



MATHS

BOOKS - MTG IIT JEE FOUNDATION

PROBABILITY

Illustrations

1. What are the possible outcomes of tossing a coin?



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2. What are the outcomes of throwing a die two times?



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3. A die is rolled and the event be 'score is even'. Write down the elements of the above event.



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4. Three coins are tossed simultaneously. List the sample space for the event.



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5. Three coins are tossed together. List the sample space for the event. Find the probability of atleast two heads.

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

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7. die is tossed once. What is the probability of getting a number 4?

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8. The probability of events E_1 and E_2 occurs is 0.6 and 0.4. Find the probability of E_1 & E_2 .



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9. 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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Solved Examples

1. Two dice are rolled. Find the probability that the sum of the numbers appears on the upper face of dice is equal to 9



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2. A selection committee of school selected 2000 girls for scholarship of different age. The data obtained are given in the following table:

Age of Girls (in years)	Number of Girls
0 - 10	900
11 - 18	600
19 - 25	500
Above 25	0

Find the probabilities of the girls selected for

scholarship in following age group.

11 - 18



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3. A selection committee of school selected 2000 girls for scholarship of different age. The data obtained are given in the following table:

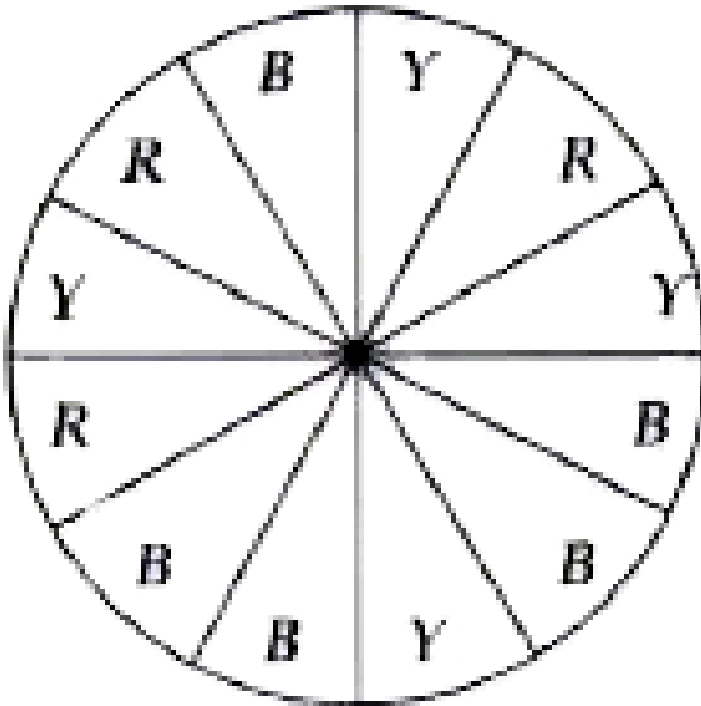
Age of Girls (in years)	Number of Girls
0 - 10	900
11 - 18	600
19 - 25	500
Above 25	0

Find the probabilities of the girls selected for scholarship in following age group.

0 - 18



4. A spinner is coloured by 3 different colours : yellow, blue and red in 12 equal sectors. After spinning the wheel, what is the probability that

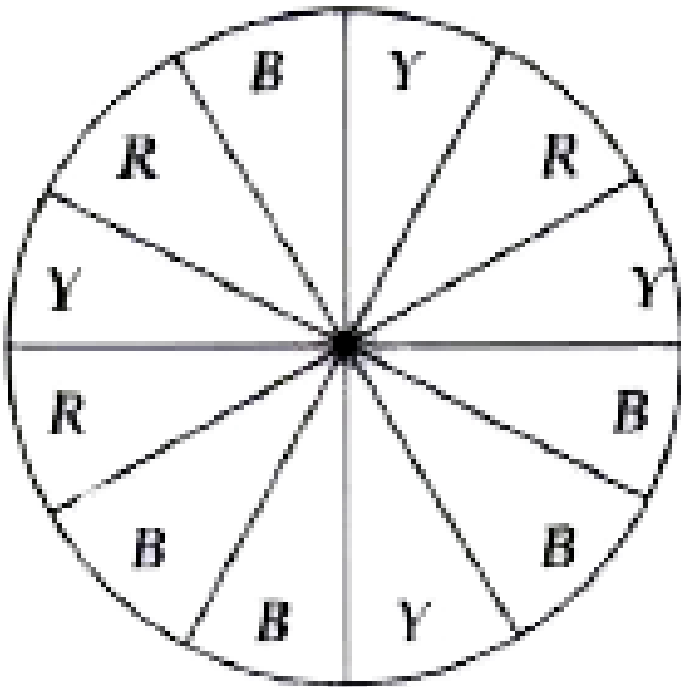


wheel stops at yellow colour?



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5. A spinner is coloured by 3 different colours : yellow, blue and red in 12 equal sectors. After spinning the wheel, what is the probability that

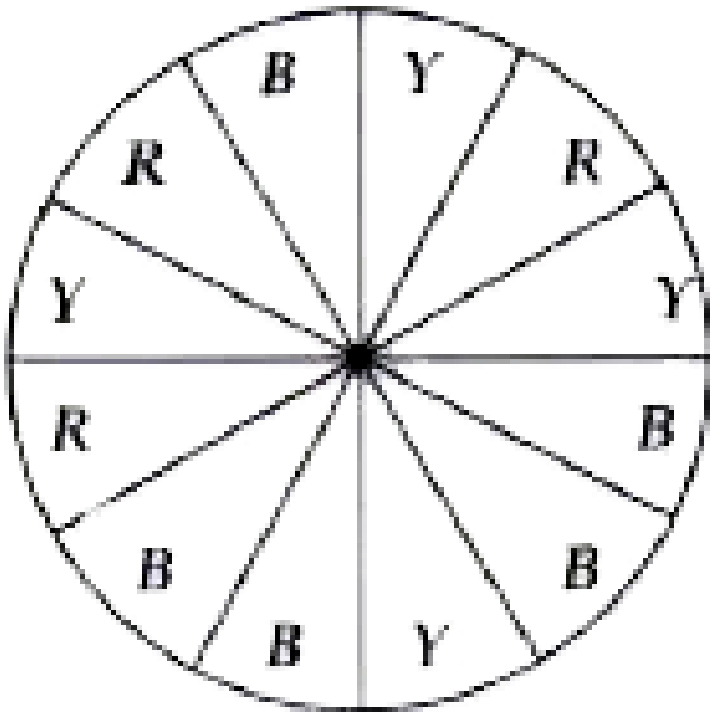


wheel stops at red colour?



