VIPIN KAUSHIK ASOSE SURAJMAL VIHAR

- Subject - Mathematics
- Chapter – Probability

Today's Targets

1. Probability and related important terms ✓
2. Experimental Probability or Empirical Probabilities ✓
3. Some Important Result ✓
4. Assertion Reason Questions, Case Study Based Questions ✓
5. Match column A with Column B Type Questions ✓
6. Rapid Fire Question, One level up Problems ✓
7. Boggle Baba Ke Bhaukali Sawal, PW Module Questions ✓

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Probability

Probability is the branch of mathematics, which refers to the occurrence of a random experiment. Probability refers to possibility. Probability is defined as the mathematical calculation of chance of occurrence of an event E, and it can be denoted by P(E). If some event has a low probability, then that event is unlikely to happen. If some event has high probability, then the event is likely to happen.

Probability

(1) It will probably rain today.
(2) I doubt that he will pass the test.
(3) Most probably, Kavita will stand first in the annual examination.
(4) Chances are high that the prices of diesel will go up.
(5) There is a 50-50 chance of India winning a toss in today's match.

The words 'probably', 'doubt', 'most probably', 'chances', etc., used in the statements above involve an element of uncertainty. For example, in (1), 'probably rain' will mean it may rain or may not rain today. We are predicting rain today based on our experience when it rained under similar conditions.

Important Terms

Experiment: An experiment is any action that can be infinitely repeated or any series of actions that have a definite set of possible outcomes. An experiment can have equal to or more than one possible outcome. It is also called the trial.

Outcomes: A possible result of a random experiment is called its outcomes. For example:- if the experiment consists of tossing a coin twice, then its outcomes are HH, HT, TH, and TT.

Event: The collection of all or some outcomes of a random experiment is called an event. For example:- if the experiment consists of tossing a coin twice and let E be the event of getting at least one head. Then, the event E contains {HT, HH, and TH}.

Examples:

- Tossing of a fair coin is a trial and turning up the tail or head are events.
- Drawing a card from a pack of playing cards is a trial, and getting an ace or a queen is an event.
- Throwing of cubical dice with six faces is a trial, and the occurrence of number 1 or 2 or 3 or 4 or 5 or 6 are events.

Important Terms

Trial: A trial is an action which results in one or several outcomes.

Event: The total number of outcomes of a random experiment is called an event.

Sample Space: The set of all possible outcomes of a trial is called its sample space. It is generally denoted by S.

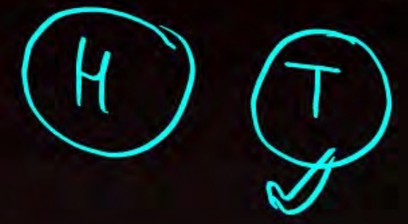
Examples:

If two coins are tossed together, then its sample space is S = {HT, TH, HH, TT}.

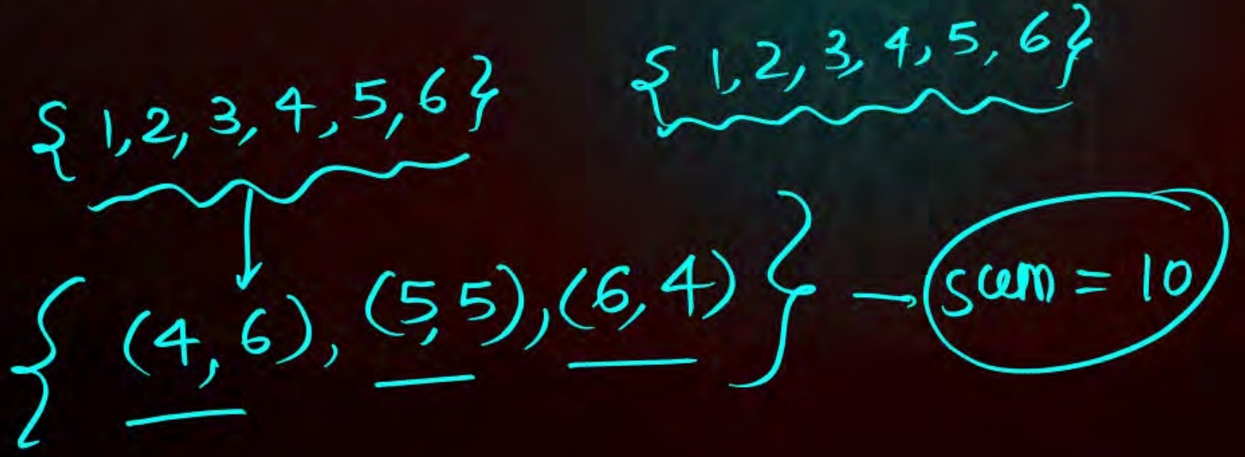
If a die is thrown once, then its sample space is S = {1, 2, 3, 4, 5, 6}.

Favourable Events: The outcomes which make necessary the happening of an event in a trial , are called favourable cases for that event.

Examples:



- If a coin is tossed, then the favorable case of getting T(Tail) is 1.
- If a dice is thrown then the favorable case for getting 1 or 2 or 3 or 4 or 5 or 6, is 1.
- If two dice are thrown, then favorable cases of getting a sum of numbers like 10 are three i.e. (4,6), (5,5), (6,4).



Experimental Probability or Empirical Probabilities

If there are 'n' number of trials of an experiment and E is an event associated with it such that E happens in m-trials. Then the empirical probability of happening of event E is denoted by P(E) and is given by

$$P(E) = \frac{\text{Number of trials in which event E happens}}{\text{Total number of trials}} = \frac{\text{Favourable cases}}{\text{Total cases}}$$

$$P(E) = \frac{m}{n}$$

Some Important Result

(i) The probability of each event lies between 0 and 1.

