone number, an old man forgets its last two digit. If the last two digits are distinct, then the probability that a man dials true number is ......

A. $\dfrac{1}{45}$

B. $\dfrac{1}{90}$

C. $\dfrac{1}{100}$

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

Answer: B

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19. A letter is selected randomly from the English alphabet. The probability that the selected letter is vowel is ....

A. $\dfrac{21}{26}$

B. $\dfrac{5}{26}$

C. $\dfrac{3}{26}$

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

Answer: B

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20. Two cards are drawn at random from a pack of 52 cards. The probability that both the cards are kings is ……..

A. $\dfrac{1}{221}$

B. $\dfrac{5}{221}$

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

D. $\dfrac{1}{21}$

Answer: A

Textbook Illustrations For Practice Work

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

2. Find the sample space associated with the experiment of rolling a
pair of dice (one is blue and the other red) once. Also, find the
number of elements of this sample space.

3. In each of the following experiments specify appropriate sample
space

(i) A boy has a 1 rupee coin, a 2 rupee coin and a 5 rupee coin in his pocket. He takes out two coins out of his pocket, one after the other.

4. In each of the following experiments specify appropriate sample space

A person is noting down the number of accidents along a busy highway during a year.

5. A coin is tossed. If it shows head, we draw a ball from a bag consisting of 3 blue and 4 white balls, if it shows tail we throw a die. Describe the sample space of this experiment.

6. Consider the experiment in which a coin is tossed repeatedly until a head comes up. Describe the sample space.

7. Consider the experiment of rolling a die. Let A be the event 'getting a prime number', B be the event 'getting an odd number'. Write the sets representing the events (i) A or B (ii) A and B (iii) A but not B (iv) 'not A.

8. Two dice are thrown and the sum of the numbers which come up on the dice is noted. Let us consider the following events associated with this experiment

A : 'the sum is even'

B : 'the sum is a multiple of 3'.

C: 'the sum is less than 4'

D: 'the sum is greater than 11'.

Which pairs of these events are mutually exclusive ?

9. A coin is tossed three times, consider the following events.

A : 'No head appears,

B : 'Exactly one head appears' and

C: 'At least two heads appear'.

Do they form a set of mutually exclusive and exhaustive events?

10. Let a sample space be $S = \{w_1, w_2, \ldots\ldots, w_6\}$. Which of the following assignments of probabilities to each outcome are valid ?

Outcomes	ω_1	ω_2	ω_3	ω_4	ω_5	ω_6
(a)	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
(b)	1	0	0	0	0	0
(c)	$\frac{1}{8}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$-\frac{1}{4}$	$-\frac{1}{3}$
(d)	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{3}{2}$
(e)	0.1	0.2	0.3	0.4	0.5	0.6

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11. One card is drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate the probability that the card will be

(i) a diamond (ii) not an ace (iii) a black card (i.e., a club or, a spade)

(iv) not a diamond (v) not a black card.

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12. A bag contains 9 discs of which 4 are red, 3 are blue and 2 are yellow. The discs are similar in shape and size. A disc is drawn at random from the bag. Calculate the probability that it will be (i) red, (ii) yellow, (iii) blue, (iv) not blue, (v) either red or blue.

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13. Two students Anil and Ashima appeared in an examination. The probability that Anil will qualify the examination is 0.05 and that Ashima will qualify the examination is 0.10. The probability that both will qualify the examination is 0.02. Find the probability that

(a) Both Anil and Ashima will not qualify the examination.

(b) Atleast one of them will not qualify the examination and

(c) Only one of them will qualify the examination.

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14. A committee of two persons is selected from two men and two women. What is the Probability probability that the committee will have (a) no man ? (b) one man ? (c) two men?

15. On her vacations Veena visits four cities(A, B, C and D) in random order. What is the probability that she visits

(i) A before B? (ii) A before B and B before C?

(iii) A fist and B last? (iv) A either first or second? (v) A just before B?

16. Find the probability that when a hand of 7 cards is drawn from well sheffled deck of 52 cards, it contians (i) all kings (ii) 3 Kings (iii) atleast 3 Kings.

