

SATISH SCIENCE ACADEMY

DHANORI PUNE-411015

PROBABILITY

Class 10 - Mathematics

Time Al	lowed: 3 hours Maximum Marks:	174
	Section A	
1.	Two dice are thrown together. The probability of getting the same number on both dice is	[1]
	a) $\frac{1}{6}$ b) $\frac{1}{12}$	
	c) $\frac{1}{3}$ d) $\frac{1}{2}$	
2.	A number is selected at random from 1 to 75. The probability that it is a perfect square is	[1]
	a) $\frac{10}{75}$ b) $\frac{8}{75}$	
	c) $\frac{6}{75}$ d) $\frac{4}{75}$	
3.	A girl has a cube one letter written on each face, as shown below:	[1]
	M, N, P, M, N, M	
	The cube is thrown once. The probability of getting M is	
	a) $\frac{1}{3}$ b) $\frac{1}{5}$	
	c) $\frac{1}{2}$ d) $\frac{1}{4}$	
4.	An unbiased die is thrown once. The probability of getting a composite number is	[1]
	a) $\frac{2}{5}$ b) $\frac{1}{3}$	
	c) $\frac{2}{3}$ d) $\frac{1}{2}$	
5.	A number is chosen from the numbers 1, 2, 3 and denoted as x, and a number is chosen from the numbers 1, 4, 9	[1]
	and denoted as y. Then $P(xy < 9)$ is:	
	a) $\frac{7}{9}$ b) $\frac{5}{9}$	
	c) $\frac{3}{9}$ d) $\frac{1}{9}$	
6.	A card is drawn at random from a well-shuffled deck of 52 playing cards. The probability of getting an ace of	[1]
	spade is:	
	a) $\frac{1}{13}$ b) $\frac{3}{52}$	
	c) $\frac{1}{52}$ d) $\frac{1}{26}$	
7.	A coin is tossed thrice. The probability of getting at least two tails is	[1]
	a) $\frac{4}{5}$ b) $\frac{2}{3}$	
	c) $\frac{1}{4}$ d) $\frac{1}{2}$	
8.	A bag contains 6 red, 8 white, 4 green and 7 black balls. One ball is drawn at random. The probability that the	[1]
	ball is drawn is neither green nor white is	

a)
$$\frac{8}{25}$$
 b) $\frac{12}{25}$
c) $\frac{13}{25}$ d) $\frac{4}{25}$
The probablity that a number selected at random from the numbers 1, 2, 3, ..., 15 is a multiple of 4, is

a)
$$\frac{2}{15}$$
 b) $\frac{1}{5}$
c) $\frac{4}{15}$ d) $\frac{1}{15}$

10. A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, [1]
6, 7, 8, 9, 10 and these values are equally likely outcomes. The probability that it will point at a number greater than 5 is

- a) $\frac{1}{2}$ b) $\frac{1}{4}$ c) $\frac{1}{5}$ d) $\frac{1}{3}$
- 11. A box contains 90 discs, numbered from 1 to 90. If one disc is drawn at random from the box, the probability [1] that it bears a prime number less than 23, is

b) $\frac{7}{90}$

d) $\frac{4}{45}$

b) $\frac{1}{2}$ d) $\frac{3}{5}$

b) •

d) $\frac{1}{6}$

a)
$$\frac{10}{90}$$

c) $\frac{9}{89}$

- 12. Cards, each marked with one of the numbers 6,7,8 ,..., 15, are placed in a box and mixed thoroughly. One card is [1] drawn at random from the box, What is the probability of getting a card with number less than 10
 - a) $\frac{2}{5}$

9.

- c) $\frac{1}{3}$
- 13. The probability of getting an even, number, when a die is thrown once is
 - a) $\frac{5}{6}$
 - c) $\frac{1}{2}$

14. A die is thrown once. The probability of getting an even number is

- a) $\frac{1}{3}$ c) $\frac{1}{6}$ b) $\frac{5}{6}$ d) $\frac{1}{2}$
- 15. The probability of throwing a number greater than 2 with a fair dice is:
 - a) $\frac{5}{6}$ b) $\frac{2}{3}$ c) $\frac{1}{3}$ d) $\frac{1}{2}$
- 16. A letter is chosen at random from the word ASSASSINATION. The probability that it is a vowel is
 - a) $\frac{6}{13}$ b) $\frac{7}{13}$ c) $\frac{6}{31}$ d) $\frac{3}{13}$
- 17. A letter of English alphabets is chosen at random. The probability that the letter chosen is a vowel is[1]
 - a) $\frac{2}{26}$ b) $\frac{4}{26}$ c) $\frac{1}{26}$ d) $\frac{5}{26}$
- 18. Two fair coins are tossed together. The probability of getting 2 heads, is:
 - a) $\frac{1}{4}$ b) $\frac{3}{8}$

2/10

[1]

[1]

[1]

[1]

[1]

[1]

	c) $\frac{3}{4}$	d) $\frac{1}{2}$			
19.	A number x is chosen at random from the numbers -3, -2, -1, 0, 1, 2, 3 the probability that $ x < 2$ is				
	a) $\frac{1}{7}$	b) $\frac{2}{7}$			
	c) $\frac{3}{7}$	d) $\frac{5}{7}$			
20.	In a lottery, there are 8 prizes and 16 blanks. What is	the probability of getting a prize?	[1]		
	a) $\frac{1}{2}$	b) $\frac{4}{3}$			
	c) $\frac{1}{3}$	d) $\frac{2}{3}$			
21.	Let A and B be two independent events.		[1]		
	Assertion (A): If P(A) = 0.3 and $P(A \cup \overline{B})$ = 0.8, the	hen P(B) is $\frac{2}{7}$			
	Reason (R): $P(\overline{E}) = 1$ - P(E), where E is any event.				
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the			
	explanation of A.	correct explanation of A.			
	c) A is true but R is false.	d) A is false but R is true.			
22.	Assertion (A): If the probability of an event is P then	the probability of its complimentary event will be 1 - P.	[1]		
	Reason (R): When E and \bar{E} are complimentary even	ts, then P(E) + $P(\bar{E})$ = 1.			
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the			
	explanation of A.	correct explanation of A.			
	c) A is true but R is false.	d) A is false but R is true.			
23.	Assertion (A): Probability of getting 53 Sundays on	a leap year is $\frac{1}{7}$.	[1]		
	Reason (R): There are 52 complete weeks and 2 days extra in a leap year.				
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the			
	explanation of A.	correct explanation of A.			
	c) A is true but R is false.	d) A is false but R is true.			
24.	Assertion (A): If A and B are two independent event	is and it is given that $P(A) = \frac{2}{5}$, $P(B) = \frac{3}{5}$, then	[1]		
	$P(A \cap B) = \frac{6}{25}$				
	Reason (R): $P(A \cap B) = P(A) \cdot P(B)$, where A at	nd B are two independent events.			
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the			
	explanation of A.	correct explanation of A.			
	c) A is true but R is false.	d) A is false but R is true.			
25.	Assertion (A): The probability of getting number 8 of	on rolling a die is zero (0).	[1]		
	Reason (R): The probability of an impossible event is zero (0).				
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the			
	explanation of A.	correct explanation of A.			
	c) A is true but R is false.	d) A is false but R is true.			
26.	Assertion (A): The probability of getting a prime num	mber, when a die is thrown once, is $\frac{2}{3}$.	[1]		
	Reason (R): On the faces of a die, prime numbers are	e 2, 3, 5.			
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the			

	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
27.	Assertion (A): In a simultaneous throw of a pair of die	ce. The probability of getting a double is $\frac{1}{6}$.	[1]
	Reason (R): The probability of an event may be negat	ive.	
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the	
	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
28.	Assertion (A): The probability of winning a game is 0	.4, then the probability of losing it, is 0.6	[1]
	Reason (R): $P(E) + P(not E) = 1$		
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the	
	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
29.	Assertion (A): in rolling a dice, the probability of gett	ing the number 8 is zero.	[1]
	Reason (R): It is an impossible event.		
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the	
	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
30.	Assertion (A): The probability of an impossible event	is 0.	[1]
	Reason (R): There is no favorable event in case of an	impossible event.	
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the	
	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
	Sect	tion B	
31.	A bag contains 18 balls out of which x balls are red. If	two more red balls are put in the bag, the probability of	[2]
	drawing a red ball will be $\frac{9}{8}$ times the probability of dr	awing first case. Find the value of x.	
32.	A box contains 12 balls out of which x are black. If on	e ball is drawn at random from the box, what is the	[2]
	probability that it will be a black ball? If 6 more black	balls are put in the box, the probability of drawing a black	
22	ball is now double of what it was before. Find x.	webshility of drawing a blue ball from the bag is thrice	[0]
33.	A bag contains 5 red balls and some blue balls. If the p	bag	[2]
34.	A bag contains 15 white and some black balls. If the p	robability of drawing a black ball from the bag is thrice	[2]
-	that of drawing a white ball find the number of black b	balls in the bag.	r_1
35.	A bag contains 15 white and some black balls. If the p	robability of drawing a black ball from the bag is thrice	[2]
	that of drawing a white ball, find the number of black	balls in the bag.	
36.	A bag contains 5 red balls and some blue balls. If the p	probability of drawing a blue ball is double that of a red	[2]
	ball, find the number of blue balls in the bag.		
37.	The probability of selecting a red ball at random form	a jar that contains only red, blue and orange balls is $\frac{1}{4}$.	[2]
	The probability of selecting a blue ball at random from	the same jar is $\frac{1}{3}$. If the jar contains 10 orange balls, find	
	the total number of balls in the jar.		

38.	A bag contains 6 red balls and some blue balls. If the probability of drawing a blue ball from the bag is twice	[2]
	that of a red, find the number of blue balls in the bag.	
39.	Two different dice are tossed together. Find the probability	[2]
	i. that the number on each die is even.	
	ii. that the sum of numbers appearing on the two dice is 5.	
40.	A card is drawn at random from a pack of 52 cards. Find the probability that the card drawn is neither a heart nor	[2]
	a king.	
41.	A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is thrice	[2]
	that of the red ball, find the number of blue balls in the bag.	
42.	Box A contains 25 slips of which 19 are marked Rs 1 and other are marked Rs 5 each. Box B contains 50 slips	[2]
	of which 45 are marked Rs 1 each and others are marked Rs 13 each. Slips of both boxes are poured into a third	
	box and reshuffled. A slip is drawn at random. What is the probability that it is marked other than Rs 1?	
43.	If a number x is chosen at random from the numbers - 2 ,- 1 ,0 ,1 ,2 . What is the probability that x^2 < 2?	[2]
44.	A die is thrown once. Find the probability of getting	[2]
	i. a composite number,	
	ii. a prime number.	
45.	Three coins are tossed together. Find the probability of getting exactly two heads.	[2]
46.	A lot consist of 144 ball pens of which 20 are defective and others are good. Nuri will buy a pen if it is good, but	[2]
	will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the	
	probability that:	
	i. she will buy it?	
	ii. she will not buy it?	
47.	A die is thrown once. Find the probability of getting	[2]
	i, a prime number;	
	ii. a number lying between 2 and 6	
	iii. an odd number.	
48.	A bag contains 15 white and some black balls. If the probability of drawing a black ball from the bag is thrice	[2]
	that of drawing a white ball find the number of black balls in the bag.	
	Section C	
49.	In a game, the entry fee is Rs 5. The game consists of tossing a coin 3 times. If one or two heads show, Shweta	[3]
	gets her entry fee back. If she throws 3 heads, she receives double the entry fees. Otherwise, she will lose. For	
	tossing a coin three times, find the probability that she	
	i. loses the entry fee.	
	ii. gets double entry fee.	
	iii. just gets her entry fee.	
50.	One card is drawn at random from a well-shuffled deck of 52 cards. Find the probability that the card drawn is	[3]
	i. a king,	
	ii. a red eight,	

iii. a spade,

51. A square dart board is placed in the first quadrant from x = 0 to x = 6 and y = 0 to y = 6. A triangular region on [3] the dart board is enclosed by the lines y = 2, x = 6 and y = x. Find the probability that a dart that randomly hits

the dart board will land in the triangular region formed by the three lines.

- 52. Two customers are visiting a particular shop in the same week (Monday to Saturday). Each is equally likely to [3] visit the shop on any one day as on another. What is the probability that both will visit the shop on:
 - i. the same day?
 - ii. different days?
 - iii. consecutive days?
- 53. Three unbiased coins are tossed simultaneously. Find the probability of getting (i) exactly 2 heads, (ii) at least 2 [3] heads, (iii) at most 2 heads.
- 54. Peter throws two different dice together and finds the product of the two numbers obtained. Rina throws a die **[3]** and squares the number obtained. Who has the better chance to get the number 25?
- 55. A bag contains cards from 1 to 49. A card is drawn from the bag at random, after mixing the cards thoroughly. [3]Find the probability that the number on the drawn card is
 - i. an odd number
 - ii. a multiple of 5
 - iii. a perfect square
 - iv. an even prime number
- 56. A die is numbered in such a way that its faces show the numbers 1, 2, 2, 3, 3, 6. It is thrown two times and the **[3]** total score in two throws is noted. Complete the following table which gives a few values of the total score on the two throws:



What is the probability that the total score is

- i. even
- ii. 6
- iii. at least 6
- 57. Cards numbered 11 to 60 are kept in a box. If a card is drawn at random from the box, find the probability that [3] the number on the drawn card is (i) an odd number, (ii) a perfect square number, (iii) divisible by 5, (iv) a prime number less than 20.
- 58. 17 cards numbered 1, 2, 3, 4, ..., 17 are put in a box and mixed thoroughly. A card is drawn at random from the **[3]** box. Find the probability that the card drawn bears

i. An odd number

ii. A number divisible by 5.

Section D

59. Read the following text carefully and answer the questions that follow: [4]
 Some students were asked to list their favourite colour. The measure of each colour is shown by the central angle

of a pie chart given below:



- i. If a student is chosen at random, then find the probability of his/her favourite colour being white? (1)
- ii. What is the probability of his/her favourite colour being blue or green? (1)
- iii. If 15 students liked the colour yellow, how many students participated in the survey? (2)
 - OR

What is the probability of the favourite colour being red or blue? (2)

60. The table given below shows the ages of 75 teachers in a school.

[4]

Age (in years)	18-29	30-39	40-49	50-59
Number of teachers	3	27	37	8

A teacher from this school is chosen at random. What is the probability that the selected teacher is

- i. 40 or more than 40 years old?
- ii. of an age lying between 30-39 years (including both)?
- iii. 18 years or more and 49 years or less?
- iv. 18 years or more old?

61. Read the following text carefully and answer the questions that follow:

[4]

In a survey on holidays, 120 people were asked to state which type of transport they used on their last holiday. The following pie chart shows the results of the survey.



Observe the pie chart and answer the following questions:

- i. If one person is selected at random, find the probability that he/she travelled by bus or ship. (1)
- ii. Which is most favourite mode of transport and how many people used it? (1)
- iii. a. A person is selected at random. If the probability that he did not use train is $\frac{4}{5}$, find the number of people who used train. (2)

OR

b. The probability that randomly selected person used aeroplane is $\frac{7}{60}$. Find the revenue collected by air company at the rate of ₹ 5,000 per person. (2)

62. Read the following text carefully and answer the questions that follow:

Family structure: In a recent survey of this year, 51% of the families in the United States of America had no children, 20% had one child, 19% had two children, 7% had three children and 3% had four or more children.



A family is selected at random.

Based on the above information, answer the following questions:

- i. Find the probability that the selected family has two or three children. (1)
- ii. Find the probability that the selected family has more than one child. (1)
- iii. a. Find the probability that the selected family has less than three children. (2)

OR

b. Find the probability that the selected family has more than two children. (2)

63. **Read the following text carefully and answer the questions that follow:**

A middle school decided to run the following spinner game as a fund-raiser on Christmas Carnival.



Making Purple: Spin each spinner once. Blue and red make purple. So, if one spinner shows Red (R) and another Blue (B), then you 'win'. One such outcome is written as 'RB'.

