MATHEMATICS

PROBABILITY

Multiple Choice questions-

1. An event is very unlikely to happen. Its probability is closest to:

(a) 0.0001

(b) 0.001

(c) 0.01

(d) 0.1

2. If the probability of an event is P, the probability of its complementary event will be:

(a) P – 1

(b) P

(c) 1 – p

(d) $1 - \frac{1}{p}$

3. If P(A) denotes the probability of an event then:

(a) P(A) < 0

(b) P(A) > 0

(c) $0 \leq P(A) \leq 1$

(d) $-1 \leq P(A) \leq 0$

4. A card is drawn from a deck of 52 cards. The event E is that card is not an ace of hearts. The number of outcomes favourable to E is:

(a) 4

(b) 13

(c) 48

(d) 51

5. The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot

is:

(a) 7

(b) 14

(c) 21

(d) 28

6. A girl calculate that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, how many tickets has she bought?

(a) 40

(b) 240

(c) 480

(d) 750

7. One ticket is drawn at random from a bag containing tickets numbered 1 to 40. The probability that the selected ticket has a number which is a multiple of 5 is:

(a) $\frac{1}{5}$
(b) $\frac{3}{5}$
(c) $\frac{4}{5}$
(d) $\frac{1}{3}$

8. Someone is asked to take a number from 1 to 100. The probability that it is a prime is:

(a) $\frac{1}{5}$
(b) $\frac{6}{25}$
(c) $\frac{1}{4}$
(d) $\frac{13}{50}$

9. A school has five houses A, B, C, D and E. A class has 23 students, 4 from house A, 8 from house B, 5 from house C, 2 from house D and rest from house E. A single student is selected at random to be the class monitor. The probability that the selected student is not from A, B and C is:

(a) $\frac{4}{23}$

(b) $\frac{6}{23}$

(c) $\frac{8}{23}$

(d) $\frac{17}{23}$

10. When a die is thrown, the probability of getting an odd number less them 3 is:

(a) $\frac{1}{6}$

(b) $\frac{1}{3}$

(c) $\frac{1}{2}$

(d) 0

Very Short Questions:

1. State true or false and give the reason. If I toss a coin 3 times and get head each tir ne, then I should expect a tail to have a higher chance in the 4th toss.
2. A bag contains slips numbered from 1 to 100. If Fatima chooses a slip at random from the bag, it will either be an odd number or an even number. Since, this situation has only two possible outcomes, so the probability of each is $\frac{1}{2}$ Justify.
3. In a family, having three children, there may be no girl, one girl, two girls or three girls. So, the probability of each is $\frac{1}{4}$. Is this correct? Justify your answer.
4. A game consists of spinning an arrow which comes to rest pointing at one of the regions (1, 2 or 3) Fig. Are the outcomes 1, 2 and 3 equally likely to occur? Give reason.
5. Two coins are tossed simultaneously. Find the probability of getting exactly one head.
6. From a well shuffled pack of cards, a card is drawn at random. Find the probability of getting a black queen.
7. If P (E) = 0.05, what is the probability of 'not E' ?
8. What is the probability of getting no head when two coins are tossed

simultaneously?

9. In a single throw of a pair of dice, what is the probability of getting the sum a perfect square?

10. Someone is asked to choose a number from 1 to 100. What is the probability of it being a prime number?

Short Questions :

1. Two dice are thrown at the same time and the product of numbers appearing on them is noted. Find the probability that the product is a prime number.

2. Find the probability that a number selected from the numbers 1 to 25 is not a prime number when each of the given numbers is equally likely to be selected.

3. One card is drawn at random from a pack of 52 cards. Find the probability that the card drawn is an ace and black.

4. A card is drawn at random from a pack of 52 playing cards. Find the probability that the card drawn is neither an ace nor a king.

5. 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?

6. 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.

7. Two players, Sangeeta and Reshma, play a tennis match. It is known that the probability of Sangeeta's winning the match is 0.62. What is the probability of Reshma's winning the match?

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

A	*B*	*C*	*D*	*E*	*A*

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

9. A card is drawn at random from a pack of 52 playing cards. Find the probability that the card drawn is neither a red card nor a black king.

10. Out of 400 bulbs in a box, 15 bulbs are defective. One bulb is taken out at random from the box. Find the probability that the drawn bulb is not defective.

