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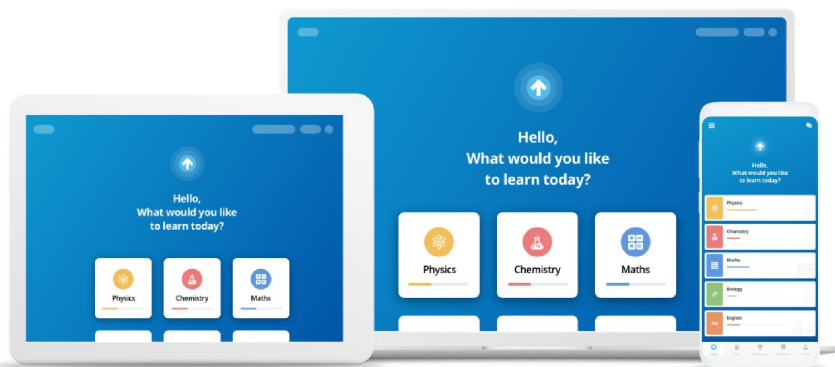
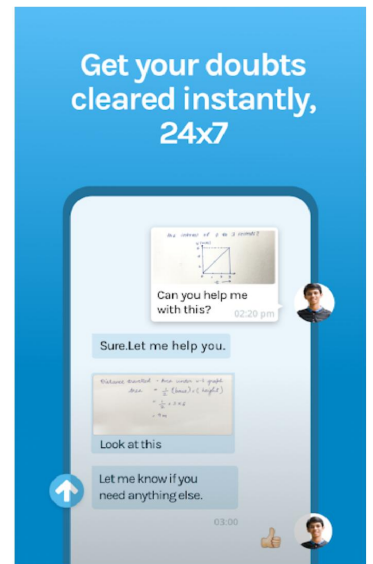
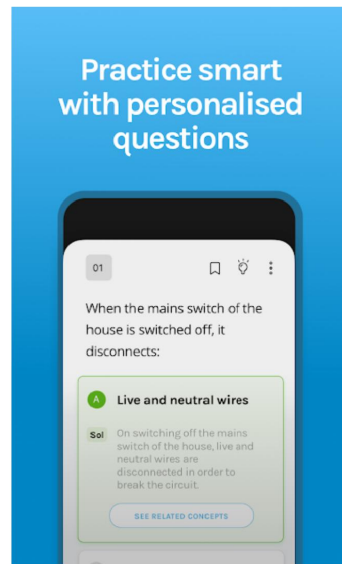
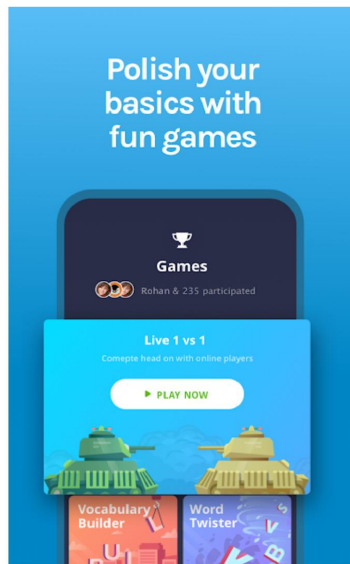
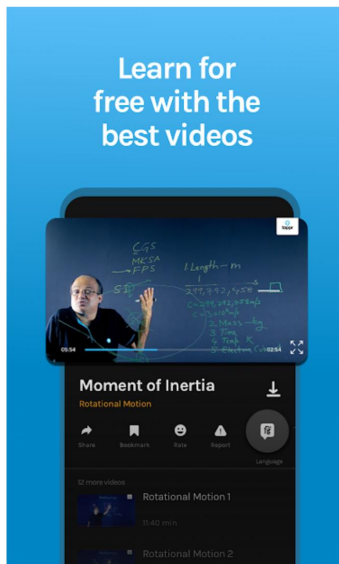
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#463407

Topic: Pictograph, Bar graph, Pie graph and Line graph

For which of these would you use a histogram to show the data?

- (a) The number of letters for different areas in a postman's bag.
- (b) The height of competitors in an athletics meet.
- (c) The number of cassettes produced by 5 companies.
- (d) The number of passengers boarding trains from 7:00 a.m. to 7:00 p.m. at a station.

Give reasons for each.

Solution

- (a) We can't use histogram in this case because we cannot define the class intervals for this data.
- (b) We can use histogram here, because it will be easy to divide the data in class intervals.
- (c) We do not have approximate data we wont use a histogram. We do not know about the number of cassettes produced by companies.
- (d) We can use histogram in this case on we can divide the given data into class intervals.

#463408

Topic: Pictograph, Bar graph, Pie graph and Line graph

The shoppers who come to a departmental store are marked as: man (M), woman (W), boy (B) or girl (G). The following list gives the shoppers who came during the first hour in the morning:

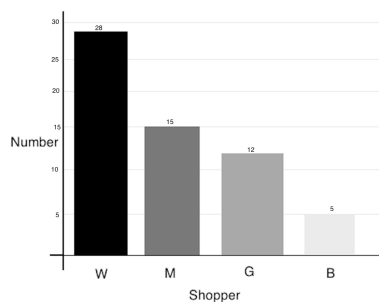
W W W G B W W M G G M M W W W G B M W B G G M W M M W W

W M W B W G M W W W G W M M W W M W G W M G W M M B G G W

Make a frequency distribution table using tally marks. Draw a bar graph to illustrate it.