17. If A, B C are three events associated with a random experiment, prove that

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C).$$

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18. In a relay race there are five teams A, B, C, D and E.

(a) What is the probability that A, B and C finish first, second and third, respectively.

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19. In a relay race there are five teams A, B, C, D and E.

(b) What is the probability that A, B and C are first three to finish (in

any order) (Assume that all finishing orders are equally likely)

Solutions Of Ncert Exemplar Problems Short Answer Type Questions

1. If the letters of the word ALGORITHM are arranged at random in a row what is the probability the letters GOR must remain together as a unit ?

2. Six new employees, two of whom are married to each other, are to be assigned six desks that are lined up in a row. If the assignment of employees to desks is made randomly, what is the probability that the married couple will have nonadjacent desks?

3. Suppose an integer from 1 through 1000 is chosen at random, find the probability that the integer is a multiple of 2 or a multiple of 9.

4. An experiment consists of rolling a die until a 2 appears.

(i) How many elements of the sample space correspond to the event that the 2 appears on the kth roll of the die ?

5. An experiment consists of rolling a die until a 2 appears.

(ii) How many elements of the sample space correspond to the event that the 2 appears not later than the kth roll of the die ?

6. A die is loaded in such a way that each odd number is twice as likely to occur as each even number. Find P(G), where G is the event that a number greater than 3 occurs on a single roll of the die.

7. In a large metropolitan area, the probabilities are .87,.36,.30 that a family (randomly chosen for a sample survey) owns a colour television set, a black and white television set, or both kinds of sets. What is the probability that a family owns either anyone or both kinds of sets ?

8. If A and B are mutually exclusive events, $P(A) = 0.35$ and $P(B) = 0.45$, find

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

(iv) $P(A \cap B)$ (v) $P(A \cap B')$ (vi) $P(A' \cap B')$

9. A team of medical students doing their internship have to assist during surgeries at a city hospital. The probabilities of surgeries rated as very complex, complex, routine, simple or very simple are respectively, 0.15, 0.20, 0.31, 0.26, .08. Find the probabilities that a particular surgery will be rated

(i) complex or very complex

(ii) neither very complex nor very simple

(iii) routine or complex

(iv) routine or simple

10. Four candidates A, B, C, D have applied for the assignment to coach a school cricket team. If A is twice as likely to be selected as B, and B and C are given about the same chance of being selected, while C is twice as likely to be selected as D, what are the probabilities that

(i) C will be selected ?

(ii) A will not be selected ?

11. One of the four persons John, Rita, Aslam or Gurpreet will be promoted next month. Consequently the sample space consists of four elementary outcomes S = {John promoted, Rita promoted, Aslam promoted, Gurpreet promoted} You are told that the chances of John's promotion is same as that of Gurpreet, Rita's chances of promotion are twice as likely as Johns. Aslam's chances are four times that of John.

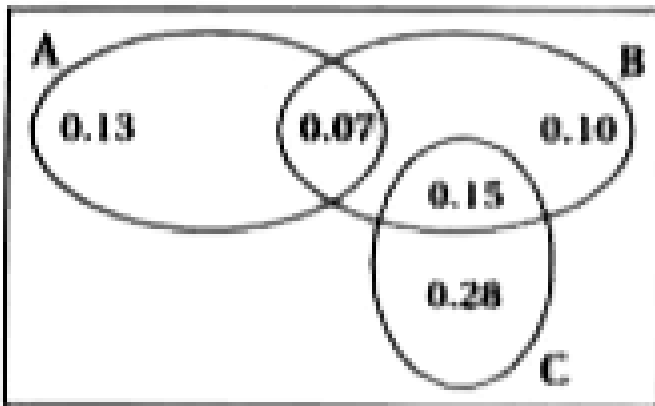(a) P Determine (John promoted)

P (Rita promoted)

P (Aslam promoted)

P (Gurpreet promoted)

(b) If A= { John promoted or Gurpreet promoted}, find P(A).