11. Harpreet tosses two different coins simultaneously (say, one is of 1 and other of 2). What is the probability that she gets at least one head?

12. A game consists of tossing a one-rupee coin 3 times and noting the outcome each time. Ramesh wins the game if all the tosses give the same result (i.e. three heads or three tails) and loses otherwise. Find the probability of Ramesh losing the game.

13. Three unbiased coins are tossed together. Find the probability of getting:

(i) all heads.

(ii) exactly two heads.

(iii) exactly one head.

(iv) at least two heads.

(v) at least two tails

14. 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

15. Suppose we throw a die once.

(i) What is the probability of getting a number greater than 4?

(ii) What is the probability of getting a number less than or equal to 4?

Long Questions :

1. 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.

2. One card is drawn from a pack of 52 cards, each of the 52 cards being equally likely to be drawn. Find the probability that the card drawn is:

(i) an ace.

(ii) red.

(iii) either red or king.

(iv) red and a king.

(v) a face card.

(vi) a red face card.

(vii) "2' of spades.

(viii) '10' of a black suit.

3. 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?

4. Two dice, one blue and one grey, are thrown at the same time. Write down all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is: (i) 8? (ii) 13? (iii) less than or equal to 12?

5. A bag contains cards numbered from 1 to 49. A card is drawn from the bag at random, after mixing the cards thoroughly. Find the probability that the number on the drawn card is:

(i) an odd number.

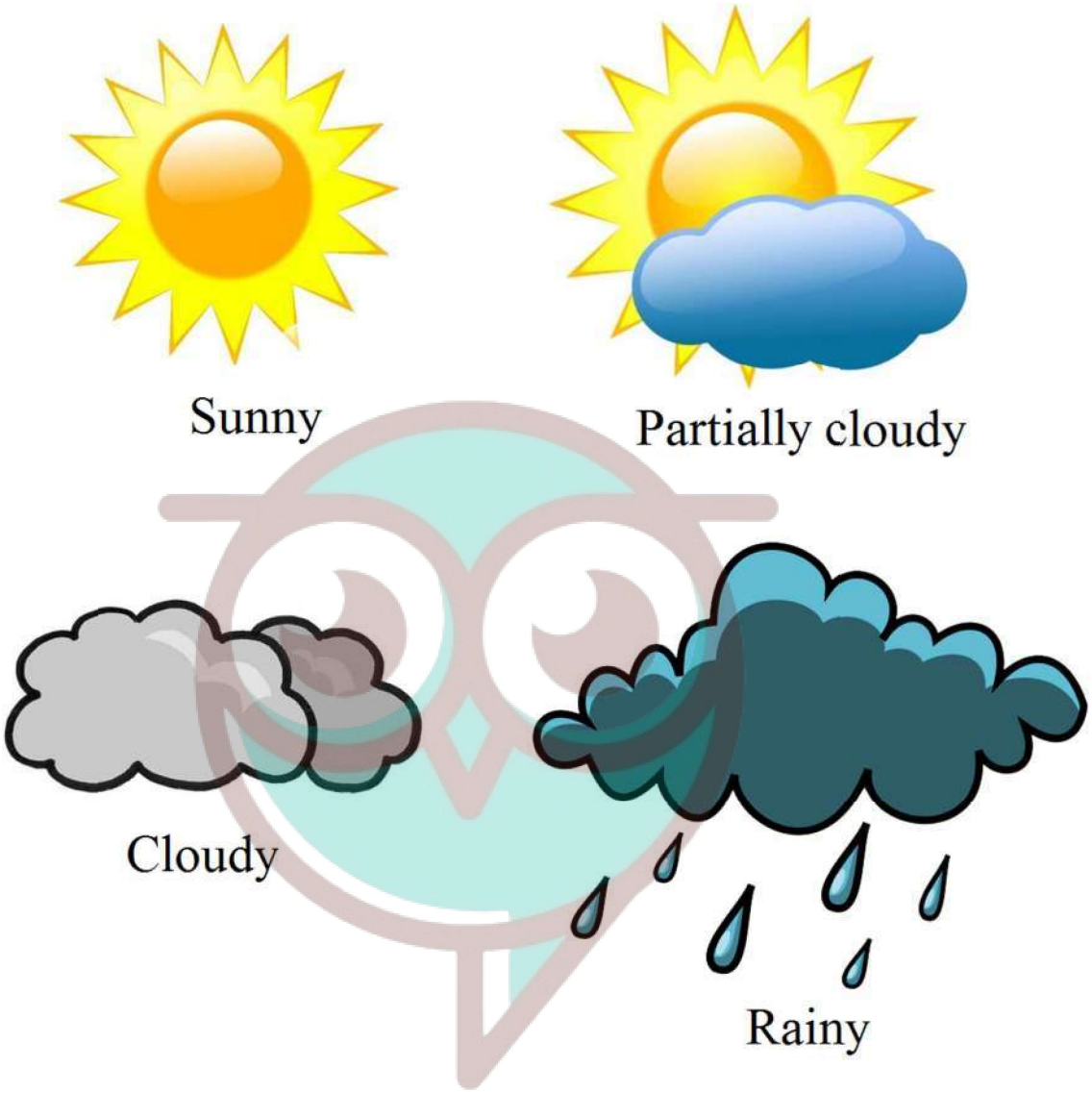
(ii) a multiple of 5.