Solution

Shopper	Tally marks	Number
W		28
M		15
G		12
B		5



#463409

Topic: Frequency Distribution

The weekly wages (in Rs) of 30 workers in a factory are:

830, 835, 890, 810, 835, 836, 869, 845, 898, 890, 820, 860, 832, 833,

855, 845, 804, 808, 812, 840, 885, 835, 835, 836, 878, 840, 868, 890,

806, 840

Using tally marks make a frequency table with intervals as

800 – 810, 810 – 820 and so on

Solution

Interval	Tally marks	Frequency
800 - 810	III	3
810 - 820	II	2
820 - 830	I	1
830 - 840	IIII	9
840 - 850		5
850 - 860	I	1
860 - 870	III	3
870 - 880	I	1
880 - 890	I	1

#463410

Topic: Histogram

Draw a histogram for the frequency table made for the data in Question 3, and answer the following questions.

- Which group has the maximum number of workers?
- How many workers earn Rs 850 and more?
- How many workers earn less than Rs 850?

Solution

(i) 830 – 840: Maximum number of workers.

(ii) Workers earn more than Rs850:

It will be workers who fall in the group of 850 – 860, 860 – 870, 870 – 880, 880 – 890

$$\therefore \text{Sum of number of all workers} = 1 + 3 + 1 + 1 + 4$$

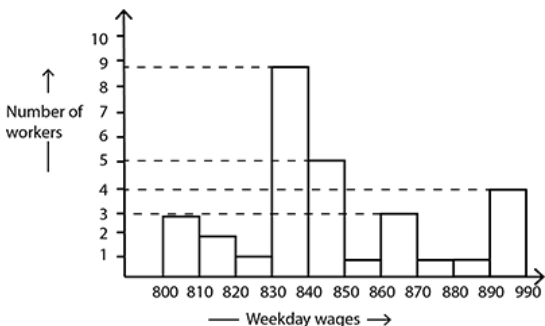
$$= 10$$

(iii) The worker who earn less than Rs850:

Category will be: 800 – 810, 810 – 820, 820 – 830, 830 – 840 and 840 – 850

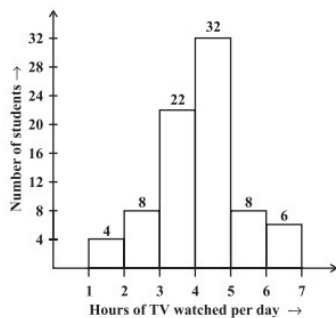
$$\therefore \text{Sum of numbers of these workers} = 3 + 2 + 1 + 9 + 5$$

$$= 20$$



#463413

Topic: Histogram



The number of hours for which students of a particular class watched television during holidays is shown through the given graph.

Answer the following.

- For how many hours did the maximum number of students watch TV?
- How many students watched TV for less than 4 hours?
- How many students spent more than 5 hours in watching TV?

Solution

(i) Maximum number of students : 32

Watched TV for (4 – 5) hours

(ii) Students who watched TV for less than 4 hours belong to category : 1 – 2hrs, 2 – 3hrs or 3 – 4hrs.

Total number of student: $4 + 8 + 22$

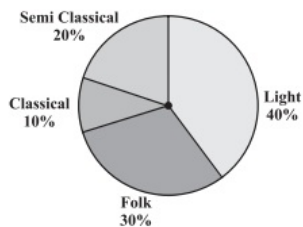
= 34

(iii) The students who watched TV for more than 5 hours: Category - 5 – 6 or 6 – 7 hours

∴ Total number of students: $8 + 6 = 14$

#463414

Topic: Pictograph, Bar graph, Pie graph and Line graph



A survey was made to find the type of music that a certain group of young people liked in a city. Adjoining pie chart shows the findings of this survey.

From this pie chart answer the following:

- If 20 people liked classical music, how many young people were surveyed?
- Which type of music is liked by the maximum number of people?
- If a cassette company were to make 1000 CDs, how many of each type would they make?

Solution

(i)

Number of people who are into classical music = 10%

10% of pie chart = 20 people

$$1\% \Rightarrow \frac{20}{10} \times 100$$

$$\text{and } 100\% \Rightarrow \frac{20}{10} \times 100 \times \frac{100}{100}$$

\Rightarrow 200 people.

(ii)

Light chart represent maximum number as it is 40% of total. \therefore Light music is liked by max. people.

(iii)

$$\text{Number of CD's of classical music} \Rightarrow \frac{10}{100} \times 1000(10\%)$$

= 100

$$\text{Number of CD's of semi classical music} = \frac{20}{100} \times 1000(20\%)$$

= 200




$$\text{Number of CD's of folk music} = \frac{30}{100} \times 1000 = 300 (30\%)$$

$$\text{Number of CD's of light music} = \frac{40}{100} \times 1000 (40\%)$$

= 400

#463415

Topic: Pictograph, Bar graph, Pie graph and Line graph

Season	No. of votes
Summer 	90
Rainy 	120
Winter 	150

A group of 360 people were asked to vote for their favourite season from the three seasons rainy, winter and summer.

(i) Which season got the most votes?

(ii) Find the central angle of each sector.

(iii) Draw a pie chart to show this information

Solution

(i) Winter got most votes: 150

(ii) to calculate central angle:

We must know total votes = $90 + 120 + 150$

= 360

Summer \Rightarrow 90 votes \Rightarrow Central angles $\Rightarrow \frac{90}{360} \times 360^\circ$

= 90°

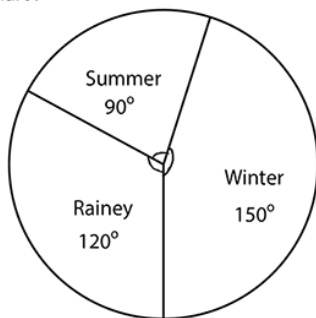
Rainy \Rightarrow 120 votes \Rightarrow Central angle = $\frac{120}{360} \times 360^\circ$

= 120°

Winter \Rightarrow 150 votes \Rightarrow Central angle $\Rightarrow \frac{150}{360} \times 360^\circ$

= 150°

Pie chart :



#463416

Topic: Pictograph, Bar graph, Pie graph and Line graph

Draw a pie chart showing the following information. The table shows the colours preferred by a group of people.

Colours	Number of people
Blue	18
Green	9
Red	6
Yellow	3
Total	36

Find the proportion of each sector.

For example, Blue is $\frac{18}{36} = \frac{1}{2}$; Green is $\frac{9}{36} = \frac{1}{4}$ and so on.

Use this to find the corresponding angles.

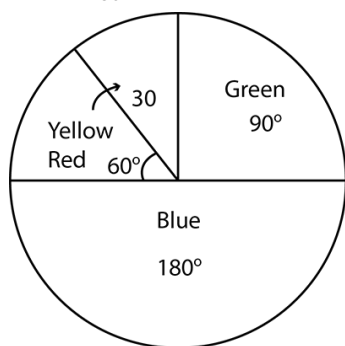
Solution

Central angle: Blue $\Rightarrow \frac{18}{36} \times 360^\circ = 180^\circ$

Green $\Rightarrow \frac{9}{36} \times 360^\circ = 90^\circ$

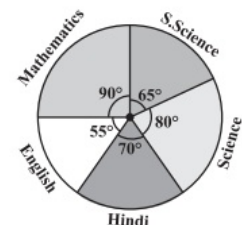
Red $\Rightarrow \frac{6}{36} \times 360^\circ = 60^\circ$

Yellow $\Rightarrow \frac{3}{36} \times 360^\circ = 30^\circ$



#463419

Topic: Pictograph, Bar graph, Pie graph and Line graph



The adjoining pie chart gives the marks scored in an examination by a student in Hindi, English, Mathematics, Social Science and Science. If the total marks obtained by the students were 540, answer the following questions.

- In which subject did the student score 105 marks? So, for 105 marks, what is the central angle?
- How many more marks were obtained by the student in Mathematics than in Hindi?
- Examine whether the sum of the marks obtained in Social Science and Mathematics is more than that in Science and Hindi.

Solution

(i)

Total marks obtained = 540

540° represents 360°

\therefore The central angle for 105 marks:

$$= \frac{105}{540} \times 360^\circ = 70^\circ$$

Hindi's central angle is 70°

\therefore Student scored 105 marks in Hindi

(ii)

Difference between central angles of Maths and Hindi

$$\Rightarrow 90^\circ - 70^\circ \Rightarrow 20^\circ$$

$$\text{Marks for } 20^\circ \text{ central angles} = \frac{20}{360} \times 540^\circ = 30^\circ$$

\therefore 30 more marks were obtained by student in maths than in hindi

(iii)

Sum of central angles of social science and maths

$$= 65^\circ + 90^\circ = 155^\circ$$

$$\text{Sum of central angles of Science and Hindi} = 80^\circ + 70^\circ = 150^\circ$$

Sum of central angles for social Science and Mathematics > Science and Hindi.

#463421

Topic: Pictograph, Bar graph, Pie graph and Line graph

The number of students in a hostel, speaking different languages is given below.

Display the data in a pie chart.

Language	Hindi	English	Marathi	Tamil	Bengali	Total
Number of students	40	12	9	7	4	72

Solution

Central angles:

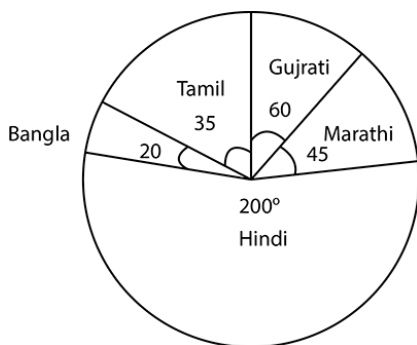
$$\text{Hindi} \Rightarrow \frac{40}{72} \times 360^\circ = 200^\circ$$

$$\text{English} \Rightarrow \frac{12}{72} \times 360^\circ = 60^\circ$$

$$\text{Marathi} \Rightarrow \frac{7}{72} \times 360^\circ = 35^\circ$$

$$\text{Tamil} \Rightarrow \frac{7}{72} \times 360^\circ = 35^\circ$$

$$\text{Bengali} \Rightarrow \frac{4}{72} \times 360^\circ = 20^\circ$$



#463422

Topic: Probability



List the outcomes you can see in these experiments.

(a) Spinning a wheel (b) Tossing two coins together

Solution

(a) Possible outcomes would be: A, B, C, D

(b) Possible outcomes: HT, HH, TH, TT

#463423

Topic: Probability

When a die is thrown, list the outcomes of an event of getting

(i) (a) a prime number (b) not a prime number.

(ii) (a) a number greater than 5 (b) a number not greater than 5

Solution

Possible outcomes: 1, 2, 3, 4, 5, 6

(i) (a) Prime numbers: 2, 3, 5

It represents the outcomes of Prime numbers

(b) Not a prime number: 1, 4, 6

It represent the outcomes of not a prime numbers.

(ii) (a) Number greater than 5:

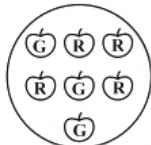
Only when 6 comes

(b) Number not greater than 5:

Only when outcomes: 1, 2, 3, 4 and 5

#463424

Topic: Probability



Find the

(a) Probability of the pointer stopping on D in spinning a wheel if it has A, A, D, B, C written on it?

(b) Probability of getting an ace from a well shuffled deck of 52 playing cards?

(c) Probability of getting a red apple from the figure given above.

Solution

(a) The pointer can stop at one of following regions A, A, D, B, C, D .

Only in 1 case that pointer will stop at region D .

Probability: $\frac{1}{5}$

(b) There are 52 cards: 4 ace cards

Probability of getting an ace card

$$= \frac{4}{52} = \frac{1}{13}$$

(c) There are a total of 7 apple, out of which 4 are red, 3 are green.

$$\text{Probability of red apple} = \frac{4}{7}$$

#463426

Topic: Probability

Numbers 1 to 10 are written on ten separate slips (one number on one slip), kept in a box and mixed well. One slip is chosen from the box without looking into it. What is the probability of?

(i) getting a number 6?

(ii) getting a number less than 6?

(iii) getting a number greater than 6?

(iv) getting a 1-digit number?

Solution

(i) Total slips: 10

Probability of getting a number 6 $\Rightarrow \frac{1}{10}$

(ii) Numbers less than 6: 1, 2, 3, 4, 5

Probability $\Rightarrow \frac{5}{10} = \frac{1}{2}$

(iii) Number greater than 6 are 7, 8, 9, 10

Probability $\Rightarrow 6 \Rightarrow \frac{4}{10} = \frac{2}{5}$

(iv) Single digit: 1, 2, 3, 4, 5, 6, 7, 8, 9

Probability = $\frac{9}{10}$

#463427

Topic: Probability

If you have a spinning wheel with 3 green sectors, 1 blue sector and 1 red sector, what is the probability of getting a green sector? What is the probability of getting a non blue sector?

Solution

Total sectors = $3 + 1 + 1 = 5$

Probability of getting green sector = $\frac{3}{5}$

Non-Blue sector: Green sector or Red sector

Probability of getting non-blue = $\frac{4}{5}$

#463428

Topic: Probability

Find the probabilities of the events:

When a die is thrown, list the outcomes of an event of getting

(i) (a) a prime number (b) not a prime number.

(ii) (a) a number greater than 5 (b) a number not greater than 5

Solution

(i) (a)

Out of 6 possible outcomes, a prime number can be obtained in 3 cases.

Probability of prime number = $\frac{3}{6} = \frac{1}{2}$

(i) (b)

Out of 6 possible outcomes, a prime number not obtained in 3 cases

Probability = $\frac{3}{6} = \frac{1}{2}$

(ii) (a)

Out of 6 possible outcomes, greater than 5 can be obtained 1 case

Probability = $\frac{1}{6}$

(ii) (b)

Out of 6 possible outcomes, a number not greater than 5 can be obtained in: 5 cases

Probability = $\frac{5}{6}$

#464313

Topic: Frequency Distribution

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.

Represent this data in the form of a frequency distribution table. Which is the most common, and which is the rarest, blood group among these students?

Solution

Blood group	Number of students
A	9
B	6
O	12
AB	3
Total	30

Most common - O (12 students)

Rarest - AB (3 students)

#464329

Topic: Frequency Distribution

Three coins were tossed 30 times simultaneously. Each time the number of heads occurring was noted down as follows:

0 1 2 2 1 2 3 1 3 0

1 3 1 1 2 2 0 1 2 1

3 0 0 1 1 2 3 2 2 0

Prepare a frequency distribution table for the data given above.

Solution

Number of heads	Frequency
0	6
1	10
2	9
3	5
Total	30

#464330

Topic: Frequency Distribution

The value of π upto 50 decimal places is given below:

3.14159265358979323846264338327950288419716939937510

(i) Make a frequency distribution of the digits from 0 to 9 after the decimal point.

(ii) What are the most and the least frequently occurring digits?

Solution

(i)

Digits	Frequency
0	2
1	5
2	5
3	8
4	4
5	5
6	4
7	4
8	5
9	8
Total	50

(ii) Least frequency \rightarrow 0 \rightarrow 2 times

Maximum frequency \rightarrow 3 & 9 \rightarrow 8 times

#464412

Topic: Pictograph, Bar graph, Pie graph and Line graph

S.No.	Causes	Female fatality rate (%)
1.	Reproductive health conditions	31.8
2.	Neuropsychiatric conditions	25.4
3.	Injuries	12.4
4.	Cardiovascular conditions	4.3
5.	Respiratory conditions	4.1
6.	Other causes	22.0

A survey conducted by an organisation for the cause of illness and death among the women between the ages 15 – 44 (in years) worldwide, found the following figures (in %):

(i) Represent the information given above graphically.

(ii) Which condition is the major cause of women's ill health and death worldwide?

(iii) Try to find out, with the help of your teacher, any two factors which play a major role in the cause in (ii) above being the major cause.

Solution

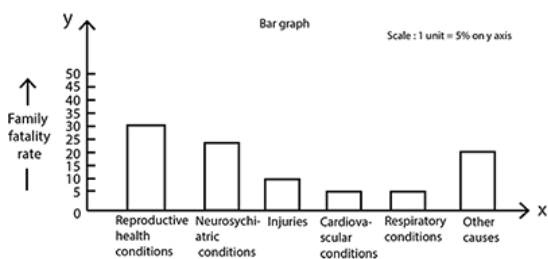
(i) Bar graph

(ii) Major cause of women's ill health : Reproductive health conditions : 31.8%

(iii) Factors are:

(i) Medical infrastructure in work.

(ii) Lack of treatment facilitators and facilities.



#464414

Topic: Pictograph, Bar graph, Pie graph and Line graph

Section	Number of girls per thousand boys
Scheduled Caste (SC)	940
Scheduled Tribe (ST)	970
Non SC/ST	920
Backward districts	950
Non-backward districts	920
Rural	930
Urban	910

The following data on the number of girls (to the nearest ten) per thousand boys in different sections of Indian society is given below.

(i) Represent the information above by a bar graph.