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6. A spinner is coloured by 3 different colours : yellow, blue and red in 12 equal sectors. After spinning the wheel, what is the probability that



wheel stops at blue colour?



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7. Two dice are rolled simultaneously. What is the probability of getting even number on first die?



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8. Two dice are rolled simultaneously. What is the probability of getting prime number on second die?



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9. Two dice are rolled simultaneously. What is the probability of getting 3 on first die?



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10. A bag contains 6 green, 5 red, 8 yellow and 3 blue marbles. If a single marble is chosen at random from the bag, what is the probability of getting a green marble



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11. A bag contains 6 green, 5 red, 8 yellow and 3 blue marbles. If a single marble is chosen at random from the bag, what is the probability of getting a red marble



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12. A bag contains 6 green, 5 red, 8 yellow and 3 blue marbles. If a single marble is chosen at random from the bag, what is the probability of getting a yellow marble



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13. A bag contains 6 green, 5 red, 8 yellow and 3 blue marbles. If a single marble is chosen at random from the bag, what is the probability of getting a blue marble?



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14. Choose an alphabet at random from A to F. What is the probability of each outcome? What is the probability that the alphabet chosen is formed with three straight lines? What is the probability that the alphabet chosen is formed with curved lines?



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15. A die is thrown once. Find the probability that number turns up on the upper face is greater than 2 and less than 5.

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16. A die is thrown once. Find the probability that number turns up on the upper face is greater than 2 and less than 5.

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17. Two dice are thrown at a time, find the probability that the sum of the numbers on the upper faces of the dice is equal to 3.

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18. 20 cards are numbered from 1 to 20. Find the probability that a card chosen at random is multiple of 2 and 3 both?

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19. One card is drawn from a well-shuffled pack of 52 cards. What is the probability that it is a red queen.



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20. A letter is chosen at random from the letters of the word 'PROBABILITY'. Find the probability that the letter chosen is a consonant



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21. A letter is chosen at random from the letters of the word 'PROBABILITY'. Find the probability that the letter

chosen is a

vowel.



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22. The diameters of circles (in mm) drawn in a design are given below.

Diameters	14-20	21-27	28-34	35-41	42-48
Number of circles	3	5	8	11	7

If a circle is chosen at random, find the probability that chosen circle has diameter less than 28.



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23. The diameters of circles (in mm) drawn in a design are given below.

Diameters	14-20	21-27	28-34	35-41	42-48
Number of circles	3	5	8	11	7

If a circle is chosen at random, find the probability that chosen circle has radius lying between 14 to 17.

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24. The diameters of circles (in mm) drawn in a design are given below.

Diameters	14-20	21-27	28-34	35-41	42-48
Number of circles	3	5	8	11	7

If a circle is chosen at random, find the probability that chosen circle has diameter above 50.

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25. There are 50 eggs in a box, 20 of them are broken. What is the probability that eggs are good

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26. There are 50 eggs in a box, 20 of them are broken. What is the probability that eggs are broken?





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27. The record of a weather station shows weather forecast of the past 250 consecutive days. Its weather forecasts were correct 175 times.

What is the probability that on a given day forecast was correct?



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28. The record of a weather station shows weather forecast of the past 250 consecutive days. Its weather forecasts were correct 175 times.

What is the probability that forecast was not correct on a given day?

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29. The table shows the marks (out of 150) obtained by a student in unit tests.

Unit test	I	II	III	IV	V	VI
Marks (out of 150)	72	96	105	80	125	139

Find the probability that the student gets 80% or more in the next unit test. Also, find the probability that the student gets less than 80% marks.

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30. An experiment consists of rolling a die and then 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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Ncert Section Exercise 15 1

1. In a cricket match, a batswoman hits a boundary 6 times out of 30 balls she plays. Find the probability that she did not hit a boundary.

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2. 1500 families with 2 children were selected randomly, and the following data were recorded:

Number of girls in a family	2	1	0
Number of families	475	814	211

Compute the probability of a family, chosen at random, having
2 girls

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3. 1500 families with 2 children were selected randomly, and the following data were recorded:

Number of girls in a family	2	1	0
Number of families	475	814	211

Compute the probability of a family, chosen at random,

having

1 girl



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4. 1500 families with 2 children were selected randomly, and the following data were recorded:

Number of girls in a family	2	1	0
Number of families	475	814	211

Compute the probability of a family, chosen at random,

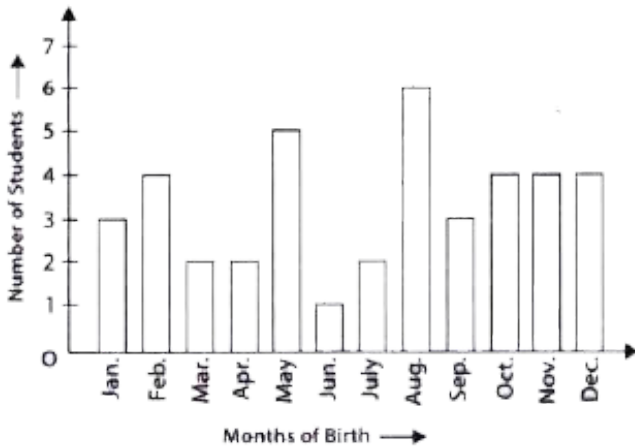
having

No girl



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5. In a particular section of Class IX, 40 students were asked about the months of their birth and the following graph was prepared for the data so obtained:



Observe the bar graph given above and answer the following question: Find the probability that a student of the class was born in August.



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6. Three coins are tossed simultaneously 200 times with the following frequencies of different outcomes:

Outcome	3 heads	2 heads	1 head	No head
Frequency	23	72	77	28

If the three coins are simultaneously tossed again, compute the probability of 2 heads coming up.



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7. An organisation selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family. The information gathered is listed in the table below.

Monthly income (in ₹)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen. Find the probability that the family chosen is

earning Rs 10000 – 13000 per month and owning exactly 2 vehicles.

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8. An organisation selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family. The information gathered is listed in the table below.

Monthly income (in ₹)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen. Find the probability that the family chosen is

earning Rs 16000 or more per month and owning exactly 1 vehicle.