Impossible Event → $0 \leq P(E) \leq 1$ ← Sure Events $\Rightarrow$ $0\% \leq P(E) \leq 100\%$

(ii) The sum of all the probabilities is 1. → complementary event.

$$P(E) + P(\bar{E}) = 1$$

(iii) $P(E) \not< 0$, $P(E) \not> 1$

Question

A coin is tossed 1000 times with the following frequencies:

Head : 455, Tail : 545

Compute the probability for each event.

Question

A coin is tossed 1000 times with the following frequencies:

Head : 455, Tail : 545

Compute the probability for each event.

- $P(H) = \frac{455}{1000} = \boxed{0.455}$
- $P(T) = \frac{545}{1000} = \boxed{0.545}$

Question

Two coins are tossed simultaneously 500 times, and we get

Two heads : 105 times

One head : 275 times

No head : 120 times

Find the probability of occurrence of each of these events.

Question

Two coins are tossed simultaneously 500 times, and we get

Two heads : 105 times $\rightarrow P(HH) = \frac{105}{500} = \frac{210}{1000} =$ 0·21

One head : 275 times $\rightarrow P(1\ Head) = \frac{275}{500} = \frac{550}{1000} =$ 0·55

No head : 120 times $\rightarrow P(No\ head) = \frac{120}{500} = \frac{240}{1000} =$ 0·24

Ans.

Find the probability of occurrence of each of these events.

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Question

The sum of all probabilities equal to:

1

2

0

–1

Question

The sum of all probabilities equal to:

A 1

B 2

C 0

D −1

Question

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 has a high school certificate is :

A 0.5

B 0.6

C 0.7

D 0.8

Question

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 has a high school certificate is :

A 0.5

B 0.6

C 0.7

D 0.8

Let, E = Person has a high school certificate

Therefore,

$$P(E) = \frac{514}{642} = 0.80062$$

$$\approx \boxed{0.8}$$ Ans

Question

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, the probability that he/she does not like to eat potato chips is :

0.25

0.50

0.75

0.80

Question

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, the probability that he/she does not like to eat potato chips is :

A 0.25

B 0.50

C 0.75 ✓

D 0.80

Let, E = He/she doesn't like potato chips

$n(E) = (364 - 91)$

$\therefore P(E) = \frac{(364-91)}{364} = \frac{273}{364} = 0.75$ Ans

Question

When two dice are thrown simultaneously, the probability that sum of the two numbers that turn up is less than 11 is:

$\frac{11}{12}$

$\frac{1}{12}$

$\frac{2}{12}$

$\frac{1}{8}$

Question

When two dice are thrown simultaneously, the probability that sum of the two numbers that turn up is less than 11 is:

A $\frac{11}{12}$

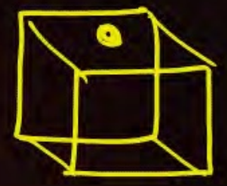
B $\frac{1}{12}$

C $\frac{2}{12}$

D $\frac{1}{8}$

6 ↔ 6 $n(\text{Total}) = 6 \times 6 = 36$

{1, 2, 3, 4, 5, 6} {1, 2, 3, 4, 5, 6}



E = sum of the numbers that turns up is less that 11

E = { (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) }

(5,6) ✗ (6,5) ✗ (6,6) ✗

$P(E) = \frac{33}{36} = \frac{11}{12}$

Alternate Method:-

Total cases $= 6 \times 6 = 36$

Favourable cases $= 36 - 3 = 33$

$P(E) = \frac{33}{36}$

11, - - - -

(5,6), (6,5), (6,6)

Question

Two dice are thrown together. The probability of getting the same number on both dice is:

$\frac{1}{2}$

$\frac{1}{3}$

$\frac{1}{6}$

$\frac{1}{12}$

Question

Two dice are thrown together. The probability of getting the same number on both dice is:

E = same number on both the dice or doublets

Doublets :- (1,1), (2,2), (3,3), (4,4), (5,5), (6,6)

$P(E) = \frac{6}{36} = \boxed{\frac{1}{6}}$ Ans

A $\frac{1}{2}$

B $\frac{1}{3}$

C $\frac{1}{6}$ ✓

D $\frac{1}{12}$

Question

A coin is tossed 1000 times, if the probability of getting a tail is 3/8, how many times head is obtained?

525

375

625

725

Question

A coin is tossed 1000 times, if the probability of getting a tail is 3/8, how many times head is obtained?

A 525

B 375

C 625

D 725

No. of Trials = 1000 times, No. of times tail occurs = 'x'

$P(T) = \frac{3}{8}$

$\frac{x}{1000} = \frac{3}{8} \Rightarrow x = \frac{1000 \times 3}{8} = 125 \times 3 = \boxed{375}$ ⇝ Tail

No. of times Head occurs = No. of Trials − No. of times tail occurs

$= 1000 - 375$

$= \boxed{625}$

Question

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.

Question

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.

$$P(\text{Item is rusted}) = \frac{(25 + 75)}{(50 + 150)} = \frac{100}{200} = \frac{1}{2}$$

Assertion and Reason Type Problem

DIRECTION: In the following questions, a statement of assertion (A) is followed by a statement of reason (R).

Mark the correct choice as:

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Question

Assertion: A coin is tossed three times. Number of elements in the sample space is 8.

Reason: When a coins is tossed n times then the number of elements in its sample space is 2^n.

Question

Assertion: A coin is tossed three times. Number of elements in the sample space is 8.

Reason: When a coins is tossed n times then the number of elements in its sample space is 2^n.

True

$n(S) = 2^n$

explain

option (A)

$2 \times 2 \times 2 = (2)^3 = 8$

H	H	H
H	H	T
H	T	H
T	H	H
T	T	H
T	H	T
H	T	T
T	T	T

8

Question

Assertion: A coins is tossed two times. Probability of getting at least two tails is 1/4.

