

PERMUTATION & COMBINATION QUESTIONS WITH SOLUTION

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How many 3 digit number can be formed with the digits 5, 6, 2, 3, 7 and 9 which are divisible by 5 and none of its digit is repeated?

- a) 12
- b) 16
- c) 20
- d) 24
- e) None of these

Answer & Explanation

Answer – c) **20**

Explanation :

__ _ 5

first two places can be filled in 5 and 4 ways respectively so, total number of 3 digit number = $5 \times 4 \times 1 = 20$

In how many different ways can the letter of the word ELEPHANT be arranged so that vowels always occur together?

- a) 2060
- b) 2160
- c) 2260
- d) 2360
- e) None of these

Answer & Explanation

Answer – b) **2160**

Explanation :

Vowels = E, E and A. They can be arranged in $3!/2!$ Ways

so total ways = $6! \times (3!/2!) = 2160$

There are 4 bananas, 7 apples and 6 mangoes in a fruit basket. In how many ways can a person make a selection of fruits from the basket.

- a) 269
- b) 280

- c) 279
- d) 256
- e) None of these

Answer & Explanation

Answer – c) 279

Explanation :

Zero or more bananas can be selected in $4 + 1 = 5$ ways (0 orange, 1 orange, 2 orange, 3 orange and 4 orange)

similarly apples can be selected in $7 + 1 = 8$ ways

and mangoes in $6 + 1 = 7$ ways

so total number of ways $= 5 \times 8 \times 7 = 280$

but we included a case of 0 orange, 0 apple and 0 mangoes, so we have to subtract this, so $280 - 1 = 279$ ways

There are 15 points in a plane out of which 6 are collinear. Find the number of lines that can be formed from 15 points.

- a) 105
- b) 90
- c) 91
- d) 95
- e) None of these

Answer & Explanation

Answer – c) 91

Explanation :

From 15 points number of lines formed $= 15C_2$

6 points are collinear, number of lines formed by these $= 6C_2$

So total lines $= 15C_2 - 6C_2 + 1 = 91$

In how many ways 4 Indians, 5 Africans and 7 Japanese be seated in a row so that all person of same nationality sits together

- a) $4! 5! 7! 3!$

- b) $4! 5! 7! 5!$
- c) $4! 6! 7! 3!$
- d) can't be determined
- e) None of these

Answer & Explanation

Answer – a) $4! 5! 7! 3!$

Explanation :

4 Indians can be seated together in $4!$ Ways, similarly for Africans and Japanese in $5!$ and $7!$ respectively. So total ways = $4! 5! 7! 3!$

In how many ways 5 Americans and 5 Indians be seated along a circular table, so that they are seated in alternative positions

- a) $5! 5!$
- b) $6! 4!$
- c) $4! 5!$
- d) $4! 4!$
- e) None of these

Answer & Explanation

Answer – c) $4! 5!$

Explanation :

First Indians can be seated along the circular table in $4!$ Ways and now Americans can be seated in $5!$ Ways. So $4! 5!$ Ways

4 matches are to be played in a chess tournament. In how many ways can result be decided?

- a) 27
- b) 9
- c) 81
- d) 243
- e) None of these

Answer & Explanation

Answer – c) **81**

Explanation :

Every chess match can have three result i.e. win, loss and draw

so now of ways = $3 \times 3 \times 3 \times 3 = 81$ ways

Q(8 –9) There are 6 players in a cricket which is to be sent to Australian tour. The total number of members is 12.

If 2 particular member is always included

- a) 210
- b) 270
- c) 310
- d) 420
- e) None of these

Answer & Explanation

Answer – a) **210**

Explanation :

only 4 players to select, so it can be done in ${}^{10}C_4 = 210$

If 3 particular player is always excluded

- a) 76
- b) 82
- c) 84
- d) 88
- e) None of these

Answer & Explanation

Answer – c) **84**

Explanation :

6 players to be selected from remaining 9 players in ${}^9C_6 = 84$ ways

In a group of 6 boys and 5 girls, 5 students have to be selected. In how many ways it can be done so that at least 2 boys are included

- a) 1524
- b) 1526
- c) 1540
- d) 1560
- e) None of these

Answer & Explanation

Answer – b) 1526

Explanation :

$${}^6C_2 * {}^5C_3 + {}^6C_3 * {}^5C_2 + {}^6C_4 * {}^5C_1 + {}^6C_5$$

□

A card from a pack of 52 cards is lost. From the remaining cards of the pack, two cards are drawn and are found to be both hearts. Find the Probability of the lost card being a heart?

- A. 12/50
- B. 8/50
- C. 11/50
- D. 9/50
- E. None of these

Answer & Explanation

Answer – C. 11/50

Explanation :

Total cards = 52

Drawn cards(Heart) = 2

Present total cards = total cards-drawn cards = 52-2=50

Remaining Card 13-2 = 11

Probability = 11/50

□ **There are three boxes each containing 3 Pink and 5 Yellow balls and also there are 2 boxes each containing 4 Pink and 2 Yellow balls. A Yellow ball is selected at random. Find the probability that Yellow ball is from a box of the first group?**

- A. 42/61
- B. 45/61
- C. 51/61
- D. 52/61
- E. None of these

Answer & Explanation

Answer – B. 45/61

Explanation :

$$\text{Probability} = (3/5 * 5/8) / [(3/5 * 5/8) + [2/5 * 1/3]] = 45/61$$

□ A fruit basket contains 10 Guavas and 20 Bananas out of which 3 Guavas and 5 Bananas are defective. If two fruits selected at random, what is the probability that either both are Bananas or both are non-defective?