(iii) a perfect square.

(iv) an even prime number.

Case Study Questions:

1. In the month of May, the weather forecast department gives the prediction of weather for the month of June. The given table shows the probabilities of forecast of different days:



Days	Days	Cloudy	Partially cloudy	Rainy
Probability	$\frac{1}{2}$	x	$\frac{1}{5}$	y

If the forecast is 100% correct for June, then answer the following questions.

i. The number of sunny days in June, is:

a. 5
b. 10
c. 15
d. 20

ii. If the number of cloudy days in June is 5, then x =

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

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

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

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

iii. The probability that the day is not rainy is:

a. $\frac{13}{15}$

b. $\frac{11}{15}$

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

d. None of these

iv. If the sum of x and y is $\frac{3}{10}$, then the number of rainy days in June is:

a. 1
b. 2
c. 3
d. 4

v. Find the number of partially cloudy days.

a. 2
b. 4
c. 6
d. 8

2. Vishal goes to a store to purchase juice cartons for his shop. The store has 80 cartons of orange juice, 90 cartons of apple juice, 38 cartons of mango juice and 42 cartons of guava juice. If Vish chooses a carton at random, then answer the following questions.

i. The probability that the selected carton is of apple juice is:

a. $\frac{1}{25}$

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

c. $\frac{13}{25}$

d. $\frac{9}{25}$

ii. The probability that the selected carton is not of orange juice is:

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

b. $\frac{11}{25}$

c. $\frac{17}{25}$

d. $\frac{4}{125}$

iii. The probability of selecting a carton of guava juice is:

a. $\frac{51}{125}$

b. $\frac{16}{125}$

c. 0

d. $\frac{21}{125}$

iv. Vishal buys 4 cartons of apple juice, 3 cartons of orange juice and 3 cartons of guava juice. A customer comes to Vishal's shop and picks a tetrapack of juice at random. The probability that the customer picks a guava juice, if each carton has 10 tetrapacks of juice, is:

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

b. $\frac{2}{10}$

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

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

v. If the storekeeper bought 14 more cartons of apple juice, then the probability of selecting a tetrapack of apple juice from the store is:

a. $\frac{25}{127}$

b. $\frac{50}{127}$

c. $\frac{75}{127}$

d. $\frac{100}{127}$

Assertion Reason Questions-

1. **Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true and R is not the correct explanation of A.
(c) A is true but R is false.

(d) A is false but R is true.

Assertion: The probability of winning a game is 0.4, then the probability of losing it, is 0.6.

Reason: P (E) + P(not E) = 1

2. **Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
   (a) Both A and R are true and R is the correct explanation of A.
   (b) Both A and R are true and R is not the correct explanation of A.
   (c) A is true but R is false.
   (d) A is false but R is true.

Assertion: If the probability of an event is P, then probability of its complementary event will be 1 P.

Reason: LCM × product of numbers = HCF

Answer Key-

Multiple Choice questions-

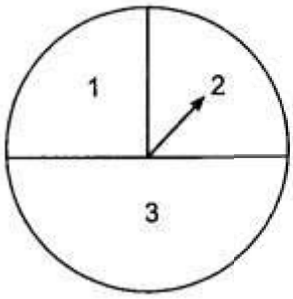
1. (a) 0.0001
2. (c) 1 – p
3. (c) 0 ≤ P(A) ≤ 1
4. (d) 51
5. (b) 14
6. (c) 480
7. (a) $\frac{1}{5}$
8. (c) $\frac{1}{4}$
9. (b) $\frac{6}{23}$
10. (a) $\frac{1}{6}$

Very Short Answer :

1. False, because the outcomes 'head' and 'tail are equally likely. So, every time the probability of getting head or tail is $\frac{1}{2}$

2. True, because the outcomes odd number' and `even number' are equally likely here.

3. False, because the outcomes are not equally, likely. For no girl, outcome is bbb, for one girl, is bgb, gbb, bbg, for two girls, it is bgg, ggb, gbg and for all girls, it is ggg.

4. 

False, because the outcome 3 is more likely than the other numbers.

5. Possible outcomes are {HH, HT, TH, TT}.

(exactly one head) $= \frac{2}{4} = \frac{1}{2}$

6. Number of black queens in a pack of cards = 2

$\therefore$ P (black queen) $= \frac{25}{2} = \frac{1}{26}$

7. As we know that,

P (E) + P (not E) = 1

P (not E) = 1 – P (E) = 1 – 0.05 = 0.95

8. Favourable outcome is TT;

$\therefore$ P (no head) $= \frac{1}{4}$

9. Total outcomes = 36

Favourable outcomes are {(1,3), (3, 1), (2, 2), (3, 6), (6,3), (4, 5), (5, 4)}

$\therefore$ Required probability $= \frac{7}{36}$

10. Total prime numbers between 1 to 100 = 25

$\therefore$ P (Prime number) $= \frac{25}{100} = 14$

Short Answer :

1. Product of the number on the dice is prime number, i.e., 2, 3, 5.

The possible ways are, (1, 2), (2, 1), (1, 3), (3, 1), (5, 1), (1, 5)

So, number of possible ways = 6

$\therefore$ Required probability $= \frac{6}{36} = \frac{1}{6}$

2. Total prime numbers from 1 to 25 = 9.

$\therefore$ Non-prime numbers from 1 to 25 = 25 – 9 = 16.

$\Rightarrow$ P (non-prime number) $= \frac{16}{25}$

3. Number of black aces in a pack of cards = 2

$\therefore$ P (an ace and black card) $= \frac{2}{52} = \frac{1}{26}$

4. Let E be the event card drawn is neither an ace nor a king.

Then, the number of outcomes favourable to the event E = 44 (4 kings and 4 aces are not there)

$\therefore \ P(E) = \frac{44}{52} = \frac{11}{13}$

5. (i) As the bag contains only lemon flavoured candies. So, the event related to the experiment of taking out an orange flavoured candy is an impossible event. So, its probability is 0.

(ii) As the bag contains only lemon flavoured candies. So, the event related to the experiment of taking out lemon flavoured candies is certain event. So, its probability is 1.

6. Here, total number of pens = 132 + 12 = 144

$\therefore$ Total number of elementary outcomes = 144

Now, favourable number of elementary events = 132

$\therefore$ Probability that a pen taken out is good one $= \frac{132}{144} = \frac{11}{12}$

7. Let S and R denote the events that Sangeeta and Reshma wins the match, respectively.

The probability of Sangeeta's winning = P(S) = 0.62

As the events R and S are complementary

∴ The probability of Reshma's winning = P(R) = 1 – P(S)

= 1 – 0.62 = 0.38.

8. The total number of elementary events associated with random experiment of throwing a die is 6.

(i) Let E be the event of getting a letter A.

∴ Favourable number of elementary events = 2

∴ $P(E) = \frac{2}{6} = \frac{1}{3}$

(ii) Let E be the event of getting a letter D.

∴ Favourable number of elementary events = 1

∴ $P(E) = \frac{1}{6}$

9. Let E be the event card drawn is neither a red card nor a black king'

The number of outcomes favourable to the event E = 24 (26 red cards and 2 black kings are not there, so 52 – 28 = 24)

∴ $P(E) = \frac{24}{52} = \frac{16}{13}$

10. Total number of bulbs in the box = 400

Total number of defective bulbs in the box = 15

Total number of non-defective bulbs in the box = 400 – 15 = 385

$$P \text{ (bulb is not defective)} = \frac{\text{Number of non - defective bulbs}}{\text{Total number of bulbs}} = \frac{385}{400} = \frac{77}{80}.$$

11. When two coins are tossed simultaneously, the possible outcomes are (H, H), (H, T), (T, H), (T, T) which are all equally likely. Here (H, H) means head up on the first coin (say on ₹ 1) and head up on the second coin (₹ 2). Similarly (H, T) means head up on the first coin and tail up on the second coin and so on.