Reason: When a coin is tossed 2 times, then the sample space is {HH, HT, TH, TT}.

Question

Assertion: A coins is tossed two times. Probability of getting at least two tails is 1/4.

Reason: When a coin is tossed 2 times, then the sample space is {HH, HT, TH, TT}.

True

True

Explain

H/T H/T

✓ H H

✓ H T

✓ T H

✓ T T

$P(E) = \frac{1}{4}$

option (A)

Question

Assertion: In a class there are m boys and n girls. A student is selected at random, then the probability of selecting a girl is n/m.

Reason: Probability of an event E of an experiment is ratio of the number of trials in which event E has happened to the total number of trials.

Question

Assertion: In a class there are m boys and n girls. A student is selected at random, then the probability of selecting a girl is n/m. → $P(\text{Girl}) = \frac{n}{m+n}$ → False

Reason: Probability of an event E of an experiment is ratio of the number of trials in which event E has happened to the total number of trials. → True

option (D)

Question

Assertion: A fair dice is rolled. Then the probability of getting an even number is 1 2 and probability of getting an odd number is 1/2 .

Reason: Possible outcomes when a fair dice is rolled is (1, 2, 3, 4, 5, 6).

H.W.

One Level Up

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Question

The probability of guessing the correct answer to a certain question is x/2. If probability of not guessing the correct answer is 2/3, then find x.

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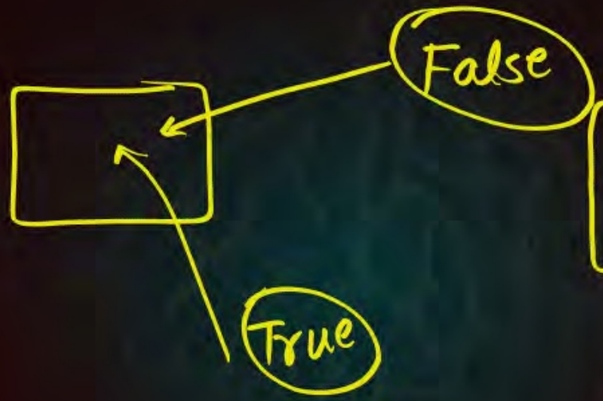


Sum of all probabilities = 1

P(True guessing) + P(Incorrect guessing) = 1

$$\frac{x}{2} + \frac{2}{3} = 1$$

$$\frac{3x+4}{6} = 1$$

$$3x + 4 = 6$$

$$3x = 6 - 4$$

$$3x = 2 \Rightarrow x = 2/3$$

Question

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.

Question

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.

E = she did not hit a boundary

$$P(E) = \frac{(30-6)}{30} = \frac{24}{30}$$

Question

1500 families with 2 children were selected randomly, and the following data were recorded. Compute the probability of a family, chosen at random, having

(i) 2 girls (ii) 1 girl (iii) No girl.

Also check whether the sum of these probabilities is 1.

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

Question

1500 families with 2 children were selected randomly, and the following data were recorded. Compute the probability of a family, chosen at random, having

(i) 2 girls $\Rightarrow P(2g) = \frac{475}{1500}$ (ii) 1 girl $\Rightarrow P(1g) = \frac{814}{1500}$ (iii) No girl. $\Rightarrow P(0g) = \frac{211}{1500}$

Also check whether the sum of these probabilities is 1.

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

Question

Three coins are tossed simultaneously 200 times with the following frequencies of different outcomes. If the three coins are simultaneously tossed again, compute the probability of 2 heads coming up.

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

Question

Three coins are tossed simultaneously 200 times with the following frequencies of different outcomes. If the three coins are simultaneously tossed again, compute the probability of 2 heads coming up.

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

$P(2\ H) = \frac{72}{200}$ Ans.

Question

A die was rolled 100 times and the number of times, 6 came up was noted. If the experimental probability calculated from this information is $2/5$, then how many times 6 come up?

Question

A die was rolled 100 times and the number of times, 6 came up was noted. If the experimental probability calculated from this information is 2/5 , then how many times 6 come up?

E = 6 came up on the top. Let us consider 6 comes up 'n' times.

$P(E) = \frac{2}{5}$

$\frac{n}{100} = \frac{2}{5} \Rightarrow n = \frac{200}{5}$

$\Rightarrow n = 40$ balls

Question

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 four times the number of times 'No Tail' appeared. If P is the the probability of getting 'Two tails', then find 8P.

Question

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 four times the number of times 'No Tail' appeared. If P is the the probability of getting 'Two tails', then find 8P.

$n(2T) = 3 \times n(\text{No Tail})$

$n(1T) = 4 \times n(\text{No Tail})$

Let $n(\text{no Tail}) = x$

$n(2T) = 3x$

$n(1T) = 4x$

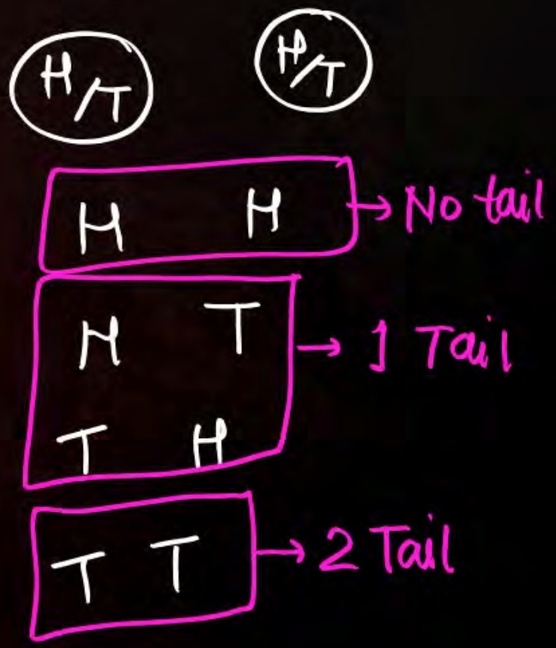
$P(2T) = P$

$P(2T) = \frac{3x}{8x} = P$

$\Rightarrow \frac{3}{8} = P$

$\Rightarrow 3 = 8P$

Ans.



Question

An organization 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. Suppose a family is chosen.

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

Find the probability that the family chosen is

1. earning Rs. 10000 – 13000 per month and owning exactly 2 vehicles.
2. earning Rs. 16000 or more per month and owning exactly 1 vehicle.
3. earning less than Rs. 7000 per month and does not own any vehicle
4. earning Rs. 13000 – 16000 per month and owning more than 2 vehicles.
5. owning not more than 1 vehicle.

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16000 or more	1	579	82	88

Find the probability that the family chosen is

1. earning Rs. 10000 – 13000 per month and owning exactly 2 vehicles. $\frac{29}{2400}$
2. earning Rs. 16000 or more per month and owning exactly 1 vehicle. $\frac{579}{2400}$
3. earning less than Rs. 7000 per month and does not own any vehicle $\frac{10}{2400}$
4. earning Rs. 13000 – 16000 per month and owning more than 2 vehicles. $\frac{25}{2400}$
5. owning not more than 1 vehicle.

$$P(E) = \frac{(10+0+1+2+1)+(160+305+535+469+579)}{2400}$$

$$= \frac{2062}{2400}$$

Cased-Based Type Questions

Cased-Based: Van Mahotsav is a tree planting festival which is celebrated annually in the month of July. During this festival thousands of trees are planted all over India. The name Van Mahotsav mean 'the festival of trees. In a school, Van Mahotsav was celebrated. 250 students took part in the festival with zeal and helped each other in planting trees. Look at the table given below.

Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

Cased-Based Type Questions

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Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

Total plantation = 100

Question

Find the probability of planting Chameli and Rose.

Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

$\frac{21}{100}$

$\frac{52}{100}$

$\frac{38}{100}$

$\frac{28}{100}$

Question

Find the probability of planting Chameli and Rose.

Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

A $\frac{21}{100}$

B $\frac{52}{100}$

C $\frac{38}{100}$

D $\frac{28}{100}$

$P(\text{Chameli \& Rose}) = \frac{24+28}{100} = \frac{52}{100}$

Question

Find the probability of planting Jasmine.

Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

$\frac{28}{100}$

$\frac{32}{100}$

$\frac{20}{100}$

$\frac{16}{100}$

Question

Find the probability of planting Jasmine.

A $\frac{28}{100}$

B $\frac{32}{100}$

C $\frac{20}{100}$

D $\frac{16}{100}$

Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

$P(\text{Jasmine}) = \frac{16}{100}$

Question

Find the probability of planting Marigold.

Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

$\frac{32}{100}$

$\frac{16}{100}$

$\frac{60}{100}$

$\frac{24}{100}$

Question

Find the probability of planting Marigold.

A $\frac{32}{100}$

B $\frac{16}{100}$

C $\frac{60}{100}$

D $\frac{24}{100}$

Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

$P(\text{marigold}) = \frac{32}{100}$

Question

Find the probability of not planting Rose.

Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

$\frac{32}{100}$

$\frac{24}{100}$

$\frac{58}{100}$

$\frac{72}{100}$

Question

Find the probability of not planting Rose.

Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

A $\frac{32}{100}$

B $\frac{24}{100}$

C $\frac{58}{100}$

D $\frac{72}{100}$

$P(\text{not planting Rose}) = \frac{(100-28)}{100} = \frac{72}{100}$

72

Question

Find the sum of probability of planting Rose, Marigold, Chameli and Jasmine.

Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

A $\frac{32}{100}$

B 0

C 1

D $\frac{16}{100}$

Question

Find the sum of probability of planting Rose, Marigold, Chameli and Jasmine.

A $\frac{32}{100}$

B 0

C 1

D $\frac{16}{100}$

Name of plants	Rose	Marigold	Chameli	Jasmine
No. of plants	28	32	24	16

$P(\text{Rose}) + P(\text{marigold}) + P(\text{chameli}) + P(\text{Jasmine})$

$= \frac{28}{100} + \frac{32}{100} + \frac{24}{100} + \frac{16}{100}$

$= \frac{28+32+24+16}{100}$

$= \frac{100}{100}$

$= 1$ ✓✓

Cased-Based Type Questions

A company selected 4000 households at random and surveyed them to find out a relationship between income level and the number of mobile sets in a home. The information so obtained is listed in following table:

Monthly income	No of Mobile sets			
	0	1	2	Above 2
< 10000	20	80	10	0
$10000 - 14999$	10	380	60	0
$15000 - 19999$	0	240	120	30
$20000 - 24999$	0	520	370	80
25000 and above	0	1100	760	220

Question

Find the probability of a household earning Rs.10000 – Rs.14999 per ~~year~~ month and having exactly one mobile set

0.095

0.08

0.04

None of these

Monthly income	No of Mobile sets			
	0	1	2	Above 2
< 10000	20	80	10	0
10000 – 14999	10	380	60	0
15000 – 19999	0	240	120	30
20000 – 24999	0	520	370	80
25000 and above	0	1100	760	220

Question

Find the probability of a household earning Rs.10000 – Rs.14999 per ~~year~~ month and having exactly one mobile set

A 0.095

B 0.08

C 0.04

D None of these

$P(1\ M) = \frac{380}{4000}$

$= 0.095$

Monthly income	No of Mobile sets			
	0	1	2	Above 2
< 10000	20	80	10	0
10000 – 14999	10	380	60	0
15000 – 19999	0	240	120	30
20000 – 24999	0	520	370	80
25000 and above	0	1100	760	220

Question

Find the probability of a household earning more than Rs.25000 per month and having 2 or more mobile set

0.245

0.3

0.1

None of these

Monthly income	No of Mobile sets			
	0	1	2	Above 2
< 10000	20	80	10	0
10000 – 14999	10	380	60	0
15000 – 19999	0	240	120	30
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Question

Find the probability of a household earning more than Rs.25000 per ~~year~~ month and having 2 or more mobile set

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20000 – 24999	0	520	370	80
25000 and above	0	1100	760	220

P(2 or more m) = $\frac{(760+220)}{4000}$

$= \frac{980}{4000}$

$= 0.245$

A 0.245

B 0.3

C 0.1

D None of these

Question

Find the probability of a household having no mobile set at all?

