MBA PIONEER 2024

QUANTITATIVE APTITUDE

DPP: 04

Probability 1

Q1 A team of two students is selected from 2 boys and 2 girls. What is the probability that the team will have 2 girls?

(A) $\frac{2}{3}$ (B) $\frac{8}{11}$

(C) $\frac{5}{7}$ (D) $\frac{1}{6}$

Q2 If the arrangement of letters of the word 'PARROT' is random then find the probability of all the vowels always being together?

(A) $\frac{4}{5}$ (B) $\frac{2}{3}$

(C) $\frac{1}{6}$ (D) $\frac{1}{3}$

Q3 Find the probability that in a random arrangement of the letters of the word "DISPLAY" be arranged so that the vowels are at the two ends?

(A) $\frac{3}{19}$ (B) $\frac{3}{5}$

(C) $\frac{1}{21}$ (D) $\frac{1}{6}$

Q4 There are 30 cards numbered from 1 to 30, two cards are drawn at random. Find the probability that the number on both the cards drawn have prime numbers.

(A) $\frac{1}{19}$

(B) $\frac{3}{29}$

(C) $\frac{1}{11}$

(D) None of the above

Q5 Six friends consisting of 3 men and 3 women are to be seated in a row in an Auditorium. Find the probability of all the men and all the women always being seated together

(A) $\frac{1}{8}$ (B) $\frac{1}{10}$

(C) $\frac{1}{12}$ (D) $\frac{1}{11}$

Q6 A box contains 5 Blue, 6 yellow and 3 Red marbles. Three marbles are drawn at random. What is the probability that they are not of the same color?

(A) $\frac{115}{182}$ (B) $\frac{333}{364}$

(C) $\frac{31}{364}$ (D) $\frac{17}{182}$

Q7 Cards are drawn from a well shuffled deck of 52 cards. If 4 cards are drawn at random from a pack of 52 cards then find the probability of getting two black cards and two red cards.

(A) $\frac{325}{833}$ (B) $\frac{31}{441}$

(C) $\frac{625}{833}$ (D) $\frac{31}{882}$

Q8 A sack contains eight red marbles and three green marbles. 4 marbles are selected at random from the sack, find the probability of selecting at least 1 green marble.

(A) $\frac{2}{29}$ (B) $\frac{3}{55}$

(C) $\frac{26}{33}$ (D) $\frac{7}{33}$

Q9 What is the rank of the word 'SIGNAL', If the letters of the word 'SIGNAL' are arranged in all possible ways as listed in the dictionary?

(A) 719   (B) 3600

(C) 3601   (D) 659

Q10 Find the probability that the 4 distinct paintings out of 10 distinct gift items arranged in a row such that no two of the four paintings are consecutive.

(A) $\frac{1}{6}$ (B) $\frac{2}{117}$

(C) $\frac{1}{2}$ (D) $\frac{1}{18}$

Q11 If each digit is used only once in a number formed from the digits 2, 3, 4, 5 and 6. Find the probability that these numbers end with 5.

(A) $\frac{1}{8}$

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

(C) $\frac{5}{24}$

(D) None of the above

Q12 A team consists of 5 boys and 7 girls out of them 6 are selected for a regional match which is held in another State. find the probability that all the team members selected are girls

(A) $\frac{1}{231}$ (B) $\frac{11}{45}$

(C) $\frac{3}{354}$ (D) $\frac{1}{132}$

Q13 In a hand of poker cards are dealt from a well shuffled pack of 52 cards is divided in half with black cards (Spades and Clubs) separated from red cards. Four cards are randomly drawn from the black half. What is the probability that they are all Spades?

(A) $\frac{13}{230}$ (B) $\frac{11}{26}$

(C) $\frac{9}{13}$ (D) $\frac{11}{230}$

Q14 The nine letters of the word D - E - T - E - R - M - I - N - E are written on nine separate pieces of paper. Then, find out the probability that the four letter word 'TERM' appears in one of these nine letter arrangements

(A) $\frac{1}{30240}$ (B) $\frac{1}{168}$

(C) $\frac{1}{324}$ (D) $\frac{1}{60480}$

Q15 A coin is tossed 3 times. What is the probability of getting exactly 2 tails

(A) $\frac{1}{8}$ (B) $\frac{4}{9}$

(C) $\frac{1}{2}$ (D) $\frac{3}{8}$

Q16

A bag contains 6 red balls, 3 yellow balls, and 8 green balls. What is the probability of drawing a red ball and a yellow ball if two balls are drawn at a time?