The outcomes favourable to the event E, 'at least one head' are (H, H), (H, T) and (T, H). So, the number of outcomes favourable to E is 3.

Therefore, P(E) $= \frac{3}{4}$

i.e., the probability that Harpreet gets at least one head is $\frac{3}{4}$.

12. The outcomes associated with this experiment are given by

HHH, HHT, HTH, THH, TTH, THT, HTT, TTT

∴ Total number of possible outcomes = 8

Now, Ramesh will lose the game if he gets

HHT, HTH, THH, TTH, THT, HTT

∴ Favourable number of events = 6

∴ Probability that he lose the game $= \frac{6}{8} = \frac{3}{4}$

13. Elementary events associated to random experiment of tossing three coins are

HHH, HHT, HTH, THH, HTT, THT, TTH, TTT

∴ Total number of elementary events = 8

(i) The event "getting all heads" is said to occur, if the elementary event HHH occurs, i.e., HHH is an outcome.

∴ Favourable number of elementary events = 1

Hence, required probability $= \frac{1}{8}$

(ii) The event "getting two heads" will occur, if one of the elementary events HHT, THH, HTH occurs.

∴ Favourable number of elementary events = 3

Hence, required probability $= \frac{3}{8}$

(iii) The event of "getting one head", when three coins are tossed together, occurs if one of the elementary events HTT, THT, TTH, occurs.

Favourable number of elementary events = 3

Hence, required probability $= \frac{3}{8}$

(iv) If any of the elementary events HHH, HHT, HTH, and THH is an outcome, then we say that

the event "getting at least two heads" occurs.

∴ Favourable number of elementary events = 4

honom 4 Hence, required probability $= \frac{4}{8} = \frac{1}{2}$

(v) Similar as (iv) P (getting at least two tails) $= \frac{4}{8} = \frac{1}{2}$

14. We have, the total number of possible outcomes associated with the random experiment of throwing a die is 6 (i.e., 1, 2, 3, 4, 5, 6).

(i) Let E denotes the event of getting a prime number.

So, favourable number of outcomes = 3 (i.e., 2, 3, 5)

∴ P(E) $= \frac{3}{6} = \frac{1}{2}$

(ii) Let E be the event of getting a number lying between 2 and 6.

∴ Favourable number of elementary events (outcomes) = 3 (i.e., 3, 4, 5)

∴ P(E) $= \frac{3}{6} = \frac{1}{2}$

(iii) Let E be the event of getting an odd number.

∴ Favourable number of elementary events = 3 (i.e., 1, 3, 5)

∴ P(E) $= \frac{3}{6} = \frac{1}{2}$

15. (i) Here, let E be the event getting a number greater than 4'. The number of possible outcomes are six : 1, 2, 3, 4, 5 and 6, and the outcomes favourable to E are 5 and 6. Therefore, the number of outcomes favourable to E is 2. So,

P(E) = P (number greater than 4) $= \frac{2}{6} = \frac{1}{3}$

(ii) Let F be the event 'getting a number less than or equal to 4'.

Number of possible outcomes = 6

Outcomes favourable to the event F are 1, 2, 3, 4.

So, the number of outcomes favourable to F is 4.

Therefore, P(F) $= \frac{4}{6} = \frac{2}{3}$

Long Answer :

1. Here, total number of possible outcomes = 52

(i) As we know that there are two suits of red card, i.e., diamond and heart and each suit contains one king.

∴ Favourable number of outcomes = 2

∴ Probability of getting a king of red colour $= \frac{2}{52} = \frac{1}{26}$

(ii) As we know that kings, queens and jacks are called face cards. Therefore, there are 12 face cards.

∴ Favourable number of elementary events = 12

∴ Probability of getting a face card $= \frac{12}{52} = \frac{3}{13}$

(iii) As we know there are two suits of red cards, i.e., diamond and heart and each suit contains 3 face cards.

∴ Favourable number of elementary events = 2 × 3 = 6

∴ Probability of getting red face card $= \frac{6}{52} = \frac{3}{26}$

(iv) Since, there is only one jack of hearts.

∴ Favourable number of elementary events = 1

∴ Probability of getting the jack of heart $= \frac{1}{52}$

(v) Since, there are 13 cards of spade.

∴ Favourable number of elementary events = 13

∴ Probability of getting a spade $= \frac{13}{52} = \frac{1}{4}$

(vi) Since, there is only one queen of diamonds.

∴ Favourable number of outcomes (elementary events) = 1

∴ Probability of getting a queen of diamond $= \frac{1}{52}$

2. Out of 52 cards, one card can be drawn in 52 ways.

So, total number of elementary events = 52

(i) There are four ace cards in a pack of 52 cards. So, one ace can be chosen in 4 ways.

∴ Favourable number of elementary events = 4

Hence, required probability $= \frac{4}{52} = \frac{1}{13}$

(ii) There are 26 red cards in a pack of 52 cards. Out of 26 red cards, one card can be chosen in 26 ways.

∴ Favourable number of elementary events = 26

Hence, required probability $= \frac{26}{52} = \frac{1}{2}$

(iii) There are 26 red cards, including two red kings, in a pack of 52 playing cards. Also, there are 4 kings, two red and two black. Therefore, card drawn will be a red card or a king if it is any one of 28 cards (26 red cards and 2 black kings).

∴ Favourable number of elementary events = 28

Hence, required probability $= \frac{28}{52} = \frac{7}{13}$

(iv) A card drawn will be red as well as king, if it is a red king. There are 2 red kings in a pack of 52 playing cards.

∴ Favourable number of elementary events = 2

Hence, required probability $= \frac{2}{52} = \frac{1}{26}$

(v) In a deck of 52 cards: kings, queens, and jacks are called face cards. Thus, there are 12 face cards. So, one face card can be chosen in 12 ways.

Favourable number of elementary events = 12

Hence, required probability $= \frac{12}{52} = \frac{3}{13}$

(vi) There are 6 red face cards 3 each from diamonds and hearts. Out of these 6 red face cards, one card can be chosen in 6 ways.

∴ Favourable number of elementary events = 6

Hence, required probability $= \frac{6}{52} = \frac{3}{26}$

(vii) There is only one '2' of spades.

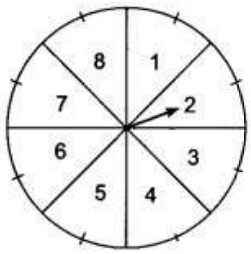
∴ Favourable number of elementary events = 1 Hence, required probability = 2

(viii) There are two suits of black cards viz. spades and clubs. Each suit contains one card bearing number 10.

∴ Favourable number of elementary events = 2

Hence, required probability $= \frac{2}{52} = \frac{1}{26}$

3.



Here, total number of elementary events (possible outcomes) = 8

(i) We have only one 'P' on the spining plant.

∴ Favourable number of outcomes = 1

Hence, the probability that arrow points at $8 = \frac{1}{26}$.

(ii) We have four odd points (i.e., 1, 3, 5 and 7)

∴ Favourable number of outcomes = 4

∴ Probability that arrow points at an odd number $= \frac{4}{8} = \frac{1}{2}$

(iii) We have 6 numbers greater than 2, i.e., 3, 4, 5, 6, 7 and 8.

Therefore, favourable number of outcomes = 6

∴ Probability that arrow points at a number greater than 2 $= \frac{6}{8} = \frac{3}{4}$

(iv) We have 8 numbers less than 9, i.e, 1, 2, 3, ... 8.

∴ Favourable number of outcomes = 8

∴ Probability that arrow points at a number less than 9 $= \frac{8}{8} = 1$

4. When the blue die shows 'l', the grey die could show any one of the numbers 1, 2, 3, 4, 5, 6.

The same is true when the blue die shows '2', '3', '4', '5' or '6'. The possible outcomes of the experiment are listed in the table below; the first number in each ordered pair is the number appearing on the blue die and the second number is that on the grey die. So, the number of possible outcomes = 6 × 6 = 36.

(i) The outcomes favourable to the event the sum of the two numbers is 8' denoted by E, are :

(2, 6), (3, 5), (4, 4), (5, 3), (6, 2) (see figure)

i.e., the number of outcomes favourable to E = 5.

Hence, P(E) $= \frac{5}{36}$

	1	2	3	4	5	6
1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
2	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
4	(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
5	(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
6	(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

(ii) As you can see from figure, there is no outcome favourable to the event F, 'the sum of two numbers is 13'.

So, P(F) $= \frac{0}{36} = 0$

(iii) As you can see from figure, all the outcomes are favourable to the event G, 'sum of two numbers ≤ 12.

So, P(G) $= \frac{36}{36} = 1.$

5. Total number of cards = 49

Total number of outcomes = 49

(i) Odd number

Favourable outcomes : 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49

Number of favourable outcomes = 25

$$\text{Probability } (E) = \frac{\text{No. of favourable outcomes}}{\text{Total number of outcomes}}$$

$$= \frac{25}{49}$$

(*ii*) A multiple of 5

Favourable outcomes: 5, 10, 15, 20, 25, 30, 35, 40, 45

Number of favourable outcomes = 9

$$\text{Probability } (E) = \frac{\text{No. of favourable outcomes}}{\text{Total number of outcomes}}$$

$$= \frac{9}{49}$$

(*iii*) A perfect square

Favourable outcomes: 1, 4, 9, 16, 25, 36, 49

Number of favourable outcomes = 7

$$\text{Probability } (E) = \frac{\text{No. of favourable outcomes}}{\text{Total number of outcomes}}$$

$$= \frac{7}{49} = \frac{1}{7}$$

(*iv*) An even prime number

Favourable outcome = 2

Number of favourable outcome = 1

$$\text{Probability } (E) = \frac{\text{No. of favourable outcomes}}{\text{Total number of outcomes}}$$

$$= \frac{1}{49}$$

Case Study Answer-

1. **Answer:**

Total number of days in June = 30

i. (c) 15

Solution:

Number of sunny days = P(sunny day) × 30 $= \frac{1}{2} \times 30 = 15$

ii. (b) $\frac{1}{6}$

Solution:

Number of cloudy days in June = 5

$\therefore x = \frac{5}{30} = \frac{1}{6}$

iii. (a) $\frac{13}{15}$

Solution:

Required probalility $= \frac{1}{2} + \frac{1}{6} + \frac{1}{5} = \frac{13}{15}$

iv. (d) 4

Solution:

We have, $x + y = \frac{3}{10} \Rightarrow y = \frac{3}{10} - \frac{1}{6} = \frac{2}{15}$

So, number of rainy days $= \frac{2}{15} \times 30 = 4$

v. (c) 6

Solution:

Number of partially cloudy days = p(partially cloudy days) × 30 $= \frac{1}{5} \times 30 = 6$

2. Answer:

Total number of cartons in the store = 80 + 90 + 38 + 42 = 250

i. (d) $\frac{9}{25}$

Solution:

P(choosing an apple juice carton) $= \frac{90}{250} = \frac{9}{25}$

ii. (c) $\frac{17}{25}$

Solution:

P(choosinganorangejuicecarton) $= \frac{80}{250} = \frac{8}{25}$

$\therefore$ p(choosing not an orange juice carton) $= 1 - \frac{8}{25} = \frac{17}{25}$

iii. (d) $\frac{21}{125}$

Solution:

p(choosing a guava juice carton) $= \frac{42}{250} = \frac{21}{125}$

iv. (c) $\frac{3}{10}$

Solution:

Total number of cartons Vishal bought =4 + 3 + = 10

Number of tetrapacks in I carton = 10

$\therefore$ Total number of tetrapacks Vishal has = 100

So, p(customer picks a guava juice tetrapack) $= \frac{3\times10}{100} = \frac{3}{10}$

v. (b) $\frac{50}{127}$

Solution:

Number of cartons left with storekeeper = 250 - 10 = 240

Number of cartons he bought = 14

$\therefore$ Total number of cartons are with storekeeper now = 240 + 14 = 254

So, p(selecting a tetrapack of apple juice from store),

$= \frac{(90-4+14)\times10}{254\times10} = \frac{100}{254} = \frac{50}{127}$

Assertion Reason Answer-

1. (a) Both A and R are true and R is the correct explanation of A.
2. (a) Both A and R are true and R is the correct explanation of A.