12. The accompanying Venn diagram shows three events, A,B, and C, also the probabilities of the various intersections (for instance, $P(A \cap B) = .07$). Determine

(i) P(A)

(ii) $P(B \cap C')$

(iii) $P(A \cup B)$

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

(v) $P(B \cap C)$

(vi) Probability of exactly one of the three occurs.

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Solutions Of Ncert Exemplar Problems Long Answer Type Questions

1. One urn contains two black balls (labelled B_1 and B_2) and one white ball. A second urn contains one black ball and two white balls (labelled W_1, and W_2). Suppose the following experiment is performed. One of the two urns is chosen at random. Next a ball is randomly chosen from the urn. Then a second ball is chosen at random from the same urn without replacing the first ball.

(i) Write the sample space showing all possible outcomes

(ii) What is the probability that two black balls are chosen ?

(iii) What is the probability that two balls of opposite colour are chosen ?

2. A bag contains 8 red and 5 white balls. Three balls are drawn at random. Find the Probability that

All the three balls are white

3. A bag contains 8 red and 5 white balls. Three balls are drawn at random. Find the Probability that

All the three balls are red

4. A bag contains 8 red and 5 white balls. Three balls are drawn at random. Find the Probability that

One ball is red and two balls are white

5. If the letters of the word ASSASSINATION are arranged at random. Find the Probability that

(a) Four S's come consecutively in the word

(b) Two I's and two N's come together

(c) All A's are not coming togerther

(d) No two A's are coming together.

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

7. If P (A) is the probability for any event A. then $P(A) < P(\overline{A})$.

8. Determine the probability p, for each of the following events.

(a) An odd number appears in a single toss of a fair die.

(b) At least one head appears in two tosses of a fair coin.

(c) A king, 9 of hearts, or 3 of spades appears in drawing a single card

from a well shuffled ordinary deck of 52 cards.

The sum of 6 appears in a single toss of a pair of fair dice.

Solutions Of Ncert Exemplar Problems Objective Type Questions

1. In a non-leap year's, the probability of having 53 Tuesdays or 53 Wednesdays is

A. $\dfrac{1}{7}$

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

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

D. none of these

Answer: B

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2. Three numbers are chosedn from 1 to 20 . Find the probability that they are not consecutive

A. $\dfrac{186}{190}$

B. $\dfrac{187}{190}$

C. $\dfrac{188}{190}$

D. $\dfrac{18}{^{20}C_3}$

Answer: B

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3. While shuffling a pack of 52 playing cars, 2 are accidentally dropped. Find the probability that the missing cards to be of different colours

A. $\dfrac{29}{52}$

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

C. $\dfrac{26}{51}$

D. $\dfrac{27}{51}$

Answer: C

4. Seven persons are to be seated in a row. The probability that two particular persons sit next to each other is

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

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

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

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

Answer: C

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5. Without repetition of the numbers, four digit numbers are formed with the numbers 0, 2, 3, 5. The probability of such a number divisibele by 5 is

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

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

C. $\dfrac{1}{30}$

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

Answer: D

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6. If A and B are mutually exclusive events, then

A. $P(A) \le P(B')$

B. $P(A) \ge P(B')$

C. $P(A) < P(B')$

D. none of these

Answer: A

7. If $P(A \cup B) = P(A \cap B)$ for any two events A and B, then ....

A. $P(A) = P(B)$

B. $P(A) > P(B)$

C. $P(A) \leq P(B)$

D. none of these

Answer: A

8. 6 boys and 6 grils sit in a row at random. The probability that all the girls sit together is

A. $\dfrac{1}{432}$

B. $\dfrac{12}{431}$

C. $\dfrac{1}{132}$

D. none of these

Answer: C

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9. A single letter is selected at random from the word 'PROBABILITY'.