$\frac{3}{400}$

$\frac{1}{400}$

$\frac{1}{200}$

None of these

Monthly income	No of Mobile sets			
	0	1	2	Above 2
< 10000	20	80	10	0
10000 – 14999	10	380	60	0
15000 – 19999	0	240	120	30
20000 – 24999	0	520	370	80
25000 and above	0	1100	760	220

Question

Find the probability of a household having no mobile set at all?

A $\frac{3}{400}$

B $\frac{1}{400}$

C $\frac{1}{200}$

D None of these

$P(0\,m) = \frac{20+10+0+0+0}{4000}$

$= \frac{30}{4000}$

$= \frac{3}{400}$

Monthly income	No of Mobile sets			
	0	1	2	Above 2
< 10000	20	80	10	0
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25000 and above	0	1100	760	220

Question

Find the probability of a household having 3 mobile set and having income less than 10000

1

2

24

None of these

Monthly income	No of Mobile sets			
	0	1	2	Above 2
< 10000	20	80	10	0
10000 – 14999	10	380	60	0
15000 – 19999	0	240	120	30
20000 – 24999	0	520	370	80
25000 and above	0	1100	760	220

Question

Find the probability of a household having 3 mobile set and having income less than 10000

A 1

B 2

C 24

D None of these

$P(3m) = \frac{0}{4000}$

$= 0$

Monthly income	No of Mobile sets			
	0	1	2	Above 2
< 10000	20	80	10	0
10000 – 14999	10	380	60	0
15000 – 19999	0	240	120	30
20000 – 24999	0	520	370	80
25000 and above	0	1100	760	220

Practice Session

VIPIN KAUSHIK ASOSE SURAJMAL VIHAR

Question

There are 500 packets in a large box and each packet contains 4 electronic devices in it. On testing, at the time of packing, it was noted that there are some faulty pieces in the packets. The data is as below. If one packet is drawn from the box, what is the probability that all the four devices in the packet are without any fault?

H.W.

No. of faulty devices in a packet	Number of packets
0	300
1	100
2	50
3	30
4	20
Total number of packets	200

Question

There are 500 packets in a large box and each packet contains 4 electronic devices in it. On testing, at the time of packing, it was noted that there are some faulty pieces in the packets. The data is as below. If one packet is drawn from the box, what is the probability that all the four devices in the packet are without any fault?

H.W.

No. of faulty devices in a packet	Number of packets
0	300
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2	50
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4	20
Total number of packets	200

Question

In a kitchen there are 108 utensils consisting of bowls, plates and glasses the ratio of bowls, plates glasses is 4:2:3 A utensils is picked at random find the probability that
(i) it is a plate (ii) it is not a bowl

Question

In a kitchen there are 108 utensils consisting of bowls, plates and glasses the ratio of bowls, plates glasses is 4:2:3. A utensils is picked at random find the probability that
(i) it is a plate (ii) it is not a bowl

No. of bowls = $4x$
No. of plates = $2x$
No. of glasses = $3x$

(i) $P(\text{plate}) = \frac{2x}{8x} = \frac{2}{8} = \frac{1}{4}$

(ii) $P(\text{not a bowl}) = \frac{2x+3x}{8x} = \frac{5x}{8x} = \frac{5}{8}$

Question

80 bulbs are selected at random from a lot and their lifetime in hours is recorded as under. One bulb is selected at random from the lot. What is the probability that the selected bulb has a life more than 500 hours?

Lifetime (in hours)	300	500	700	900	1100
Frequency	10	12	25	23	10

Question

80 bulbs are selected at random from a lot and their lifetime in hours is recorded as under. One bulb is selected at random from the lot. What is the probability that the selected bulb has a life more than 500 hours?

Lifetime (in hours)	300	500	700	900	1100
Frequency	10	12	25	23	10

P(lifetime > 500 hours)

$= \frac{25+23+10}{80} = \frac{58}{80}$

Question

One card is drawn randomly from a well shuffled pack of 52 playing cards. Find the probability that the drawn card is a black king.

Question

One card is drawn randomly from a well shuffled pack of 52 playing cards. Find the probability that the drawn card is a black king.

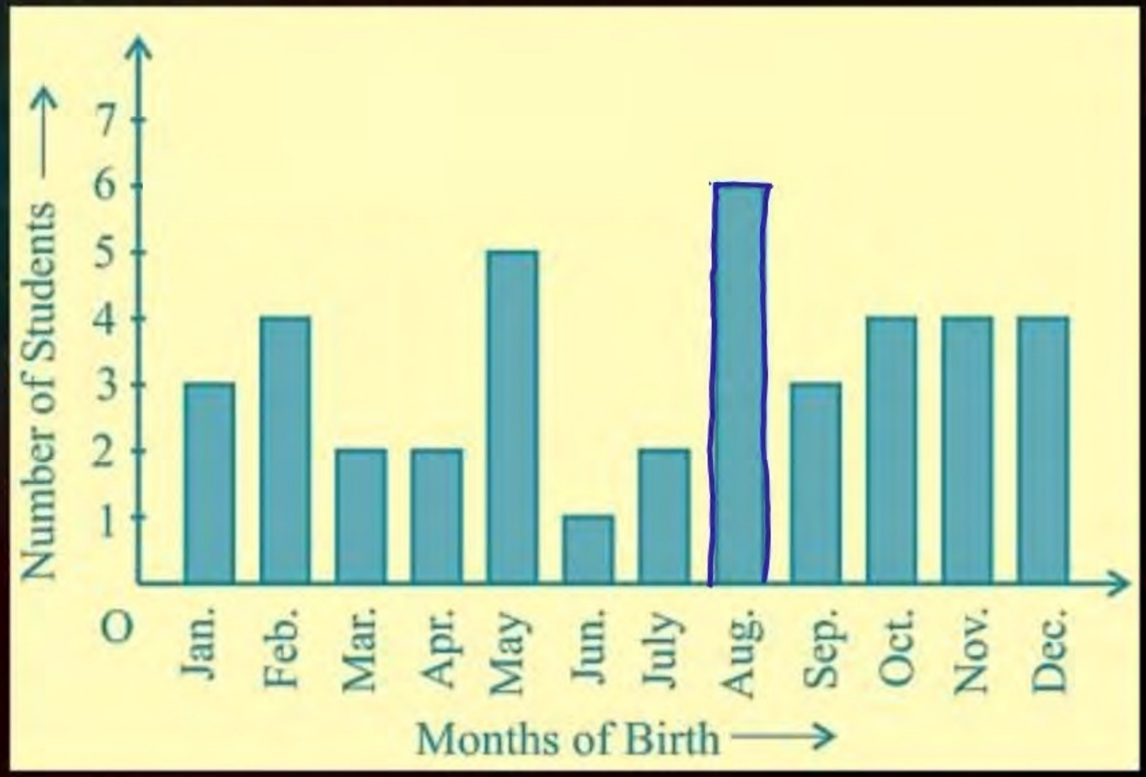
↳ 1 spade

→ P(Black King) = $\frac{2}{52} = \frac{1}{26}$

Question

Refer to Example 5, Section 14.4, Chapter 14. Find the probability that a student of the class was born in August.

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:

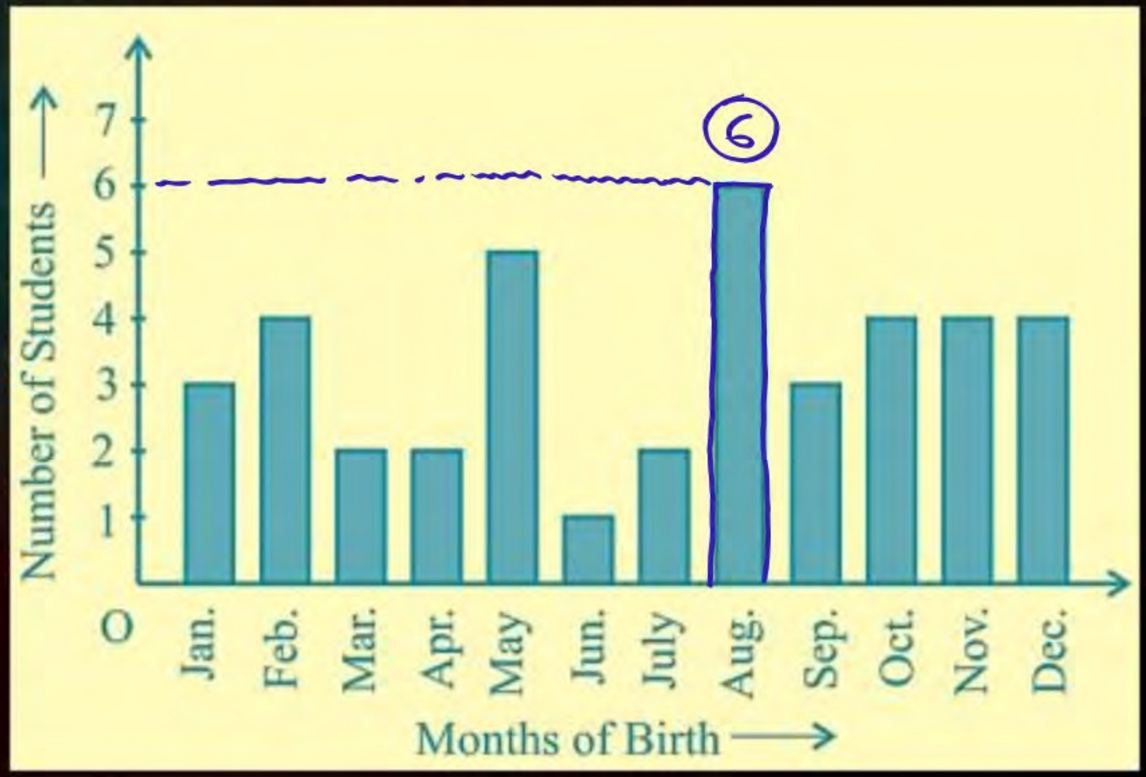


Question

Refer to Example 5, Section 14.4, Chapter 14. Find the probability that a student of the class was born in August.

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:

$$P(\text{Born in Aug}) = \frac{6}{40} = \frac{3}{20}$$



Question

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. Find the probability that a student chosen at random

(i) likes statistics,

(ii) does not like it

Opinion	Number of students
Like	135
Dislike	65

Question

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. Find the probability that a student chosen at random

(i) likes statistics, → $P(\text{like stats}) = \frac{135}{200}$

(ii) does not like it

↳ $P(\text{does not like it}) = \frac{65}{200}$

Opinion	Number of students
Like	135
Dislike	65

Question

Refer to Table

(i) Find the probability that a student obtained less than 20% in the mathematics test.

(ii) Find the probability that a student obtained marks 60 or above.

Marks	Number of students
0-20	7
20-30	10
30-40	10
40-50	20
50-60	20
60-70	15
70-Above	8
Total	30

Question

Refer to Table

(i) Find the probability that a student obtained less than 20% in the mathematics test.