(A) $\frac{6}{67}$ (B) $\frac{7}{61}$

(C) $\frac{11}{65}$ (D) $\frac{9}{68}$

Q17 Miss Nancy is playing a game with coins, If she tossed the coin 8 times then find the probability of at least 4 tails.

(A) $\frac{163}{256}$ (B) $\frac{49}{50}$

(C) $\frac{1}{2}$ (D) $\frac{175}{193}$

Q18 Two cards are randomly drawn one after the other from a well shuffled deck of 52 cards. Find the probability of both the cards being black cards if replacement is not allowed.

(A) $\frac{25}{102}$ (B) $\frac{1}{17}$

(C) $\frac{6}{89}$ (D) $\frac{2}{17}$

Q19 Four dice are thrown simultaneously. Find the probability that all of them show the same face.

(A) $\frac{1}{72}$ (B) $\frac{1}{108}$

(C) $\frac{1}{216}$ (D) $\frac{1}{24}$

Q20 If the letters of the word 'PROBABILITY 'are arranged at random, find the probability that all the 'B's' occur together.

(A) $\frac{3}{11}$ (B) $\frac{1}{33}$

(C) $\frac{2}{11}$ (D) $\frac{1}{55}$

Q21 If the sum of two integers which are selected at random from integers 1 to 21 is odd then find the probability that both the numbers are even.

(A) $\frac{2}{7}$ (B) $\frac{6}{21}$

(C) 0 (D) $\frac{1}{2}$

Q22 What is the probability of drawing a Clubs card in each of the two consecutive draws from a well

shuffled pack of 52 cards, If the card drawn is not replaced after the first draw.

(A) $\frac{4}{17}$ (B) $\frac{12}{13}$

(C) $\frac{4}{7}$ (D) $\frac{1}{17}$

Q23 A container contains 5 tube lights of which two are broken. Randomly drawn a sample of three tube lights then find the probability that the sample contains exactly one broken tube light

(A) $\frac{1}{5}$ (B) $\frac{3}{5}$

(C) $\frac{1}{7}$ (D) $\frac{7}{10}$

Q24 The letters of the word, 'TYPICAL' are arranged at random in a row, then what is the probability that two vowels come together.

(A) $\frac{2}{7}$ (B) $\frac{3}{7}$

(C) $\frac{2}{3}$ (D) $\frac{6}{7}$

Q25 A box contains 5 blue, 3 green, 6 orange and 4 red towels. Two towels are picked up at random. What is the probability that none is blue?

(A) $\frac{26}{51}$ (B) $\frac{18}{171}$

(C) $\frac{23}{170}$ (D) None of these

Q26 If four persons are to be selected at random from a masterchef group, out of 4 men and 3 women, then find the probability that 3 men and 1 women or 1 men and 3 women are selected.

(A) $\frac{7}{12}$ (B) $\frac{16}{35}$

(C) $\frac{4}{7}$ (D) None of these

Q27 A bag contains 5 red balls, 3 green balls, and 2 blue balls. If one ball is drawn at random, what is the probability of it being red or blue?

(A) 2/5   (B) 1/2

(C) 4/5   (D) 7/10

Q28 An egg tray contains 15 eggs out of which 3 are rotten. If Mr. Rao randomly chooses three eggs from this egg tray then what is the probability of that at least one of them is rotten.

(A) $\frac{12}{91}$ (B) $\frac{47}{91}$

(C) $\frac{44}{91}$ (D) $\frac{12}{13}$

Q29 Find the probability that 2 are diamonds and one is club from a pack of 52 cards if three cards are drawn together

(A) $\frac{223}{1014}$ (B) $\frac{25}{169}$

(C) $\frac{507}{11050}$ (D) None of these

Q30 Randomly two cards are drawn from a pack of 52 cards, then find out the probability that either both are red or both are Jacks.

(A) $\frac{55}{221}$ (B) $\frac{325}{1326}$

(C) $\frac{6}{221}$ (D) $\frac{1}{1326}$

Answer Key

Q1	(D)		Q16	(D)
Q2	(D)		Q17	(A)
Q3	(C)		Q18	(A)
Q4	(B)		Q19	(C)
Q5	(B)		Q20	(C)
Q6	(B)		Q21	(C)
Q7	(A)		Q22	(D)
Q8	(C)		Q23	(B)
Q9	(D)		Q24	(A)
Q10	(A)		Q25	(A)
Q11	(B)		Q26	(B)
Q12	(D)		Q27	(D)
Q13	(D)		Q28	(B)
Q14	(B)		Q29	(C)
Q15	(D)		Q30	(A)

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

The total number of ways of selecting 2 students from a total of 4 students will be $^4C_2 = 6$ ways.