- i. List all possible outcomes of the game. (1)
- ii. Find the probability of **Making Purple**. (1)
- iii. For each win, a participant gets ₹ 10, but if he/she loses, he/she has to pay ₹ 5 to the school.

If 99 participants played, calculate how much fund could the school have collected. (2)

OR

If the same amount of \gtrless 5 has been decided for winning or losing the game, then how much fund had been collected by school? (Number of participants = 99) (2)

64. **Read the following text carefully and answer the questions that follow:**

Blood group describes the type of blood a person has. It is a classification of blood based on the presence or absence of inherited antigenic substances on the surface of red blood cells. Blood types predict whether a serious reaction will occur in a blood transfusion.

[4]

[4]

[4]

In a sample of 50 people, 21 had type O blood, 22 had type A, 5 had type B and rest had type AB blood group.



- i. What is the probability that a person chosen at random had type O blood? (1)
- ii. What is the probability that a person chosen at random had type AB blood group? (1)
- iii. What is the probability that a person chosen at random had neither type A nor type B blood group? (2)OR

What is the probability that person chosen at random had either type A or type B or type O blood group? (2)

65. **Read the following text carefully and answer the questions that follow:**

Computer-based learning (CBL) refers to any teaching methodology that makes use of computers for information transmission. At an elementary school level, computer applications can be used to display multimedia lesson plans. A survey was done on 1000 elementary and secondary schools of Assam and they were classified by the number of computers they had.



Number of Computers	1 - 10	11 - 20	21 - 50	51 - 100	101 and more
Number of Schools	250	200	290	180	80

One school is chosen at random. Then:

- i. Find the probability that the school chosen at random has more than 100 computers. (1)
- ii. Find the probability that the school chosen at random has 50 or fewer computers. (1)
- iii. Find the probability that the school chosen at random has no more than 20 computers. (2)

OR

Find the probability that the school chosen at random has 10 or less than 10 computers. (2)

Section E

66. A box contains 90 discs which are numbered 1 to 90. If one disc is drawn at random from the box, find the [5] probability that it bears

i. a two digit number,

ii. number divisible by 5.

- 67. The houses in a row are numbered consecutively from 1 to 49. Show that there exists a value of X such that sum **[5]** of numbers of houses proceeding the house numbered X is equal to sum of the numbers of houses following X.
- 68. Cards marked with numbers 3, 4, 5........., 50 are placed in a bag and mixed thoroughly. One card is drawn at [5]

[4]

random from the bag. Find the probability that number on the card drawn is :

a. Divisible by 7.

b. A perfect square.

c. A multiple of 6.

- 69. A circular target of radius 11 cm consists of an inner circle of radius 5 cm and 3 concentric circles of radii 7 cm, [5]
 9 cm and 10 cm dividing the target into 4 regions. If a shot hits the target, find the probabilities of hitting each region. If you shoot the target 121 times, what is your expectation? How will you improve your performance?
- 70. A number x is selected at random from the numbers 1,2,3 and 4. Another number y is selected at random from [5] the numbers 1,4, 9 and 16. Find the probability that product of x and y is less than 16.
- 71. All the three face cards of spades are removed from a well-shuffled pack of 52 cards. A card is drawn at random **[5]** from the remaining pack. Find the probability of getting
 - i. a black face card

ii. a queen

iii. a black card

iv. a spade

- 72. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is [5](i) a king or jack (ii) a non-ace (iii) a red card (iv) neither a king nor a queen.
- 73. The king, queen and jack of clubs are removed from a deck of 52 cards. The remaining cards are mixed together [5] and then a card is drawn at random from it. Find the probability of getting (i) a face card, (ii) a card of heart, (iii) a card of clubs (iv) a queen of diamond.
- 74. A bag contains 4 white balls, 6 red balls, 7 black balls and 3 blue balls. One ball is drawn at random from the [5] bag. Find the probability that the ball drawn is

i. white

ii. not black

iii. neither white nor black

iv. red or white.

75. Two customers Shyam and Ekta are visiting a particular shop in the same week (Tuesday to Saturday). Each is equally likely to visit the shop on any day as on another day. What is the probability that both will visit the shop on (i) the same day? (ii) consecutive days? (iii) different days?