(ii) Find the probability that a student obtained marks 60 or above.

(i) $P(\text{score} < 20\%) = \frac{7}{30}$

(ii) $P(\text{score} > 60\%) = \frac{15+8}{30} = \frac{23}{30}$

Marks	Number of students
0-20	7
20-30	10
30-40	10
40-50	20
50-60	20
60-70	15
70-Above	8
Total	30

Question

Prepare a frequency distribution table regarding the blood groups of 30 students of a class. Use this table to determine the probability that a student of this class, selected at random, has blood group AB.

The blood groups of 30 students of class-VIII are recorded as follows:

Blood Group	frequency	Tally marks
A	9	𝍸 𝍸 IIII
B	6	𝍸 I
AB	3	III
O	12	𝍸 𝍸 II

total = 30

P(Blood group AB) = .

Question

Prepare a frequency distribution table regarding the blood groups of 30 students of a class. Use this table to determine the probability that a student of this class, selected at random, has blood group AB.

The blood groups of 30 students of class-VIII are recorded as follows:

Blood Group	frequency	Tally marks
A	9	𝍸 𝍸 IIII
B	6	𝍸 I
AB	3	III
O	12	𝍸 𝍸 II

total = 30

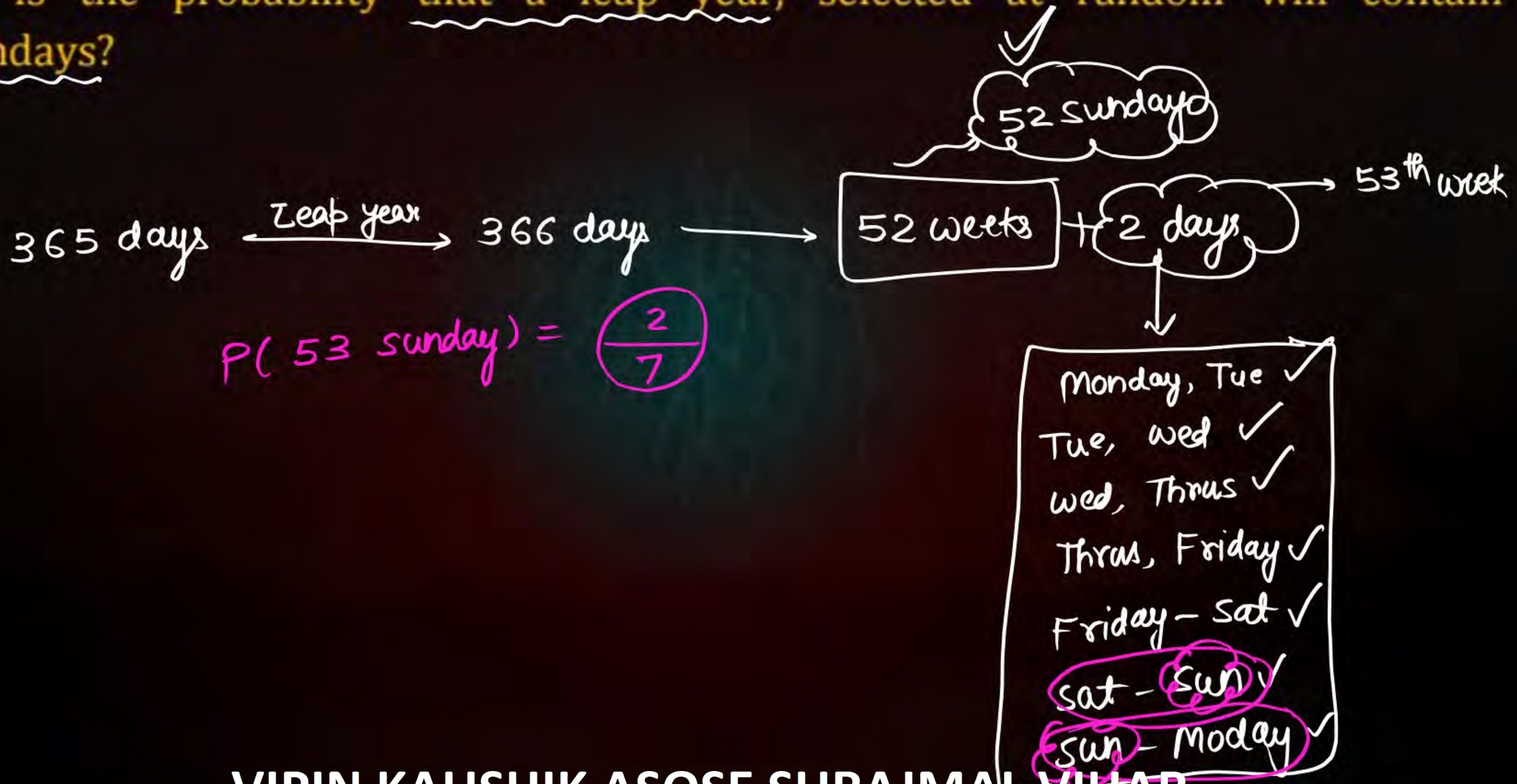
$$P(\text{Blood group AB}) = \frac{3}{30} = \frac{1}{10}$$