The required number of ways such that both the students are girls will be $^2C_2 = 1$ way.

Therefore the required probability will be $\frac{1}{6}$.

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Video Solution:

Q2 Text Solution:

Total number of words = 6

Number of possible ways of arranging all the words of PARROT $= \frac{6!}{2!}$

= 360 ways

Given that the vowels should always be together, then "AO" must be together.

Therefore the number of required arrangements will be $\frac{5!}{2!} * 2!$

(As "R" is getting repeated, further AO can itself be arranged in 2! ways)

= 120 ways

Therefore the required probability will be

$= \frac{120}{360}$

$= \frac{1}{3}$

Video Solution:

Q3 Text Solution:

The word Display contains 5 consonants and 2 vowels

The two vowels can be arranged in 2 ways

Remaining 5 consonants can be arranged in 5!

= 5 × 4 × 3 × 2 × 1

= 120 ways

Total no. of required ways = 120 × 2 = 240 ways

The total number of ways in which the letters of the word DISPLAY can be arranged is 7! or 5040 ways

Required probability $= \frac{240}{5040} = \frac{1}{21}$.

Video Solution:

Q4 Text Solution:

Possible outcomes = $^{30}C_2$ ways

= 435

There are 10 prime numbers between 1 to 30

Possible outcomes = $^{10}C_2 = 45$

Required Probability $= \frac{45}{435} = \frac{3}{29}$

Video Solution:

Q5 Text Solution:

Total number of friends = 6

Therefore they can be seated in a total of 6! = 720 ways.

Now given that the men and women will always be together which can be done in 2! * 3! * 3! = 72 ways.

Therefore the required probability will be
$$= \frac{72}{720}$$
$$= \frac{1}{10}$$

Video Solution:

Q6 Text Solution:

Total Cases=$^{14}C_3$=364

Total cases of drawing same color= $^5C_3 + {}^6C_3 + {}^3C_3 = 10 + 20 + 1 = 31$

Total cases of NOT drawing same color=364-31=333

So, required probability=$\frac{333}{364}$

Video Solution:

Q7 Text Solution:

Total number of possible outcomes = $^{52}C_4$

there are 26 black cards and 26 red cards

Required number of outcomes = $^{26}C_2 \times {}^{26}C_2$

Required Probability = $\frac{26C_2 \times {}^{26}C_2}{52C_4}$
$$= \frac{325}{833}$$

Video Solution:

Q8 Text Solution:

Given that there are a total of 8 red and 3 green marbles.

The total number of ways of selecting 4 marbles from a total of 11 marbles will be $^{11}C_4$ = 330 ways. The number of ways in which no green marble is chosen means all the ways in which only the red marbles are chosen which will be $^8C_4$ = 70 ways.

So the required probability will be
$$= 1 - \frac{70}{330}$$
$$= \frac{26}{33}$$

Video Solution:

Q9 Text Solution:

Alphabetical order are A, G, I, L, N and S

words beginning with A = 5!

Words beginning with G = 5!

Words beginning with I = 5!

Words beginning with L = 5!

Words beginning with N = 5!

Words beginning With SA = 24

Words beginning with SG = 24

Words beginning with SIA = 6

The next few words will be

SIGALN

SIGANL

SIGLAN

SIGLNA

SIGNAL

Therefore the rank of the word SIGNAL will be 5(5!) + 24 + 24 + 6 + 5

= 659

Video Solution:

Q10 **Text Solution:**

The total number of ways of arranging 10 distinct gift items is 10!

Now the 4 distinct paintings need to be separate

Let us first arrange the remaining 6 gift items which can be done in 6! ways.

Now a total of 7 gaps will be created out of which any 4 can be selected and further these 4 paints can once again be arranged amongst themselves in 4! ways.

Therefore the required number of ways will be 6! * 7C4 * 4!