The probability that it is a vowel is

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

B. $\dfrac{4}{11}$

C. $\dfrac{2}{11}$

D. $\dfrac{3}{11}$

Answer: B

10. If the probabilities for A to fail in an examination is 0.2 and that

for B is 0.3, then the probability that either A or B fails is

A. > 0.5

B. 0.5

C. ≤ 0.5

D. 0

Answer: C

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

P(A')+P(B') is

A. 0.4

B. 0.8

C. 1.2

D. 1.6

Answer: C

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12. If M and N are any two events, the probability that at least one of them occurs is

A. $P(M) + P(N) - 2P(M \cap N)$

B. $P(M) + P(N) - P(M \cap N)$

C. $P(M) + P(N) + P(M \cap N)$

D. $P(M) + P(N) + 2P(M \cap N)$

Answer: B

Solutions Of Ncert Exemplar Problems True False

1. The probability that a person visiting a zoo will see the giraffe is 0.72, the probability that he will see the bears is 0.84 and the probability that he will see both is 0.52.

2. The probability that a student will pass his examination is 0.73, the probability of the student getting a compartment is 0.13, and the probability that the student will either pass or get compartment is 0.96.

3. The probabilities that a typist will make 0, 1, 2, 3, 4, 5 or more mistakes in typing a report are, respectively, 0.12, 0.25, 0.36, 0.14, 0.08, 0.11.

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4. If A and B are two candidates seeking admission in an engineering College. The probability that A is selected is .5 and the probability that both A and B are selected is at most.3. Is it possible that the probability of B getting selected is 0.7?

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5. The probability of intersection of two events A and B is always less than or equal to those favorable to the event A.

6. The probability of an occurrence of event A is .7 and that of the occurrence of event B is .3 and the probability of occurrence of both is .4.

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7. The sum of probabilities of two students getting distinction in their final examinations is 1.2.

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Solutions Of Ncert Exemplar Problems Fillers

1. The probability that the home team will win an upcoming football game is 0.77, the probability that it will tie the game is 0.08, and the

probability that it will lose the game is ......

2. If E_1, E_2, E_3 and E_4 are the four elementary outcomes in a sample space and $P(E_1) = 0.1, P(E_2) = 0.5, P(E_3) = 0.1,$ then the probability of E_4 is ....

3. Let $S = \{1, 2, 3, 4, 5, 6\}$ and $E = \{1, 3, 5\}$ then E' is ....

4. If A and B are two events associated with a random experiment such that $P(A) = 0.3, P(B) = 0.2$ and $P(A \cap B) = 0.1,$ then the value of $P(A \cap B')$ is ....

5. The probability of happening of an event A is 0.5 and that of B is 0.3. If A and B are mutually exclusive events, then the probability of neither A nor B is ....

Solutions Of Ncert Exemplar Problems Match The Followings

1. Match the Column-I with the correct answer in Column-II

Column - I	Column - II
(i) 0.95	(a) Not possible for event.
(ii) 0.02	(b) Event does not occur.
(iii) –0.3	(c) Event may or may not occur.
(iv) 0.5	(d) Event occurs.
(v) 0	(e) Occurrences of the event has very less possibility.

2. Match the Column-I with the correct answer in Column-II

Column - I	Column - II
(i) If E_1 and E_2 are the two mutually exclusive events	(a) $E_1 \cap E_2 = E_1$
(ii) If E_1 and E_2 are the mutually exclusive and exhaustive events.	(b) $(E_1 - E_2) \cup (E_1 \cap E_2) = E_1$
(iii) If E_1 and E_2 have common outcomes, then	(c) $E_1 \cap E_2 = \phi$ and $E_1 \cup E_2 = S$
(iv) $E_1 \subset E_2$ are two events such that $E_1 \subset E_2$	(d) $E_1 \cap E_2 = \phi$

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Question Of Module

1. A coin is tossed four times write the elements of sample space.

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2. How many elements are event that coin is tossed n time.

3. Consider the experiment in which a coin is tossed repeatedly until a head comes up. Describe the sample space.

4. Does empty set represents an event? If yes, name the tpye of event. If no, then give reason.

5. A coin is tossed thrice. Write the elements of an event that 3 heads are not obtained. Also give complement of that event.

6. If $A = \emptyset$ and $B = \emptyset$ then does A and B are mutually exclusive. Give reason of your dedication.

7. If probability of event A is $\frac{7}{11}$, then give probability of its complement event A'?

8. $P(A) = 0.5, P(B) = 0.4.$ Find $P(A \cap B)$ if $P(A \cup B) = 0.8.$ Give reason if it not valid.

9. A and B are two events such that P(A)=0.54, P(B)=0.69 and P(A,C, B) =0.35. Find

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

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

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Practice Work

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

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2. describe the sample space for the indicated experiment. From a group of 2 boys and 3 girls, two children are selected.

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3. Write the sample space at an event that coin is tossed till to head is obtained observe that it is an example of finite or infinite sample space.

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

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

6. A coin is tossed thrice. If all the three times, the result is tail, a die is thrown. Otherwise the experiment become end. Write the sample space for this experiment.

7. Two cards are selected randomly from four cards denoted as A, B, C, D without replacement. Describle the sample space for this experiment.

8. A box contain 3 identical red balls, 3 identical white balls and 1 black ball. A ball is selected randomly from a bag and then put it in

the bag. Aging a ball is drawn. Write the sample space for this experiment.

9. A coin is tossed. If the result is head, a coin is tossed again. If the result is tail, a die is thrown. Write the sample space for this experiment.

10. Three distinct balls are placed in two drawers. Write the sample space for this experiment.

11. A sample space 5 consists 1 to 30 positive integers. Event A Ai shows the elementary divisible by i. Write the elements of the events A_2, A_3, A_4, A_5. Veify the truthless of following statements.

(1) A_2 and A_3 are mutually exclusive events.

(2) A_4 is a subset of A_2.

(3) A_3, A_4 and A_5 are not mutually exclusive.

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12. A die is throw. Describe the following events :

A: The number on die is less than 7.

B: The number on die is multiple of 3.

C : The number on die is greater than 4.

D: The number on die is smaller than 2.

Also find $A \cap C$, $B \cup C$, $D' \cup C'$.

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13. A bag contains a red ball, a black ball, a yellow ball and a white ball. One ball is selected randomly and note its colour and then put it into the bag. Again second ball is selected and note its colour. Write the sample space for this experiment. Hence, describe the following events :

(1) A: Selected both the balls are of same colours.

(2) B: Only one ball is white.

(3) C: At least one ball is white.

(4) D: Both the balls are of different colour.

Hence, find $A \cap B$, $B \cup C$, $A \cup D$, $A \cap D$. What can we say about the events B and C ? What can we say about the events A and D?

14. Two dice are thrown write the sample space for this experiment. Describe the following events.

Event A : The sum of the number on the dice is divisible by 4.

Event B : The sum of the numbers on the dice is divisible by 3.

Event C: The sum of the numbers is less than 7.

Event D: Both the numbers on the dice are even.

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15. Three dice are rolling simultaneously. Find the probability of getting same numbers on all dice.

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16. The integer is selected at random from 1 to 25. The probability that it is a prime number is

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17. An urn contains 7 white, 5 black and 3 read balls. Two balls are drawn at random. Find the probability that.

(i) Both the balls are red.

(ii) One balls is red and other is black.

One ball is white.

18. A single letter is selected at random from the word 'PROBABILITY'. The probability that it is a vowel is

19. A card is drawn at random from pack of 52 playing cards. Find the probability of getting (i) a face card (ii) red card.

20. A five digit number is formed by the digits 1, 2, 3, 4, 5 without repetition. Find the probability that the number is divisible by 4.

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21. Three squares of chess board are selected at random. Find the probability of getting 2 squares of one colour and other of a different colour.

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22. What is the probability that in a leap year chosen at random will contain 53 Sunday?

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23. A and B are mutually exclusive event. If $P(A) = \frac{1}{4}$, $P(B) = \frac{2}{5}$ and $P(A \cup B) = \frac{1}{2}$.

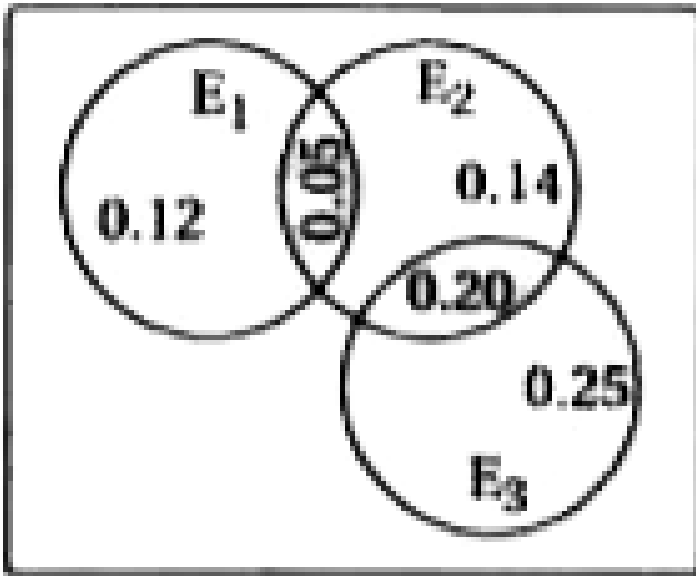**24.** A die is thrown twice. What is the probability that at least one of the two throws comes up with the number 4 ?

25. A, B and C are mutually exclusive and exhaustive events. If $P(B) = \frac{3}{2}P(A)$ and $P(C) = \frac{1}{2}P(B)$, then find P(A).

26. Following Vann diagram show the probabilities of three events.

Find the following probabilities.

(i) $P(E_2)$ (ii) $P(E_2 \cap E_3)$

(iii) $P(E_1 \cup E_2)$ (iv) $P(E_1 \cap E_2')$

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27. Find the probability of getting almost two tails or at least two heads in a toss of three coins.

28. A number is chosen at random from the numbers 20 to 50. What is the probability that the number chosen is a multiple of 3 or 5 or 7 ?

29. A basket contains 15 guava and 12 banana. Out of which 5 guava and 7 banana are defective. If a person takes out 3 at random, then what is the probability that either all are guava or all are good?

30. If A and B are mutually exclusive events, $P(A) = 0.35$ and $P(B) = 0.45$, find

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

(iv) $P(A \cap B)$ (v) $P(A \cap B')$ (vi) $P(A' \cap B')$

31. Find the probability that when a hand of 7 cards is drawn from a well shuffled deck of 52 cards it contains :

(i) All queens

(ii) 3 Queens

(iii) At least 3 Queens

32. In an interview for a job, 5 boys and 3 girls appeared. If 4 persons are to be selected at randon from this group, then find the probability that 3 boys and 1 girl or 1 boy and 3 girls are selected.

33. A box contains 8 red, 3 white and 9 black balls. If three balls are drawn at random, find the probability that:

(i) All three balls are of different colour,

(ii) One ball is red and two balls are white.

(iii) All three balls are black.

34. A group consists of 3 men, 2 women and 4 children. If four persons are selected at| random, find the probability of selecting :

(i) 1 man, 1 woman and 2 children

(ii) Exactly 2 children (iii) 2 women

35. An integer is chosen at random from first 200 natural numbers. What is the probability that the integer chosen is divisible by 6 or 8 ?

36. The probability that a student will receive A, B, C or D grade are 0.40, 0.50, 0.15 and 0.10 respectively. Find the probability that a student will receive (i) B or C grade (ii) At least C grade.

37. A and B are mutually exclusive events. P(A)=0.28, P(B)=0.38, then find (i) $P(A \cup B)$, (ii) $P(A \cap B)$, (iii) $P(A \cap B')$, (iv) $P(A' \cap B')$

38. Without repetition of the numbers, four digit numbers are formed with the numbers 0, 2, 3, 5. The probability of such a number divisibele by 5 is

39. Three of six vertices of a regular hexagon are chosen at random. What is the probability that the triangle with these vertices is equilateral ?

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40. Two dice are thrown together. What is the probability that sum of the numbers on the two faces is neither divisible by 3 not by 4 ?

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