Question

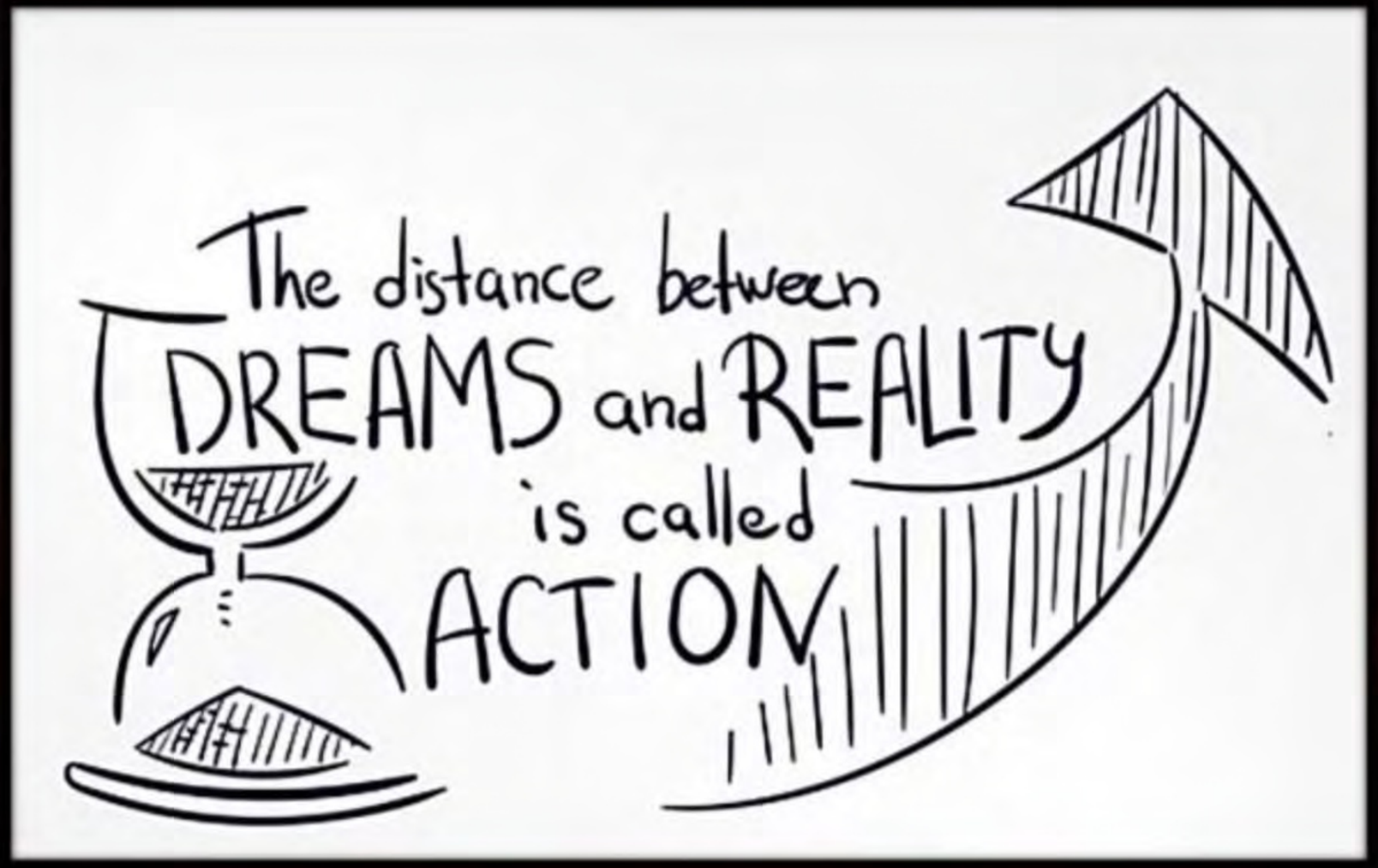
What is the probability that a leap year, selected at random will contain 53 Sundays?

Question

What is the probability that a leap year, selected at random will contain 53 Sundays?



$P(53 \text{ sunday}) = \frac{2}{7}$



VIPIN KAUSHIK ASOSE SURAJMAL VIHAR

Module Questions

VIPIN KAUSHIK ASOSE SURAJMAL VIHAR

Question

You have a spinning wheel with 3 green sectors, 1 blue sector and 1 red sector, if the probability of getting non-blue is 4/m. Then, the blue of m is

5

4

3

1

Question

You have a spinning wheel with 3 green sectors, 1 blue sector and 1 red sector, if the probability of getting non-blue is 4/m. Then, the blue of m is

A 5

B 4

C 3

D 1

$$P(\text{non-blue sector}) = \frac{4}{m}$$

$$\frac{4}{5} = \frac{4}{m}$$

Question

A tyre manufacturing company kept a record of the distance covered before a tyre needed to be replaced. The table show the result of 1000 cases:
If you buy a tyre of this company what is the probability that it will need to be replaced after it has covered somewhere between 4000 km and 14000 km?

Distance in Km	Frequency
Less than 4000	20
4000 to 9000	210
9000 to 14000	325
More than 14000	445

0.65

0.535

0.125

None of these

Question

A tyre manufacturing company kept a record of the distance covered before a tyre needed to be replaced. The table show the result of 1000 cases:
If you buy a tyre of this company what is the probability that it will need to be replaced after it has covered somewhere between 4000 km and 14000 km?

Distance in Km	Frequency
Less than 4000	20
4000 to 9000	210
9000 to 14000	325
More than 14000	445

A 0.65

B 0.535 ✓

C 0.125

D None of these

P(Tyre need to change)

$= \frac{210+325}{1000} = \frac{535}{1000}$

$= 0.535$

$= 1000$

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Question

The probability that a two digit number selected at random will be a multiple of '3' and not a multiple of '5' is

2/15

4/15

1/15

4/90

Question

The probability that a two digit number selected at random will be a multiple of '3' and not a multiple of '5' is

A 2/15

B 4/15

C 1/15

D 4/90

3 multiple : 3, 6, 9, 12, 15, 18, 21, 24, ..., 99,

P(multiple of 3 but not multiple of 5) = $\frac{(30-6)}{90}$

$= \frac{\cancel{24}^{8}}{\cancel{90}_{30}} = \frac{4}{15}$

15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95

$99 = 12 + (n-1)3$

$87 = (n-1)\times 3$

$29 = n-1$

$n = 30$

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