So, the probability will be

6! * 7C4 * $\frac{4!}{10}$

$= \frac{1}{6}$

Video Solution:

Q11 **Text Solution:**

(i) The number of 5 - digit numbers formed by the digits 2 , 3 , 4 , 5 and 6 = P (5 , 5)

$= \frac{5!}{5!-5!} = \frac{5!}{0!}\frac{5!}{1!} = 120$

(ii) 5 is fixed at uint's place

remaining 4 -digits are 2 , 3 , 4 , and 6

The required number of 5 - digit numbers

= P(4 , 4)

$= \frac{4!}{1!} = 24$

Required Probability $= \frac{24}{120} = \frac{1}{5}$

Video Solution:

Q12 **Text Solution:**

Total number of members = 12

The total number of ways of selecting 6 members from total will be $^{12}C_6$.

Required number of ways such that all the members are girls will be $^7C_6$

Therefore the required probability will be

$^7C_6/^{12}C_6$

$= \frac{1}{132}$

Video Solution:

Q13 **Text Solution:**

Total number of outcomes n(S) = $^{26}C_4 = \frac{26!}{4! \, 22!}$

= 14950

n(A) = $^{13}C_4 = \frac{13!}{4!! \, 9!} = 715$

P(A) = $\frac{715}{14950} = \frac{11}{230}$

Video Solution:

Q14 **Text Solution:**

In this word ' DETERMINE' letter 'E' repeats three times

Arrangement = $\frac{9!}{3!}$ = 60480

So treat 'TERM' as one term

(TERM) DINEE,

Number of ways of arranging the above will be

$\frac{6!}{2!}$ = 360

Therefore the required probability will be $\frac{360}{60480}$

$= \frac{1}{168}$

Video Solution:

Q15   Text Solution:

$n(S) = 2^3 = 8$

$n(A) = \frac{3!}{2!} = 3$

$P(A) = \frac{n(A)}{n(S)} = \frac{3}{8}$

Video Solution:

Q16   Text Solution:

According to the question,

Number of ways of drawing a red ball and a yellow ball = $6 \times 3 = 18$

Number of ways of drawing two balls = $17c_2 = 136$

Therefore, the probability of drawing a red and yellow ball at a time = $\frac{18}{136} = \frac{9}{68}$

Hence, option D is correct.

Video Solution:

Q17   Text Solution:

$$= {}^8C_4\left(\tfrac{1}{2}\right)^4\left(\tfrac{1}{2}\right)^{8-4} + {}^8C_5\left(\tfrac{1}{2}\right)^5\left(\tfrac{1}{2}\right)^{8-5}$$
$$+ {}^8C_6\left(\tfrac{1}{2}\right)^6\left(\tfrac{1}{2}\right)^{8-6} + {}^8C_7\left(\tfrac{1}{2}\right)^7\left(\tfrac{1}{2}\right)^{8-7}$$
$$+ {}^8C_8\left(\tfrac{1}{2}\right)^8\left(\tfrac{1}{2}\right)^{8-6}$$
$$= \left(\tfrac{1}{2}\right)^8\left[{}^8C_4 + {}^8C_5 + {}^8C_6 + {}^8C_7 + {}^8C_8\right]$$
$$= \left(\tfrac{1}{2}\right)^8\left(\tfrac{8!}{4!\,4!} + \tfrac{8!}{5!\,3!} + \tfrac{8!}{6!\,2!} + \tfrac{8!}{7!\,1!} + \tfrac{8!}{8!}\right)$$
$$= \tfrac{163}{256}$$

Video Solution:

Q18   Text Solution:

The total number of ways of drawing two cards one after the other from a deck of 52 cards will be ${}^{52}C_1 * {}^{51}C_1$

The required number of ways for each of the cards drawn being black will be ${}^{26}C_1 * {}^{25}C_1$

Therefore the required probability will be

$$\frac{\left({}^{26}C_1 * {}^{25}C_1\right)}{{}^{52}C_1 * {}^{51}C_1}$$
$$= \frac{25}{102}$$

Video Solution:

Q19   Text Solution:

Total number of events associated to the random experiment of throwing four dice = $6 \times 6 \times 6 \times 6 = 6^4$

Required number of ways = $(1,1,1,1), (2,2,2,2), (3,3,3,3), (4,4,4,4), (5,5,5,5), (6,6,6,6)$

So the favorable number of elementary events = 6

Required probability $= \frac{6}{6^4} = \frac{1}{216}$

Video Solution:

Q20   Text Solution:

Total number of letters = 11

Arrangements $= \frac{11!}{2!\,2!}$

Consider two B's as one letter there are 10 letters consisting of two identical B's

Arrangement of these 9 letters $= \dfrac{\frac{10!}{2!}}{\frac{11!}{2!\,2!}}$

$= \dfrac{2}{11}$

Video Solution:

Q21   Text Solution:

The required probability will be 0 in this case as the sum will be odd only when exactly one of the numbers chosen is odd.