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9. An organisation selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family. The information gathered is listed in the table below.

Monthly income (in ₹)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen. Find the probability that the family chosen is

earning less than RS 7000 per month and does not own any vehicle

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10. An organisation selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family. The information gathered is listed in the table below.

Monthly income (in ₹)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen. Find the probability that the family chosen is earning Rs 13000-16000 per month and owning more than 2 vehicles.



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11. An organisation selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family. The information gathered is listed in the table below.

Monthly income (in ₹)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen. Find the probability that the family chosen is
owning not more than 1 vehicle



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12. To know the opinion of the students about the subject statistics, a survey of 200 students was conducted. The data is recorded in the following table.

Opinion	Number of students
like	135
dislike	65

Find the probability that a student chosen at random likes statistics



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13. To know the opinion of the students about the subject statistics, a survey of 200 students was conducted. The data is recorded in the following table.

Opinion	Number of students
like	135
dislike	65

Find the probability that a student chosen at random does not like it.



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14. The distance (in km) of 40 engineers from their residence to their place of work were found as follows:

5 3 10 20 25 11 13 7 12 31 19 10 12 17 18 11 32 17 16 2 7 9 7 8
3 5 12 15 18 3 12 14 2 9 6 15 15 7 6 12

. What is the empirical probability that an engineer lives:
less than 7 km from her place of work?



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15. The distance (in km) of 40 engineers from their residence to their place of work were found as follows:

5 3 10 20 25 11 13 7 12 31 19 10 12 17 18 11 32 17 16 2 7 9 7 8

3 5 12 15 18 3 12 14 2 9 6 15 15 7 6 12

What is the empirical probability that an engineer lives:
more than or equal to 7 km from her place of work?



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16. The distance (in km) of 40 engineers from their residence to their place of work were found as follows:

5 3 10 20 25 11 13 7 12 31 19 10 12 17 18 11 32 17 16 2 7 9 7 8

3 5 12 15 18 3 12 14 2 9 6 15 15 7 6 12

What is the empirical probability that an engineer lives:
within $\frac{1}{2}$ km from her place of work?



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17. Activity : Note the frequency of two - wheelers , three - wheelers and four - wheelers going past during a time interval , in front of your school gate. Find the probability that any one vehicle out of the total vehicles you have observed is a two - wheeler.



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18. Eleven bags of wheat flour, each marked 5 k g, actually contained the following weights of flour (in kg).

4.97 5.05 5.08 5.03 5.00 5.06 5.08 4.98 5.04 5.07 5.00

Find the probability that any of these bags chosen at random contains more than 5 kg of flour.



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19. A study was conducted to find out the concentration of sulphur dioxide in the air in parts per million (ppm) of a certain city. The data obtained for 30 days is as follows:

0.03 0.08 0.08 0.09 0.04 0.17

0.16 0.05 0.02 0.06 0.18 0.20

0.11 0.08 0.12 0.13 0.22 0.07

0.08 0.01 0.10 0.06 0.09 0.18

0.11 0.07 0.05 0.07 0.01 0.04

Using this table, find the probability of the concentration of sulphur dioxide in the interval 0.12-0.16 on any of these days.



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20. The blood groups of 30 students of Class VIII are recorded as follows:

A,B,O,O,AB,O,A,O,B,A,O,B,A,O,O,

A,AB,O,A,A,O,O,AB,B,A,O,B,A,B,O

Use this table to determine the probability that a student of this class, selected at random, has blood group AB.



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[Exercise Multiple Choice Questions](#)

1. A die is tossed 216 times. The results are as follows

Outcome	1	2	3	4	5	6
Frequency	40	35	25	35	36	45

The probability of getting 2 is

A. $\frac{25}{216}$

B. $\frac{35}{216}$

C. $\frac{36}{216}$

D. $\frac{40}{216}$

Answer: B



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2. A coin is tossed 100 times and head appears 46 times. Now, if we toss a coin at random, what is the probability of getting a tail?

A. $\frac{23}{50}$

B. $\frac{27}{50}$

C. $\frac{28}{50}$

D. $\frac{26}{50}$

Answer: B



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3. A die is thrown 260 times. Prime numbers appear on the upper face 39 times. If a die is thrown at random, what is the probability of getting a prime number?

A. $\frac{3}{2}$

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

C. $\frac{3}{20}$

D. $\frac{1}{20}$

Answer: C



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4. The following table shows the blood groups of 60 students of a class :

Blood groups	A	B	O	AB
Number of students	16	12	23	9

One student of the class is chosen at random. What is the probability that the chosen student has blood group?

(i) O (ii) AB (iii) A (iv) B

A. $23/60$

B. $3/20$

C. $4/15$

D. $1/5$

Answer: A

5. The following table shows the blood groups of 60 students of a class :

Blood groups	A	B	O	AB
Number of students	16	12	23	9

One student of the class is chosen at random. What is the probability that the chosen student has blood group?

(i) O (ii) AB (iii) A (iv) B

A. $4/15$

B. $3/20$

C. $23/60$

D. $1/5$

Answer: B



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6. 12 packets of salt, each marked 2 kg, actually contained the following weights (in kg) of salt:

1.980, 2.000, 2.025, 1.985, 1.990, 2.040, 1.950, 2.050, 2.060,
1.980, 2.030, 1.970

Out of these packets, one packet is chosen at random.

What is the probability that the chosen packet contains more than 2 kg of salt?

A. $1/12$

B. $1/6$

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

D. $\frac{5}{12}$

Answer: D



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7. Three coins are tossed simultaneously 200 times with the following frequencies of different outcomes

Outcome	3 heads	2 heads	1 head	No head
Frequency	23	72	77	28

If the three coins are simultaneously tossed again, compute the probability of getting no head.

A. $\frac{23}{25}$

B. $7/25$

C. $28/50$

D. $7/50$

Answer: D



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8. In a cricket match, a batsman hits a boundary 16 times out of 30 balls he plays. Find the probability that he does not hit a boundary.

A. $7/15$

B. $8/15$

C. 2/15

D. 12/15

Answer: A

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9. The given table shows the marks obtained by 80 students in a class test with maximum marks 100.

Marks	0-15	15-30	30-45	45-60	60-75	Above 75
No. of students	6	13	17	24	16	4

A student of the class is selected at random. Find the probability that he/she gets less than 15% marks.

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

B. $\frac{3}{40}$

C. $\frac{9}{20}$

D. none of these

Answer: B



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10. The given table shows the ages (in years) of 360 patients, getting medical treatment in a hospital.

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
No. of patients	90	50	60	80	50	30

One of the patients is selected at random. The probability that the selected patient's age is 30 years or more but less than 40 years, is

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

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

C. 0

D. 1

Answer: A



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11. The given table shows the ages (in years) of 360 patients, getting medical treatment in a hospital.

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
No. of patients	90	50	60	80	50	30

One of the patients is selected at random. The probability that the selected patient's age is 10 years or more, is

- A. 0
- B. $\frac{1}{6}$
- C. 1
- D. 1

Answer: C



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12. In a one day match, a player played 40 balls. The runs scored are as follows :

Runs scored	0	1	2	3	4	6
No. of balls	13	15	5	1	4	2

Find the probability that player hits a four or a six.

A. $\frac{3}{20}$

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

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

D. $\frac{9}{20}$

Answer: A



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13. A number from 1 to 11 is chosen at random. What is the probability of choosing an odd number?

A. $1/11$

B. $5/11$

C. $6/11$

D. None of these

Answer: C



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14. At Middle School, 3 out of 5 students make honor roll. What is the probability (in %) that a student does

not make honor roll?

A. 0.65

B. 0.4

C. 0.6

D. None of these

Answer: B



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15. A large basket of fruits contains 3 oranges, 2 apples and 5 bananas. If a piece of fruit is chosen at random, what is the probability of getting a banana?

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

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

C. $\frac{7}{10}$

D. $\frac{3}{10}$

Answer: B



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16. A pair of dice is rolled. What is the probability of getting a sum of 2?

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

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

C. $1/36$

D. None of these

Answer: C



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17. A city survey found that 47% of teenagers have a part time job. The same survey found that 30% plan to attend college. Find the probability that a teenager has a part time job.

A. $37/100$

B. $30/100$

C. $40/100$

D. $47/100$

Answer: D



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18. In a school, 14% of students take computer classes and 67% take drama classes. What is the probability that a student neither takes computer class nor takes drama class?

A. $8/100$

B. $29/100$

C. $53/100$

D. $19/100$

Answer: D



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19. From a deck of 52 cards, the probability of drawing a face card is

A. $4/13$

B. $3/13$

C. $1/13$

D. $1/4$

Answer: B



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20. A dice is tossed . The probability of having a prime number greater than 2 on toss is

A. $1/3$

B. $1/3$

C. $1/12$

D. $2/3$

Answer: A



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21. The following data shows the relation between the number of families and number of children they have. What is the probability of a family chosen at random having at least two children?

Children	0	1	2	3	4	5
Number of families	12	7	15	3	6	10

A. $\frac{33}{53}$

B. $\frac{35}{53}$

C. $\frac{34}{53}$

D. $\frac{19}{53}$

Answer: C



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22. Among first 20 natural numbers, probability of getting on odd number is

A. $1/2$

B. $1/3$

C. $1/5$

D. $1/7$

Answer: A



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23. In a city, the weekly observations made on cost of living index are given below. One week is chosen at random.

Cost of living index	Number of weeks
140 - 150	5
150 - 160	10
160 - 170	20
170 - 180	9
180 - 190	6
190 - 200	2

Find the probability that chosen week has cost of living greater than 150 but less than 170.

A. $14/15$

B. $15/26$

C. $9/26$

Answer: B**Watch Video Solution**

24. The heights (in cm) of 50 students of a class are given below

Height (in cm)	151	152	153	154	155	156	157
No. of students	6	3	12	4	10	8	7

One student is selected at random. Find the probability that the height of the selected student is 157 cm.

A. $\frac{3}{50}$

B. $\frac{2}{25}$

C. $\frac{8}{25}$

D. $\frac{7}{50}$

Answer: D



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25. The given table shows the number of students participating in various activities in a school.

Activities	Games	Music	Singing	Drama
No. of students	27	36	15	12

From the above information one student is chosen. Find the probability that the student participates in games.

A. $\frac{3}{10}$

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

C. $\frac{1}{7}$

D. $\frac{1}{10}$

Answer: A



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26. Two coins are tossed simultaneously for 360 times. The number of times '2 Tails' appeared was three times 'No Tail' appeared and number of times '1 Tail' appeared is double the number of times 'No Tail' appeared. Find the probability of getting 'Two tails'.

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

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

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

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

Answer: A



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27. The probability of guessing the correct answer to a certain question is x . If probability of not guessing the correct answer is $\frac{2}{3}$, then find x .

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

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

C. $\frac{2}{3}$

D. None of these

Answer: A



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28. In a sample study of 642 people, it was found that 514 people have a high school certificate. If a person is selected at random, the probability that the person do not have a high school certificate is

A. $\frac{251}{321}$

B. $253 / 321$

C. $251 / 329$

D. $64 / 321$

Answer: D



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29. In a survey of 364 children aged 19-36 months, it was found that 91 liked to eat potato chips. If a child is selected at random, then find the probability that he/she like to eat potato chips.

A. $1 / 4$

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

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

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

Answer: A



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30. A box contains 50 bolts and 150 nuts. On checking the box, it was found that half of the bolts and half of the nuts are rusted. If one item is chosen at random, find the probability that it is rusted

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

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

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

D. $\frac{1}{15}$

Answer: B



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31. There are 13 girls and 15 boys in a line. If one student is chosen at random, then find the probability that he is a boy.

A. $\frac{13}{28}$

B. $\frac{15}{28}$

C. 13/15

D. None of these

Answer: B

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32. On a particular day, the number of vehicles passing through a crossing is given below:

Vehicle	Frequency
Two-wheeler	57
Three-wheeler	33
Four-wheeler	30

A particular vehicle is chosen at random. What is the probability that it is not a four-wheeler?

A. $\frac{1}{8}$

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

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

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

Answer: C



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33. A group of 80 students of Class IX are selected and asked for their choice of subject to be taken, which is recorded as below:

Subject	Hindi	Sanskrit	Punjabi	Drawing	Total
Number of students	29	18	21	12	80

If a student is chosen at random, find the probability that he/she chooses either Punjabi or Drawing.

A. $\frac{33}{80}$

B. $\frac{29}{80}$

C. $\frac{35}{80}$

D. $\frac{31}{80}$

Answer: A



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34. A and B are the only two outcomes of an event. If $P(A) = 0.72$, then what will be the probability of event B?

A. 0.25

B. 0.28

C. 0.18

D. 0.15

Answer: B



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35. A coin is tossed for a certain number of times. If the probability of getting a head is 0.4 and head appears for 24 times, find the number of times, the coin was tossed.

A. 120

B. 60

C. 40

D. 80

Answer: B



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36. An English book contains 130 pages. A page is selected at random. What is the probability that the number on the page is divisible by 25?

A. $7/10$

B. $9/10$

C. $1/26$

D. None of these

Answer: C



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37. If three dice are thrown simultaneously, then the probability of getting a sum of 5, is

A. $5/216$

B. $1/6$

C. $1/36$

D. $1/72$

Answer: C



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38. The probabilities of the following frequencies of an experiment is given in the table. Find the value of p .

f	3	5	7	9	11	13
$P(f)$	$\frac{6}{48}$	$\frac{8}{48}$	$\frac{15}{48}$	$\frac{p}{48}$	$\frac{8}{48}$	$\frac{4}{48}$

A. 6

B. 7

C. 8

D. 9

Answer: B



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39. If $\frac{10}{100}, \frac{13}{100}, \frac{15}{100}, \frac{18}{100}, \frac{x}{100}, \frac{30}{100}$ are the probabilities of 6 observations of an experiment. Find the value of x .

A. 12

B. 13

C. 14

D. 15

Answer: C



40. Two coins are tossed, then find the values of x , y and z in the following table respectively:

Number of heads	Probability
0	x
1	y
2	z

A. $\frac{1}{2}, \frac{1}{4}, \frac{1}{4}$

B. $\frac{1}{4}, \frac{1}{4}, \frac{1}{2}$

C. $\frac{1}{4}, \frac{1}{2}, \frac{1}{4}$

D. $\frac{1}{2}, \frac{1}{2}, \frac{1}{4}$

Answer: C





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

A. $1/50$

B. $8/100$

C. $9/100$

D. $1/10$

Answer: C



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42. In a school, 100 students took part in Van Mahotsava and helped each other in planting the trees.

Name of plant	Rose	Marigold	Chameli	Jasmine
Number of plants	32	28	16	24

Find the sum of probabilities of planting Rose and Jasmine.

A. $\frac{8}{25}$

B. $\frac{6}{25}$

C. $\frac{2}{25}$

D. $\frac{14}{25}$

Answer: D



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43. In a kitchen, there are 108 utensils, consisting of bowls, plates and glasses. The ratio of bowls, plates and glasses is 4 : 2 : 3. A utensil is picked at random. Find the probability that it is a plate.

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

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

C. $\frac{3}{9}$

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

Answer: A



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44. If the probability of winning a race of an athlete is $\frac{1}{6}$ less than the twice the probability of losing the race. Find the probability of winning the race.

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

B. $\frac{11}{18}$

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

D. $\frac{3}{18}$

Answer: B



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45. In a survey, out of all students, 53% said 'No' 20% said 'Yes' and the remaining said 'They could not decide'. If a student is chosen at random, what is the chance that the student did not say 'No'?

A. $\frac{15}{100}$

B. $\frac{43}{100}$

C. $\frac{47}{100}$

D. $\frac{57}{100}$

Answer: C



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46. Two sections of class IX having 27 students in each section appeared for Mathematics olympiad. The marks obtained by them are shown below.

46, 31, 74, 68, 42, 54, 14, 61, 48, 37, 26, 8, 64, 57,

93, 72, 53, 59, 38, 16, 88, 56, 46, 66, 45, 61, 54,

27, 27, 44, 63, 58, 43, 81, 64, 36, 49, 50, 76, 38,

47, 77, 62, 53, 40, 71, 60, 45, 42, 34, 46, 40, 59, 42

One student is selected at random. Find the probability that selected student is having marks more than 49.

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

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

C. $\frac{6}{9}$

D. 7/9

Answer: B



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47. Two sections of class IX having 27 students in each section appeared for Mathematics olympiad. The marks obtained by them are shown below.

46, 31, 74, 68, 42, 54, 14, 61, 48, 37, 26, 8, 64, 57,

93, 72, 53, 59, 38, 16, 88, 56, 46, 66, 45, 61, 54,

27, 27, 44, 63, 58, 43, 81, 64, 36, 49, 50, 76, 38,

47, 77, 62, 53, 40, 71, 60, 45, 42, 34, 46, 40, 59, 42

One student is selected at random. Find the probability

that selected student is

having marks between 39 and 99.

A. $6/9$

B. $7/9$

C. $1/2$

D. $1/2$

Answer: B



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48. 100 plants each were sown in six different colonies A, B, C, D, E and F. After 31 days, the number of plants survived are as follows:

Colonies	A	B	C	D	E	F
No. of plants survived	80	90	84	76	82	92

Find the probability that:

more than 80 plants survived in a colony?

A. $\frac{2}{3}$

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

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

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

Answer: A



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49. 100 plants each were sown in six different colonies A, B, C, D, E and F. After 31 days, the number of plants survived are as follows:

Colonies	A	B	C	D	E	F
No. of plants survived	80	90	84	76	82	92

Find the probability that:

less than 82 plants survived in a colony?

A. $1/3$

B. $2/3$

C. $1/6$

D. $5/6$

Answer: A



50. The table shows the number of people visiting the 'Good-Living pavilion' in a trade fair during different times of the day.

Time	Number of people
9 am - 11 am	175
11 am - 1 pm	125
1 pm - 3 pm	225
3 pm - 5 pm	200
5 pm - 7 pm	120

Find the probability that the randomly chosen person visited the pavilion after 1 pm but before 5 pm.

A. $85/169$

B. $84/167$

C. $85/167$

Answer: A [Watch Video Solution](#)

51. The table shows the number of people visiting the 'Good-Living pavilion' in a trade fair during different times of the day.

Time	Number of people
9 am - 11 am	175
11 am - 1 pm	125
1 pm - 3 pm	225
3 pm - 5 pm	200
5 pm - 7 pm	120

Find the probability that the randomly chosen person visited the pavilion between 9 am to 1 pm.

A. $60/169$

B. $59/169$

C. $61/169$

D. $58/169$

Answer: A



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52. A bag contains 20 balls out of which x are white. If 10 more white balls are put in the bag, the probability of drawing a white ball now will be double that of drawing one white ball at random before putting 10 white balls in bag. Find x .

A. 20

B. 5

C. 10

D. 15

Answer: B



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Exercise Match The Following

1. An NGO selected 2000 families at random and surveyed them to determine number of children in a family. The data is given below:

Number of families	Boy	Girl
400	1	1
600	2	1
300	1	2
500	2	0
200	0	2

If one family is chosen at random then, match the List-I with their corresponding probabilities in List-II.

List-I

List-II

(P) The probability that the family chosen has 1 boy and 2 girls is

(1) $\frac{1}{10}$

(Q) The probability that the family chosen has no boy is

(2) $\frac{3}{10}$

(R) The probability that the family chosen has 1 boy and 1 girl is

(3) $\frac{3}{20}$

(S) The probability that the family chosen has 2 boys and 1 girl is

(4) $\frac{1}{5}$

A. P-2, Q-4, R-3, S-1

B. P-4, Q-3, R-2, S-1

C. P-1, Q-2, R-3, S-4

D. P-3, Q-1, R-4, S-2

Answer: D



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Exercise Assertion And Reason Type

1. Assertion : Two coins are tossed. Number of elements in the sample space is 4.

Reason : When a coin is tossed n times then the number of elements in its sample space is $n + 2$.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

Answer: C



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2. Assertion : A die is thrown. Let E be the event that number appears on the upper face is less than 1, then $P(E)$

$$E) = \frac{1}{6}$$

Reason : Probability of impossible event is 0.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: D



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3. Assertion : A coin is tossed two times. Probability of getting at least two heads is $\frac{1}{4}$ Reason : When a coin is tossed two times, then the sample space is {HH, HT, TH, IT}

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

Answer: A



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4. Assertion : A fair die is rolled. Then the probability of getting an even number is $\frac{1}{2}$ and probability of getting an odd number is $\frac{1}{2}$

Reason : Possible outcomes when a fair die is rolled is {1, 2, 3, 4, 5, 6}.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

Answer: A



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5. Assertion : Two well balanced dice are rolled and the numbers that turn up are observed. Then the number of elements in sample space is 12.

Reason : When two dice are rolled, number of elements in sample space is 6×6

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: D

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Exercise Comprehension Type

1. The shirt size worn by a group of 200 persons who bought the shirt from a store, are as follows:

Shirt size	37	38	39	40	41	42	43	44
Number of persons	15	25	39	41	36	17	15	12

If a person is chosen randomly then

Probability that the person bought shirt of size 39 is

A. $15/200$

B. $39/200$

C. $41/200$

D. $17/200$

Answer: B



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2. The shirt size worn by a group of 200 persons who bought the shirt from a store, are as follows:

Shirt size	37	38	39	40	41	42	43	44
Number of persons	15	25	39	41	36	17	15	12

If a person is chosen randomly then

Probability that the person bought shirt of size less than 40 is

A. $\frac{40}{200}$

B. $\frac{36}{200}$

C. $\frac{79}{200}$

D. $\frac{39}{200}$

Answer: C



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3. The shirt size worn by a group of 200 persons who bought the shirt from a store, are as follows:

Shirt size	37	38	39	40	41	42	43	44
Number of persons	15	25	39	41	36	17	15	12

If a person is chosen randomly then

Probability that the person bought shirt of size greater than 40 is

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

B. $\frac{3}{8}$

C. $\frac{17}{200}$

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

Answer: A



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4. A life insurance agent found the following data for distribution of ages of 100 policy holders. A policy holder is chosen at random.

Age (in years)	Number of policy holders
0-20	8
20-25	2
25-30	15
30-35	20
35-40	20
40-45	20
45-50	15

Find the difference between the probabilities if policy holders are chosen randomly of age (30-35) years and of age (45-50) years.

A. $\frac{3}{20}$

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

C. 2 / 21

D. 1 / 20

Answer: D

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5. A life insurance agent found the following data for distribution of ages of 100 policy holders. A policy holder is chosen at random.

Age (in years)	Number of policy holders
0-20	8
20-25	2
25-30	15
30-35	20
35-40	20
40-45	20
45-50	15

Find the sum of probabilities if a policy holder are chosen randomly of age (0-20) years and policy holders of age (25-30) years

A. $\frac{3}{20}$

B. $\frac{2}{25}$

C. $\frac{23}{100}$

D. $\frac{3}{25}$

Answer: C



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6. A life insurance agent found the following data for distribution of ages of 100 policy holders. A policy

holder is chosen at random.

Age (in years)	Number of policy holders
0-20	8
20-25	2
25-30	15
30-35	20
35-40	20
40-45	20
45-50	15

Probability of policy holders chosen randomly of age less than 25 years is

- A. $1/5$
- B. $1/10$
- C. $1/100$
- D. $2/25$

Answer: B



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Exercise Subjective Problems Very Short Answer Type

1. Define probability



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2. Define any two properties of probability.



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3. The following data about number of girls in a family was recorded.

Number of girls in a family	2	1	0
Number of families	475	514	11

A family is chosen at random. Find the probability of having 2 girls in the chosen family.

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4. A survey of 100 children of a locality shows their favourite sport

No. of children who like football	48
No. of children who like cricket	52

Out of these children, one is chosen at random. What is the probability that the chosen child likes football?

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5. A coin is tossed 750 times with the following frequencies: Head: 500, Tail : 250

Compute the probability for each event

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6. In a game, a woman wins 16 times out of 20 balls she plays. Find the probability that she does not win the game.

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7. The following table shows the birth months of 48 babies in a hospital:

Jan.	Feb.	March	April	May	June
2	4	3	4	5	1
July	Aug.	Sep.	Oct.	Nov.	Dec.
6	6	4	3	4	6

Find the probability of months in which 6 babies were born



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8. The percentage of marks obtained by 10 students in the monthly unit tests are given below:

No. of students	1	2	4	2	1
Percentage of marks obtained	70	60	65	75	80

Based on this data, a student is selected at random. Find the probability that the selected student obtains more than 70% marks in a unit test.



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9. In single throw of two dice, find the probability that there will be a doublet



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10. Two dice are thrown simultaneously. Find the probability that a sum less than 7 will turn up on the upper faces.



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1. A dice is thrown then find the probability that 7 will turn up on the upper faces.



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2. An integer is chosen at random from the first 200 positive integers. Find the probability that the integer is divisible by 11



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3. A die is thrown 100 times and following observations were recorded:

Number on die	1	2	3	4	5	6
Frequency	12	18	14	26	14	16

Find the probability that the die shows
a number less than 3.

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4. A die is thrown 100 times and following observations
were recorded:

Number on die	1	2	3	4	5	6
Frequency	12	18	14	26	14	16

Find the probability that the die shows
a number greater than 4

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5. A die is thrown 100 times and following observations were recorded:

Number on die	1	2	3	4	5	6
Frequency	12	18	14	26	14	16

Find the probability that the die shows an even number.



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6. Two coins are tossed 1000 times and the outcomes were recorded as given below:

Number of heads	0	1	2
Frequency	240	450	310

What is the probability of getting

at most one head?

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7. Two coins are tossed 1000 times and the outcomes were recorded as given below:

Number of heads	0	1	2
Frequency	240	450	310

What is the probability of getting

at least one head?

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8. Marks obtained by 90 students of class IX in a test are given below:

Marks (%)	0-20	20-40	40-60	60-80	80-100
No. of students	8	15	32	26	9

Out of these students, one is chosen at random. Find the probability that the chosen student obtains less than 20% marks



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9. Marks obtained by 90 students of class IX in a test are given below:

Marks (%)	0-20	20-40	40-60	60-80	80-100
No. of students	8	15	32	26	9

Out of these students, one is chosen at random. Find the probability that the chosen student obtains more than 80% marks

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10. Marks obtained by 90 students of class IX in a test are given below:

Marks (%)	0-20	20-40	40-60	60-80	80-100
No. of students	8	15	32	26	9

Out of these students, one is chosen at random. Find

the probability that the chosen student obtains more than 60 %marks

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11. In a locality of 5000 families were chosen at random and the following data was collected

Number of members	2	3	4	5	6 or more
Number of families	1060	1000	1020	1070	850

Out of these families, a family is chosen at random. What is the probability that the chosen family has less than 5 but more than 3 members?

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12. On one page of a directory, there are 160 telephone numbers. The frequency distribution of the unit place digit is given below:

Unit place digit	0	1	2	3	4	5	6	7	8	9
Freq- uency	10	16	18	30	15	10	15	16	10	20

From this page, one of the numbers is chosen at random. What is the probability that the unit place digit in the chosen number is an odd prime number?



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13. 80 batteries are selected at random from a lot and their lifetime is recorded in the form of a frequency

table given below:

Lifetime (in hours)	1750	2160	1004	1089	1100
Frequency	10	15	23	25	7

A battery is chosen at random from the lot. What is the probability that it has lifetime which is perfect square of a natural number?

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14. In 60 throws of a die, the outcomes were noted as below:

Outcomes	1	2	3	4	5	6
Number of times	8	10	15	10	7	10

If die is thrown at random, then what is the probability that upper face of a die shows an even prime number?



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Exercise Subjective Problems Long Answer Type

1. Three coins are tossed simultaneously 180 times and it is found that 3 tails appeared 34 times, 2 tails appeared 55 times, 1 tail appeared 72 times and no tail appeared 19 times. Find the probability of getting 3 tails



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2. Three coins are tossed simultaneously 180 times and it is found that 3 tails appeared 34 times, 2 tails appeared 55 times, 1 tail appeared 72 times and no tail appeared 19 times. Find the probability of getting 2 tails



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3. Three coins are tossed simultaneously 180 times and it is found that 3 tails appeared 34 times, 2 tails appeared 55 times, 1 tail appeared 72 times and no tail appeared 19 times. Find the probability of getting 1 tail



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4. Three coins are tossed simultaneously 180 times and it is found that 3 tails appeared 34 times, 2 tails appeared 55 times, 1 tail appeared 72 times and no tail appeared 19 times. Find the probability of getting 0 tail.



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5. A die is thrown 300 times and the outcomes are noted as given below:

Outcome	1	2	3	4	5	6
Frequency	75	50	45	35	40	55

If a die is thrown at random, find the probability of

getting

1



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6. A die is thrown 300 times and the outcomes are noted as given below:

Outcome	1	2	3	4	5	6
Frequency	75	50	45	35	40	55

If a die is thrown at random, find the probability of getting

5



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7. A die is thrown 300 times and the outcomes are noted as given below:

Outcome	1	2	3	4	5	6
Frequency	75	50	45	35	40	55

If a die is thrown at random, find the probability of getting multiple of 3



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8. A die is thrown 300 times and the outcomes are noted as given below:

Outcome	1	2	3	4	5	6
Frequency	75	50	45	35	40	55

If a die is thrown at random, find the probability of

getting

multiple of 2.



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9. The table given below shows the marks obtained by 50 students of a class in a test with maximum 2. marks

Marks (%)	0-15	15-30	30-45	45-60	60-75	Above 75
No. of students	6	10	10	14	6	4

100.

A student of the class is selected at random. Find the probability that the selected student gets

less than 15% marks



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10. The table given below shows the marks obtained by 50 students of a class in a test with maximum marks 100.

Marks (%)	0-15	15-30	30-45	45-60	60-75	Above 75
No. of students	6	10	10	14	6	4

A student of the class is selected at random. Find the probability that the selected student gets 60% or more marks

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11. The table given below shows the marks obtained by 50 students of a class in a test with maximum marks 100.

Marks (%)	0-15	15-30	30-45	45-60	60-75	Above 75
No. of students	6	10	10	14	6	4

A student of the class is selected at random. Find the probability that the selected student gets marks equal to or greater than 45% but less than 60%.



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12. On one page of a telephone directory, there are 150 phone numbers. The frequency distribution of their unit digits is given below

Unit digit	0	1	2	3	4	5	6	7	8	9
Freq- uency	10	20	15	10	20	20	10	15	15	15

One of the numbers is chosen at random from the page.

What is the probability that the unit digit of the chosen number is less than 3 ?



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13. On one page of a telephone directory, there are 150 phone numbers. The frequency distribution of their unit digits is given below

Unit digit	0	1	2	3	4	5	6	7	8	9
Freq- uency	10	20	15	10	20	20	10	15	15	15

One of the numbers is chosen at random from the page.

What is the probability that the unit digit of the chosen

number is

greater than 8 ?



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14. Following are the ages (in years) of 300 patients, getting medical treatment in a hospital.

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
No. of patients	80	40	50	70	40	20

One of the patients is selected at random. Find the probability that the age of the selected patient is 10 years or more.



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15. Following are the ages (in years) of 300 patients, getting medical treatment in a hospital.

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
No. of patients	80	40	50	70	40	20

One of the patients is selected at random. Find the probability that the age of the selected patient is less than 10 years



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16. Following are the ages (in years) of 300 patients, getting medical treatment in a hospital.

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
No. of patients	80	40	50	70	40	20

One of the patients is selected at random. Find the probability that the age of the selected patient is more than 70 years.



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17. Following are the ages (in years) of 300 patients, getting medical treatment in a hospital.

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
No. of patients	80	40	50	70	40	20

One of the patients is selected at random. Find the

probability that the age of the selected patient is 70 years or less.



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Exercise Integer Numerical Value Type

1. Ram and Priya are playing a game. Ram's winning probability is $\frac{1}{3}$. Numerator of Priya's winning probability is



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2. If a coin is tossed 4 times, then the number of elements in the sample space is



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3. A coin is tossed 500 times with the following frequencies : Head : 255, Tail : 245.

Then the sum of the probabilities of each event is



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4. Find the probability of an odd number selected randomly from first 30 natural numbers.



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5. Find the sum of numerator and denominator of the probability of choosing a day from a week.



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6. Product of the numerator and denominator of probability of choosing a vowel randomly from the word 'EXAMINATION' is



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7. The probability of choosing a vowel randomly from 5 vowels is $\frac{m}{n}$. Then $n - m$ is equal to



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8. Two dice are thrown simultaneously. If the probability of the event that sum of numbers shown on the upper face of dice that is greater than 13 is $\frac{n}{36}$ then find the value of n .



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9. The probability that a non-leap year has 53 Sundays is

$\frac{m}{n}$. Then find the value of $n + m$.



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10. A bag contains 6 green and 5 blue balls. If probability of choosing a green ball randomly is $n/11$ then the number of factors of n is



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Olympiad Hots Corner

1. A bag contains 8 red and 4_ green balls. One ball is selected at random. Find the probability that the ball drawn is red.

A. $\frac{2}{3}$

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

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

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

Answer: A



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2. Two fair dice are rolled together. The probability that the difference of numbers appearing is 1 will be

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

B. $\frac{7}{36}$

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

D. $\frac{7}{14}$

Answer: C



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3. Based on the given information, find the probability of people with age 60, 61 & 64 who can drive

Age (in years)	Number of persons of different age who can drive the car
60	16090
61	11490
62	8012
63	5448
64	3607
65	2320

A. $\frac{36071}{41490}$

B. $\frac{31187}{46967}$

C. $\frac{31232}{41149}$

D. $\frac{31232}{41609}$

Answer: B



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4. Study the following statements carefully and select the correct option. Cards marked with the consecutive odd numbers from 1 to 200 are put in a box and mixed thoroughly. One card is drawn at random from the box.

Statement - 1 : Probability that drawn card is multiple of 3 is $\frac{1}{3}$

Statement - 2 : Probability that drawn card is a perfect square and a multiple of 9 both is $\frac{2}{3}$.

- A. Both Statement-1 and Statement-2 are true.
- B. Both Statement-1 and Statement-2 are false.
- C. Statement-1 is true but Statement-2 is false.
- D. Statement-1 is false but Statement-2 is true.

Answer: B



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5. 14 cards numbered 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 are placed in a box and mixed thoroughly. If a card is drawn from the box, then probability that the number on the card divisible by 3 or 2 is

A. $\frac{12}{14}$

B. $\frac{5}{14}$

C. $\frac{9}{14}$

D. $\frac{4}{14}$

Answer: C



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6. What is the probability of having 53 Thursday in ordinary year (except leap year)?

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

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

C. $\frac{1}{7}$

D. $\frac{4}{7}$

Answer: C



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7. A fair die is thrown once. The probability of getting neither a prime nor a composite number is

A. 1

B. 0

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

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

Answer: D



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8. A bag contains 15 balls of which x are black and remaining are red. If the number of red balls are increased by 5, the probability of drawing the red ball doubles, then probability of drawing red ball is

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

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

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

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

Answer: A



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9. A box contains some black balls and 30 white balls. If the probability of drawing a black ball is two fifths of a white ball, then the number of black balls in the box is

A. 6

B. 12

C. 18

D. 30

Answer: B



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10. There are 50 cards marked with the numbers 1 to 50. One card is drawn at random. What is the probability that number on the card is a prime number ?

A. $\frac{3}{10}$

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

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

D. $\frac{2}{15}$

Answer: A



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11. A point is selected at random from the interior of a circle. The probability that the point is closer to the centre than the boundary of the circle is

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

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

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

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

Answer: C



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12. Aashna play a game in which two dice are thrown together. She wins if the product of the two numbers appearing on their tops is odd or a multiple of 5. The probability of her winning is

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

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

C. $\frac{7}{18}$

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

Answer: B



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13. From a pack of 52 playing cards all cards whose numbers are multiples of 3 are removed. A card is now drawn at random. What is the probability that the card drawn is

(i) a face card (King, Jack or Queen) ?

(ii) an even numbered red card ?

A. $\frac{10}{52}$

B. $\frac{1}{4}$

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

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

Answer: C



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14. A die is thrown twice. The probability of the sum being odd, is

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

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

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

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

Answer: A



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15. A natural number k is chosen from the set $\{1, 2, 3, \dots, 100\}$. The probability that it is prime, is

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

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

C. $\frac{19}{100}$

D. $\frac{23}{100}$

Answer: A



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16. A card is drawn from a well shuffled pack of 52 cards. The probability that card drawn is a red ace is

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

B. $\frac{1}{26}$

C. $\frac{3}{52}$

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

Answer: B



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17. There are 5 red, 2 yellow and 7 white roses in a flower vase. If a rose is selected randomly, the probability of the selection of white rose is

A. $\frac{5}{14}$

B. $\frac{1}{7}$

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

D. 1

Answer: C



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18. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of a red ball, find the number of blue balls in the bag.

A. 19

B. 20

C. 15

D. 10

Answer: D



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19. Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. The probability that the ticket drawn has a number which is multiple of 3 and 5 is

A. $1/20$

B. $2/5$

C. $8/15$

D. 9 / 20

Answer: A



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20. The probability that it will rain today is 0.84. What is the probability that it will not rain today?

A. 2

B. 1

C. 0.16

D. 0.61

Answer: C



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