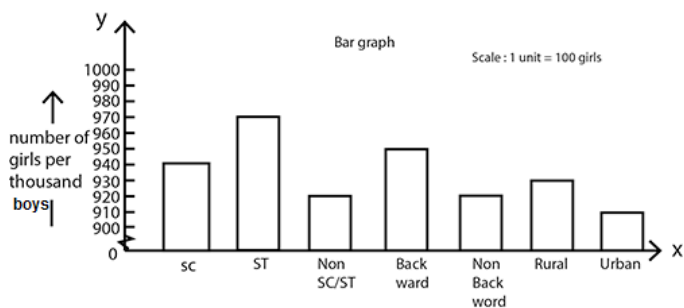
(ii) In the classroom discuss what conclusions can be arrived at from the graph.

Solution

ST : Maximum girls : 970

Urban : Minimum girls : 910

Number of girls in rural > urban.



#464415

Topic: Pictograph, Bar graph, Pie graph and Line graph

Political Party	A	B	C	D	E	F
Seats Won	75	55	37	29	10	37

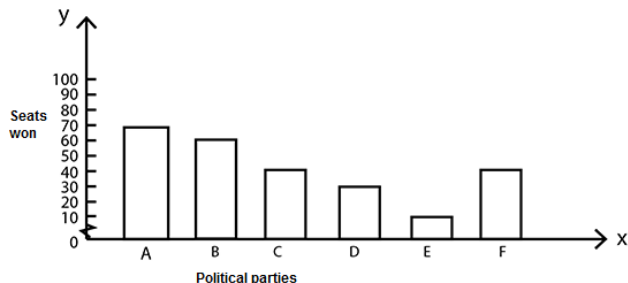
Given below are the seats won by different political parties in the polling outcome of a state assembly elections:

- Draw a bar graph to represent the polling results.
- Which political party won the maximum number of seats?

Solution

(i) Bar graph

ii) Party A.



#464462

Topic: Probability

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.

Solution

Lets assume a case:

Number of 2 wheelers passed = 18

Number of 3 wheelers passed = 23

Number of 4 wheelers passed = 19

The time interval is 15 minutes for all the 3 conditions.

Total number of vehicles passed = Number of 2 wheelers + Number of 3 wheelers + Number of 4 wheelers

$$= 18 + 23 + 19 = 60$$

$$\text{Probability that one vehicle out of total vehicles is 2 wheelers} = \frac{18}{60} = \frac{3}{10}$$

#464463

Topic: Probability

In a class of 40 students, ask them to write a 3-digit number. Choose any student at random. What is the probability that the number written by her/him is divisible by 3?

Remember that a number is divisible by 3, if the sum of its digits is divisible by 3.

Solution

Total number of students in the class = 40

and out of 40 students, number divisible would be:

Case : Number divisible by 3 or Sum of its digits divisible by 3

Total 3 digit numbers = 100 to 999

$$= 900 \text{ numbers}$$

First number divisible is greater than 100, i.e., = 102

Now add 3 to 102 till 999

$$a = 102 \text{ Common difference } d = 3$$

$$n = ? \text{ Last number } = 999$$

$$\Rightarrow 999 = a + (n - 1)d$$

$$\Rightarrow 999 = 102 + (n - 1)3$$

$$\Rightarrow \frac{897}{3} = n - 1, n = 300$$

$$\text{Probability} = \frac{300}{900} = \frac{1}{3}$$

#465253

Topic: Introduction

Which of the following experiments have equally likely outcomes? Explain.

(i) A driver attempts to start a car. The car starts or does not start.

(ii) A player attempts to shoot a basketball. She/he shoots or misses the shot.

(iii) A trial is made to answer a true-false question. The answer is right or wrong.

(iv) A baby is born. It is a boy or a girl

Solution

- i) Equally likely outcome because either the car starts or does not. There can be no other possibility.
- ii) Equally likely outcome because either the goes through the basket or it does not. There can be no other possibility.
- iii) Equally likely outcome because in a true or false type of question, either the answer is correct or wrong. There can be only 2 possibilities or no other possibility.
- iv) Equally likely outcome because either the child born is a girl or a boy. There can be no other possibility.

#465254**Topic:** Introduction

Why is tossing a coin considered to be a fair way of deciding which team should get the ball at the beginning of a football game?

Solution

When a coin is tossed, there is an equally likely outcome of getting either a head or a tail, so tossing a coin is a fair way of deciding.

#465257**Topic:** Probability

A bag contains lemon flavoured candies only. Malini takes out one candy without looking into the bag. What is the probability that she takes out

- (i) an orange flavoured candy?
- (ii) a lemon flavoured candy?

Solution

i) Since the bag contains only lemon candies, the probability of picking an orange flavored candy does not arise.

So, $P(\text{orange candy}) = 0$.

ii) Since the bag contains only lemon candies, the probability of picking a lemon flavored candy is certain

So, $P(\text{lemon candy}) = 1$.

#465258**Topic:** Probability

It is given that in a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability that the 2 students have the same birthday?

Solution

Let \bar{B} \equiv Event that 2 students do not have same birthday

$$\therefore P(\bar{B}) = 0.992$$

So, probability of 2 students having same birthday $P(B) = 1 - P(\bar{B})$

$$= 1 - 0.992$$

$$= 0.008$$

#465260**Topic:** Probability

A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is (i) red ? (ii) not red?

Solution

Total number of balls in the bag = $3 + 5 = 8$

$$\text{i) } P(\text{red ball}) = \frac{3}{8} \quad [\text{probability} = \text{no. of red balls}/\text{total number of balls}]$$

$$\text{ii) } P(\text{not red}) = \frac{5}{8} \quad [\text{probability} = \text{no. of non red balls}/\text{total number of balls}]$$

#465261

Topic: Probability

A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red ? (ii) white ? (iii) not green?