In the given problem, both the numbers chosen are even and their sum will therefore always result in an even number.

Video Solution:

Q22   Text Solution:

A = Event of drawing a Clubs in first draw

B = Event of drawing a Club in second draw

$P\left(A\right) = \dfrac{^{13}C_1}{^{52}C_1} = \dfrac{13}{52} = \dfrac{1}{4}$

$P\left(\dfrac{B}{A}\right) = \dfrac{^{12}C_1}{^{51}C_1} = \dfrac{12}{51} = \dfrac{4}{17}$

[Probability drawing of card in second draw when a Club card has already been drawn in first draw]

Required   Probability

$= P(A \cap B) = P(A)P\left(\dfrac{B}{A}\right)$

$= \dfrac{1}{4} \times \dfrac{4}{17} = \dfrac{1}{17}$

Video Solution:

Q23   Text Solution:

Total number of outcomes $= {}^5C_3$

Broken tube lights = 2

Non broken = 3

Possible arrangements $= \dfrac{^{2}C_1 \times {}^{3}C_2}{^{5}C_3} = \dfrac{3}{5}$

Video Solution:

Q24   Text Solution:

Total number of letters in the word TYPICAL = 7

Total number of possible outcomes = 7! ways

If vowels (I A) come together then we have 6 letters.

So, possible outcomes = 6! ways on the other hands two vowels can be put together in 2! ways.

Total number of arrangements in which two vowels come together = 6! × 2!

Number of favorable outcomes = 6! × 2!

Required Probability $= \dfrac{6! \times 2!}{7!} = \dfrac{2}{7}$

Video Solution:

Q25   Text Solution:

Total number of towels = 5 + 3 + 6 + 4 = 18

Let E be the event of drawing 2 non blue towels

n (E) $= {}^{13}C_2 = 78$

n(S) $= {}^{18}C_2 = 153$

$P(E) = \frac{78}{153} = \frac{26}{51}$

Video Solution:

Q26 Text Solution:

Total number of men = 4

Total number of women = 3

Let X = Selection of 3 men and 1 women

and Y = Selection of 1 men and 3 women

$P(X) = \frac{^4C_3 \times {}^3C_1}{^7C_4} = \frac{12}{35}$

$P(Y) = \frac{^4C_1 \times {}^3C_3}{^7C_4} = \frac{4}{35}$

Required Probability is:

$\frac{12}{35} + \frac{4}{35} = \frac{16}{35}$

Video Solution:

Q27 Text Solution:

To find the probability of drawing a red or blue ball, we need to calculate the favorable outcomes (red and blue balls) over the total number of outcomes (all balls).

The total number of balls in the bag are 5 (red) + 3 (green) + 2 (blue) = 10.

The number of favorable outcomes (red or blue balls) are 5 (red) + 2 (blue) = 7.

Therefore, the probability is 7/10.

Video Solution:

Q28 Text Solution:

Total number of eggs = 15

Rotten eggs = 3

P(none is rotten) = $\frac{^{12}C_3}{^{15}C_3} \frac{12 \times 11 \times 10}{15 \times 14 \times 13} = \frac{44}{91}$

P(at least 1 is rotten) = $\left(1 - \frac{44}{91}\right) = \frac{47}{91}$

Video Solution:

Q29 Text Solution:

$n(S) = {}^{52}C_3 = \frac{52 \times 51 \times 50}{3 \times 2 \times 1} = 22100$

Let E = Event of getting 2 diamonds and 1 club

n(E) = number of ways of choosing 2 diamonds out of 13 cards and 1 club out of 13 cards is

$= {}^{13}C_2 \times 13C_1 = \frac{13 \times 12 \times 13}{2} = 1014$

$P(E) = \frac{1014}{22100} = \frac{507}{11050}$

Video Solution:

Q30 Text Solution:

Possible arrangements = $^{52}C_2$

Let A = event of getting both red cards

B = event of getting both Jack cards

A ∪ B = Event of getting Jacks of red cards

n (A) = $^{26}C_2$ = 325

n(B) = $^4C_2$ = 6

n(A ∩ B)= 2C₂ = 1

P(A ∪ B) = P(A) + P(B) − P(A ∩ B)

$= \frac{325}{1326} + \frac{6}{1326} - \frac{1}{1326} = \frac{330}{1326} = \frac{55}{221}$

Video Solution: