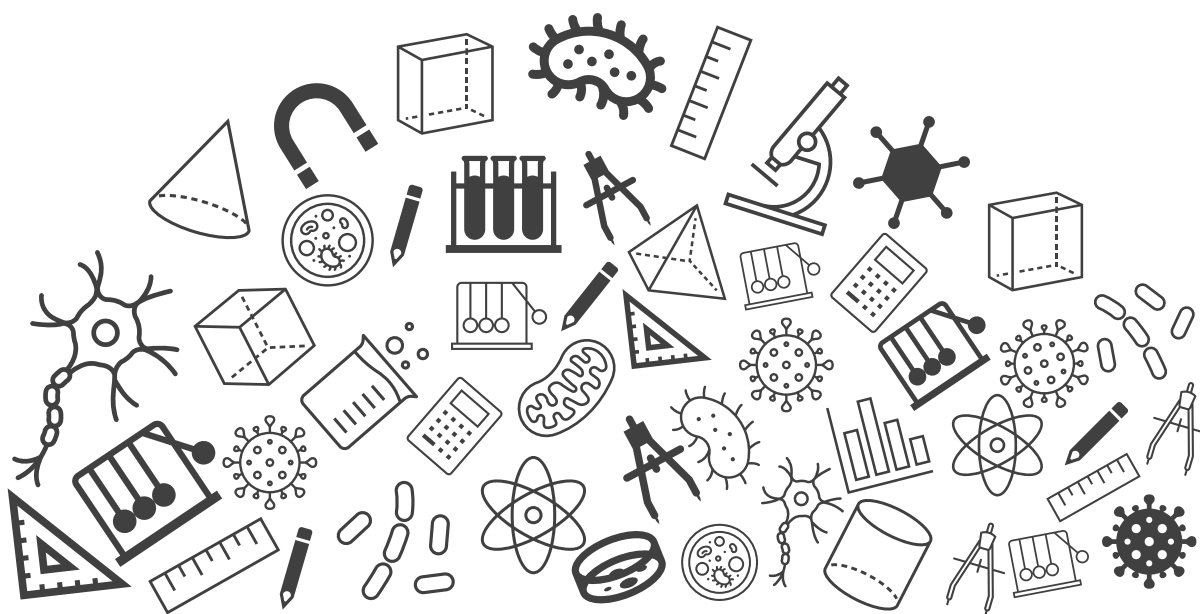




Grade 10

Mathematics

Exam Important Questions



Probability

Topic : Exam Important Questions

1. Five cards – ten, jack, queen, king and ace of diamonds, are well-shuffled with their face downwards. One card is then picked up at random. 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? (2 Marks)

Total number of outcomes before queen is drawn = 5

Total number of favourable outcomes after queen is drawn and put aside = 4

(a) Favourable outcome = 1

Hence, $P(\text{getting an ace}) = \frac{1}{4}$ (1Mark)

(b) There is no card as queen.

$\therefore$ Favourable outcome = 0

Hence, $P(\text{getting a queen}) = \frac{0}{4} = 0$ (1Mark)

2. 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 a perfect square number.

(1 Mark)

Total number of outcomes = 90

From 1 to 90, the perfect squares are 1, 4, 9, 16, 25, 36, 49, 64 and 81.

$\therefore$ Favourable outcomes = 9 (0.5 Marks)

Hence, $P(\text{getting a perfect square number}) =$

$\frac{9}{90} = \frac{1}{10}$ (0.5Marks)

3. A single die is rolled. Find the probability of the sum of the five visible faces being greater than or equal to 19.

(2 Marks)

The sum of the six values on a die = $1 + 2 + 3 + 4 + 5 + 6 = 21$

(0.5 Marks)

For the sum of the five visible faces to be greater than or equal to 19, the value facing down should be less than or equal to 2. (0.5

Marks)

For this event, there are 6 outcomes of which 2 are favourable.

Hence, the required probability is $\frac{2}{6} = \frac{1}{3}$ (1Mark)

Probability

4. If the digits of the number 12345 are randomly rearranged, what is the probability that the new number is divisible by

(i) 3 (ii) 9(2 Marks)

(i) For a number to be divisible by 3, the sum of digits has to be divisible by 3. Here, we can see that the sum of the five digits is 15. It will be 15 irrespective of the order in which these digits are written. Hence, it is a sure event and its probability will be 1.

(1 Mark)

(ii) For a number to be divisible by 9, the sum of digits has to be divisible by 9. Here, we can see that the sum of digits is 15, which is not a multiple of 9. So, irrespective of the order of the digits, the five digit number will not be a multiple of 9 (impossible event). Thus, the probability is 0.

(1 Mark)

5. When a die was rolled 60 times, the following was observed.

Outcome	1	2	3	4	5	6
Frequency	9	10	12	13	7	9

(i) Which number had an experimental probability that matched the theoretical probability?

(ii) How many numbers had an experimental probability that was less than that which would have been predicted by theoretical probability?

[2 marks]

To match with theoretical probability, a number should appear ten out of sixty tries.

(i) Experimental probability: $P(E) = \frac{\text{Number of trials in which the event happened}}{\text{Total number of trials}}$

$$P(2) = \frac{10}{60} \quad (0.5 \text{ Marks})$$

Theoretical probability: $P(E) = \frac{\text{Number of favourable outcomes}}{\text{Number of all possible outcomes}}$

$$\text{Theoretical probability of getting a 2: } P(2) = \frac{10}{60}$$

Thus, the value 2 had an experimental probability that matched the theoretical probability.

(0.5 Marks)

(ii) By inspection, we can see that the frequency of 1, 5 and 6 is less than 10 for the total of 60 tries. Thus, three numbers had an experimental probability that was less than the theoretical probability.

(1 Mark)

Probability

6. 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.

[2 marks]

The outcomes associated with the experiment in which a coin is tossed thrice: HHH, HHT, HTH, THH, TTH, HTT, THT, TTT

Therefore, total number of outcomes = 8

(1 Mark)

Number of favourable outcomes (for Hanif to lose the match) = 6

Hence, required probability = $\frac{6}{8} = \frac{3}{4}$ (1Mark)

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



(1 Mark)

Total number of fish in the tank = 5 + 8 = 13

∴ Total number of elementary events = 13

There are 5 male fishes in the tank.

∴ Favourable number of elementary events = 5

Hence, P (taking out a male fish)

$$= \frac{\text{Favourable number of elementary events}}{\text{Total number of elementary events}} = \frac{5}{13} \quad (1Mark)$$

Probability

8. 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?

[1 mark]

Let E be the event of not having the same birthday
 $\Rightarrow P(E) = 0.992$

$P(E')$ = The probability of having the same birthday

Hence, $P(E) + P(E') = 1$ (0.5 Marks)

So, $P(E') = 1 - P(E) = 1 - 0.992 = 0.008$
 (0.5 Marks)