Solution

Total number of marbles in the box = $5 + 8 + 4 = 17$

i) $P(\text{red}) = \frac{\text{no. of red marbles}}{\text{total number of marbles}}$

$$P(\text{red}) = \frac{5}{17}$$

ii) $P(\text{white}) = \frac{\text{no. of white marbles}}{\text{total number of marbles}}$

$$P(\text{white}) = \frac{8}{17}$$

iii) $P(\text{green}) = \frac{\text{no. of green marbles}}{\text{total number of marbles}}$

$$P(\text{green}) = \frac{4}{17}$$

$$P(\text{not green}) = 1 - P(\text{green}) = \frac{13}{17}$$

#465262

Topic: Probability

A piggy bank contains hundred 50p coins, fifty c 1 coins, twenty c 2 coins and ten c 5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, what is the probability that the coin (i) will be a 50p coin ? (ii) will not be a c 5 coin?

Solution

Total number of coins in the piggy bank = $100 + 50 + 20 + 10 = 180$.

i)

$$P(50p \text{ coin}) = \frac{\text{number of 50p coins}}{\text{total number of coins}} = \frac{100}{180}$$

$$P(50p \text{ coin}) = \frac{5}{9}$$

ii)

Number of c 5 coins = 10

Number of coins which are not c 5 = 170

$$P(\text{coin not being c 5}) = \frac{170}{180} = \frac{17}{18}$$

#465265

Topic: Probability

Gopi buys a fish from a shop for his aquarium. The shopkeeper takes out one fish at random from a tank containing 5 male fish and 8 female fish (see Fig.). What is the probability that the fish taken out is a male fish?

Solution

Total number of fish in the tank = 13

$$P(\text{Male fish}) = \frac{\text{Number of male fish}}{\text{Total number of fish}}$$

$$P(\text{Male fish}) = \frac{5}{13}$$

#465266

Topic: Probability



A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 (see Fig.), and these are equally likely outcomes. What is the probability that it will point at

- (i) 8?
- (ii) an odd number?
- (iii) a number greater than 2?
- (iv) a number less than 9?

Solution

i) $P(8) = \frac{1}{8}$

ii)

$$P(\text{Odd number}) = \frac{\text{Number of odd numbers}}{\text{Total number of numbers in the chart}}$$

$$P(\text{Odd number}) = \frac{4}{8} = \frac{1}{2}$$

iii)

$$P(\text{Number} > 2) = \frac{\text{Number of numbers} > 2}{\text{Total number of numbers in the chart}}$$

$$P(\text{Number} > 2) = \frac{6}{8} = \frac{3}{4}$$

iv)

$$P(\text{Number} < 9) = \frac{\text{Number of numbers} < 9}{\text{Total number of numbers in the chart}}$$

$$P(\text{Number} < 9) = \frac{8}{8} = 1$$

#465268

Topic: Probability

A die is thrown once. Find the probability of getting

- (i) a prime number; (ii) a number lying between 2 and 6; (iii) an odd number

Solution

Sample space = { 1, 2, 3, 4, 5, 6 }

i) $P(\text{Prime number}) = \frac{\text{Number of prime numbers}}{\text{Sample space}}$

$$P(\text{Prime number}) = \frac{3}{6} = \frac{1}{2}$$

ii) $P(\text{Number between 2 and 6}) = \frac{3}{6} = \frac{1}{2}$

iii) $P(\text{Odd number}) = \frac{3}{6} = \frac{1}{2}$

#465269

Topic: Probability

One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting

(i) a king of red colour (ii) a face card (iii) a red face card (iv) the jack of hearts (v) a spade (vi) the queen of diamonds

Solution

i) King of red colour can be hearts King or a diamond king.

So, the possibility is 2.

$$P(\text{Red king}) = \frac{2}{52} = \frac{1}{26}$$

ii) A face card can be jack, queen, king of any suite.

In this way we will get $3 \times 4 = 12$ face cards.

$$P(\text{Face card}) = \frac{12}{52} = \frac{3}{13}$$

iii) A red face card can be either hearts or diamond king, jack or queen, which means there are $3 \times 2 = 6$

$$P(\text{Red face card}) = \frac{6}{52} = \frac{3}{26}$$

iv) There is only one Jack of hearts.

$$P(\text{Jack of hearts}) = \frac{1}{52}$$

v) There are 13 spades in total.

$$\text{So, } P(\text{Spade}) = \frac{13}{52} = \frac{1}{4}$$

vi) There is only one queen diamond.

$$\text{Hence, } P(\text{Queen diamond}) = \frac{1}{52}$$

#465270

Topic: Probability

Five cards-the ten, jack, queen, king and ace of diamonds, are well-shuffled with their face downwards. One card is then picked up at random.

(i) What is the probability that the card is the queen?

(ii) If the queen is drawn and put aside, what is the probability that the second card picked up is (a) an ace? (b) a queen?

Solution

i) Total number of cards $n(S) = 5$

Let $Q \equiv$ Event that queen of diamonds is drawn.

$$\therefore n(Q) = 1$$

$$\text{So, } P(Q) = \frac{n(Q)}{n(S)} = \frac{1}{5}$$

ii)

a) If the queen is put aside, then the total number of cards $n(S) = 4$

Let $A \equiv$ Event that ace of diamonds is drawn.

$$\therefore n(A) = 1$$

$$\text{So, } P(A) = \frac{n(A)}{n(S)} = \frac{1}{4}$$

b) If the queen is put aside, then the total number of cards $n(S) = 4$

Let $B \equiv$ Event that queen of diamonds is drawn.

$$\therefore n(B) = 0 \quad \dots \text{Since the queen was already put aside.}$$

$$\text{So, } P(B) = \frac{n(B)}{n(S)} = 0$$

#465271

Topic: Probability

12 defective pens are accidentally mixed with 132 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one

Solution

Number of good pens = 132

Number of defective pens = 12

Total number of pens = $132 + 12 = 144$

$$P(\text{Good pen}) = \frac{132}{144} = \frac{11}{12}$$

#465272

Topic: Probability

(i) A lot of 20 bulbs contain 4 defective ones. One bulb is drawn at random from the lot. What is the probability that this bulb is defective?

(ii) Suppose the bulb drawn in (i) is not defective and is not replaced. Now one bulb is drawn at random from the rest. What is the probability that this bulb is not defective ?

Solution

$$\text{i) } P(\text{Defective bulb}) = \frac{\text{Defective Bulbs}}{\text{Total Bulbs}} = \frac{4}{20} = \frac{1}{5}$$

ii) Since one bulb is already drawn, the number of bulbs remaining is 19.

Number of non defective bulbs is 15 as one bulb is picked.

$$P(\text{Non-defective}) = \frac{15}{19}$$

#465273

Topic: Probability

A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number (ii) a perfect square number (iii) a number divisible by 5

Solution

i) Number of 2 digit numbers from 1 to 90 = 81.

$$P(2 \text{ digit number}) = \frac{81}{90} = \frac{9}{10}$$

ii) Number of perfect squares between 1 and 90 = (1, 4, 9, 16, 25, 36, 49, 64, 81) = 9

$$P(\text{Perfect square}) = \frac{9}{90} = \frac{1}{10}$$

iii) Multiples of 5 are 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90

Number of multiples of 5 = 18

$$P(\text{Multiples of 5}) = \frac{18}{90} = \frac{1}{5}$$

#465274

Topic: Probability



A child has a die whose six faces show the letters as given below:

The die is thrown once. What is the probability of getting (i) A? (ii) D?

Solution

Total possible outcomes when a dice is thrown $n(S) = 6$

i) $A \equiv$ Event that A shows up on the dice.

$$\therefore n(A) = 2$$

$$P(A) = \frac{n(A)}{n(S)} = \frac{2}{6} = \frac{1}{3}$$

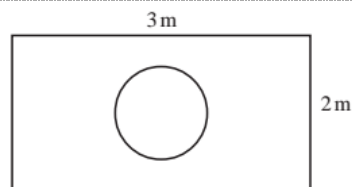
ii) $D \equiv$ Event that D shows up on the dice.

$$\therefore n(D) = 1$$

$$P(D) = \frac{n(D)}{n(S)} = \frac{1}{6}$$

#465275

Topic: Probability



Suppose you drop a die at random on the rectangular region shown in fig. What is the probability that it will land inside the circle with diameter 1m?

Solution

$$\text{Area of the circle} = \pi r^2 = \frac{\pi(1)^2}{4} = \frac{\pi}{4} \text{ sq m.}$$

$$\text{Area of the rectangle} = 3 \times 2 = 6 \text{ sq m.}$$

$$P(\text{Die will land in the circle}) = \frac{\text{Area of circle}}{\text{Area of rectangle}} = \frac{\pi}{24}$$

$$P(\text{Die will land in the circle}) = \frac{\pi}{24}$$

#465276

Topic: Probability

A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but 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 ?

Solution

Total number of pens = 144

No. of defective pens = 20

No. of good pen = 124

$$\text{i) } P(\text{Good pen}) = \frac{124}{144} = \frac{31}{36}$$

$$\text{ii) } P(\text{Defective pen}) = \frac{20}{144} = \frac{5}{36}$$

#465279

Topic: Probability

(i) Complete the following table:

Event: 'Sum on 2 dice'	2	3	4	5	6	7	8	9	10	11	12
Probability	$\frac{1}{36}$						$\frac{5}{36}$				$\frac{1}{36}$

(ii) A student argues that there are 11 possible outcomes 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12. Therefore, each of them has a probability $\frac{1}{11}$. Do you agree with this argument?

Justify your answer.

Solution

Event: Sum of 2 dice	2	3	4	5	6	7	8	9	10	11	12
Probability	$\frac{1}{36}$	$\frac{2}{36}$	$\frac{3}{36}$	$\frac{4}{36}$	$\frac{5}{36}$	$\frac{6}{36}$	$\frac{5}{36}$	$\frac{4}{36}$	$\frac{3}{36}$	$\frac{2}{36}$	$\frac{1}{36}$

(i) From the table it can be observed that,

To get sum as 2, possible outcomes = (1, 1)

To get sum as 3, possible outcomes = (2, 1), (1, 2)

To get sum as 4, possible outcomes = (3, 1), (1, 3), (2, 2)

To get sum as 5, possible outcomes = (2, 3), (3, 2), (1, 4), (4, 1)

To get sum as 6, possible outcomes = (1, 5), (5, 1), (2, 4), (4, 2), (3, 3)

To get sum as 7, possible outcomes = (1, 6), (6, 1), (3, 4), (4, 3), (2, 5), (5, 2)

To get sum as 8, possible outcome = (2, 6), (6, 2), (3, 5), (5, 3), (4, 4)

To get sum as 9, possible outcomes = (3, 6), (6, 3), (4, 5), (5, 4)

To get sum as 10, possible outcome = (4, 6), (6, 4), (5, 5)

To get sum as 11, possible outcome = (5, 6), (6, 5)

To get sum as 12, possible outcome = (6, 6)

(ii) The probability of each of these sums will not be $\frac{1}{11}$, as these sums are not equally likely.

#465280

Topic: Probability

A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Hanif wins if all the tosses give the same result i.e., three heads or three tails, and loses otherwise. Calculate the probability that Hanif will lose the game

Solution

Sample space = {HHH, HHT, HTH, HTT, THH, THT, TTH, TTT}

Outcomes when he does not choose 3 heads or 3 tails = {HHT, HTH, HTT, THH, THT, TTH}

$$\text{Probability of losing} = \frac{6}{8} = \frac{3}{4}$$

#465281

Topic: Probability

A die is thrown twice. What is the probability that

(i) 5 will not come up either time? (ii) 5 will come up at least once?

Solution

Throwing a die twice and throwing two dice simultaneously are treated as the same experiment.

Sample space = {(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6)
(2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6)
(3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6)
(4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6)
(5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6)
(6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)}

i) $P(5 \text{ will not come up either time}) = \text{Number of times 5 does not show divided by total number of outcomes}$

$$P(5 \text{ will not come up either time}) = \frac{25}{36}$$

ii) $P(5 \text{ will come up at least once}) = \text{Number of times 5 shows up at least once divided by total number of outcomes}$

$$P(5 \text{ will come up at least once}) = \frac{11}{36}$$

#465285

Topic: Probability

Which of the following arguments are correct and which are not correct? Give reasons for your answer.

(i) If two coins are tossed simultaneously there are three possible outcomes-two heads, two tails or one of each. Therefore, for each of these outcomes, the probability is $\frac{1}{3}$

(ii) If a die is thrown, there are two possible outcomes-an odd number or an even number. Therefore, the probability of getting an odd number is $\frac{1}{2}$

Solution

i) Possible outcomes = {HH, HT, TH, TT}

The number of outcomes is 4.

$$\text{Hence, the probability for each of these outcomes} = \frac{1}{4}$$

The argument is false.

ii) Possible outcomes = {1, 2, 3, 4, 5, 6}

$$P(\text{Odd number}) = \frac{\text{Number of odd numbers shown}}{\text{Total outcomes}}$$

$$P(\text{Odd number}) = \frac{3}{6} = \frac{1}{2}$$

The argument is correct.

#465286

Topic: Probability

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?

Solution

i) Possibility of visiting the shop on same day = {(tue, tue), (wed, wed), (thurs, thurs), (fri, fri), (sat, sat)}

Total outcomes is $5 \times 5 = 25$

$$P(\text{on the same day}) = \frac{5}{25} = \frac{1}{5}$$

ii) Possibility of visiting the shop on consecutive days = {(tue, wed), (wed, thurs), (thurs, fri), (fri, sat), (thurs, wed), (fri, thurs), (sat, fri), (wed, tue)}

Total outcomes is 25.

$$P(\text{on consecutive days}) = \frac{8}{25}$$

iii) Possibility of visiting the shop on different days = {tue, wed, thurs, fri, sat}

$$P(\text{on different days}) = 1 - P(\text{on same day}) = 1 - \frac{1}{5} = \frac{4}{5}$$

#465288

Topic: Probability

		Number in first throw					
Number in second throw	+	1	2	2	3	3	6
	1	2	3	3	4	4	7
	2	3	4	4	5	5	8
	2					5	
	3						
	3			5			9
	6	7	8	8	9	9	12

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 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?

Solution

+	1	2	2	3	3	6
1	2	3	3	4	4	7
2	3	4	4	5	5	8
2	3	4	4	5	5	8
3	4	5	5	6	6	9
3	4	5	5	6	6	9
6	7	8	8	9	9	12

Total no. of possible outcomes when 2 dice are thrown $6 \times 6 = 36$

i) Total times when the sum is even = 18

$$P(\text{Getting an even no.}) = \frac{18}{36} = \frac{1}{2}$$

ii) Total times when the sum is 6 = 4

$$P(\text{Getting sum as 6}) = \frac{4}{36} = \frac{1}{9}$$

iii) Total times when the sum is atleast 6 = 15

$$P(\text{Getting sum atleast 6.}) = \frac{15}{36} = \frac{5}{12}$$

#465289

Topic: Probability

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, determine the number of blue balls in the bag

Solution

Let there be x blue balls.

So, the total number of balls = $x + 5$

$$P(\text{Blue ball}) = \frac{x}{(x + 5)}$$

$$P(\text{Red ball}) = \frac{5}{(x + 5)}$$

Given,

$$P(\text{Blue}) = 2 \times P(\text{Red})$$

$$\frac{x}{(x + 5)} = 2 \times \frac{5}{(x + 5)}$$

Solving, we get x as 10.

So, the number of blue balls = 10.

#465290

Topic: Probability

A box contains 12 balls out of which x are black. If one ball is drawn at random from the box, what is the probability that it will be a black ball?

If 6 more black balls are put in the box, the probability of drawing a black ball is now double of what it was before. Find x .

Solution

Initially, total number of balls = 12

No. of black balls = x

$$\text{So, } P(\text{black ball}) = \frac{x}{12}$$

If 6 more black balls are added, total number of balls = $12 + 6 = 18$

NO. of black balls = $x + 6$

$$P(\text{black ball}) = \frac{x + 6}{18}$$

Given the probability of drawing a black ball is now double of what it was before

$$\text{So, } \frac{2x}{12} = \frac{(x + 6)}{18}$$

$$\frac{x}{6} = \frac{(x + 6)}{18}$$

$$3x = x + 6 \quad 2x = 6 \quad x = 3$$

So, the number of black balls present initially = 3.

#465292

Topic: Probability

A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{2}{3}$. Find the number of blue balls in the jar.

Solution

Total number of marbles = 24

Let there be x green marbles and $(24 - x)$ blue marbles.

$$P(\text{green}) = \frac{x}{24} = \frac{2}{3}$$

Solving, we get x as 16.

So, the number of green marbles = 16 and blue marbles = $24 - 16 = 8$ marbles.