- A. 315/435
- B. 313/435
- C. 317/435
- D. 316/435
- E. None of these

Answer & Explanation

Answer – D. 316/435

Explanation :

$$P(A) = 20C2 / 30C2, P(B) = 22C2 / 30C2$$

$$P(A \cap B) = 15C2 / 30C2$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) \Rightarrow (20C2/30C2) + (22C2/30C2) - (15C2/30C2) = 316/435$$

□ A committee of five persons is to be chosen from a group of 10 people. The probability that a certain married couple will either serve together or not at all is?

- A. 54/199
- B. 52/195
- C. 53/186
- D. 51/126
- E. None of these

Answer & Explanation

Answer – D. 51/126

Explanation :

Five persons is to be chosen from a group of 10 people = $10C5 = 252$

Couple Serve together = $8C3 * 2C2 = 56$

Couple does not serve = $8C5 = 56$

Probability = $102/252 = 51/126$

□ Out of 14 applicants for a job, there are 6 women and 8 men. It is desired to select 2 persons for the job. The probability that atleast one of selected persons will be a Woman is?

- A. 77/91
- B. 54/91
- C. 45/91
- D. 40/91
- E. None of these

Answer & Explanation

Answer – A. 77/91

Explanation :

Man only = $8C2 = 28$

Probability of selecting no woman = $28/91$

Probability of selecting atleast one woman = $1 - 28/91 = 77/91$

□ Three Bananas and three oranges are kept in a box. If two fruits are chosen at random, Find the probability that one is Banana and another one is orange?

- A. 1/5
- B. 3/5
- C. 4/5
- D. 2/5
- E. None of these

Answer & ExplanationAnswer – **B. 3/5****Explanation :**Total probability = $6C2 = 15$ Probability that one is Banana and another one is orange = $3C1 * 3C1 = 9$ probability = $9/15 = 3/5$

☐ A basket contains 6 White 4 Black 2 Pink and 3 Green balls. If three balls picked up random, What is the probability that all three are White?

A. 4/91

B. 5/93

C. 7/97

D. 8/92

Answer & ExplanationAnswer – **A. 4/91****Explanation :**

Total Balls = 15

Probability = $6C3 / 15C3 = 4/91$

☐ A basket contains 6 White 4 Black 2 Pink and 3 Green balls. If three balls are picked at random, what is the probability that two are Black and one is Green?

A. 22/355

B. 15/381

C. 10/393

D. 14/455

E. 18/455

Answer & ExplanationAnswer – **E. 18/455****Explanation :**

Total Balls = 15

Probability = $4C2 * 3C1 / 15C3 = 18/455$

☐ A basket contains 6 White 4 Black 2 Pink and 3 Green balls. If four balls are picked at random, what is the probability that atleast one is Black?

A. 69/91

B. 80/91

C. 21/91

D. 55/91

E. None of these

Answer & ExplanationAnswer – **A. 69/91****Explanation :**

Total Balls = 15

Probability = $11C4 / 15C4 = 22/91$ One is black = $1 - 22/91 = 69/91$

☐ A basket contains 6 White 4 Black 2 Pink and 3 Green balls. If two balls are picked at random, what is the probability that either both are Pink or both are Green?

A. 2/105

B. 4/105

C. 8/137

D. 5/137

E. None of these

Answer & Explanation

Answer – B. 4/105

Explanation :

Probability both are Pink = $1/15C2$

Probability both are Green = $3/15C2$

Required Probability = $4/15C2 = 4/105$

☐

How many words of 4 letters with or without meaning be made from the letters of the word 'NUMBER', when repetition of letters is not allowed?

A) 480

B) 360

C) 240

D) 360

E) 24

Answer & Explanation

D) 360

Explanation:

NUMBER is 6 letters.

We have 4 places where letters are to be placed.

For first letter there are 6 choices, since repetition is not allowed, for second, third and fourth letter also we have 5, 4, and 3 choices resp., so total of $6*5*4*3$ ways = 360 ways.

☐ **In how many ways the letters of the word 'ALLIGATION' be arranged taking all the letters?**

A) 120280

B) 453600

C) 360340

D) 3628800

E) None of these

Answer & Explanation

B) 453600

Explanation:

ALLIGATION contains 10 letters, so total 10! ways. There are 2 As, 2 Ls, 2 Is

So $10!/(2!*2!*2!)$

☐ **In how many ways all the letters of the word 'MINIMUM' be arranged such that all vowels are together?**

A) 60

B) 30

C) 90

D) 70

E) 120

Answer & Explanation

A) 60

Explanation:

Take vowels in a box together as one – IIU, M, N, M, M

So there are 5 that to be placed for this 5!, now 3 Ms, so $5!/3!$, so arrangement of vowels inside box gives $3!/2!$

So total = $5!/3! * 3!/2!$

□ In how many ways a group of 4 men and 3 women be made out of a total of 8 men and 5 women?

- A) 720
- B) 140
- C) 120
- D) 360
- E) 210

Answer & Explanation

B) 140

Explanation:

Total ways = ${}^8C_4 * {}^5C_3$

□ How many 3 digit numbers are divisible by 4?

- A) 256
- B) 225
- C) 198
- D) 252
- E) 120

Answer & Explanation

B) 225

Explanation:

A number is divisible by 4 when its last two digits are divisible by 4

For this the numbers should have their last two digits as 00, 04, 08, 12, 16, ... 96

By the formula, $a_n = a + (n-1)d$

$$96 = 0 + (n-1)*4$$

$$n = 25$$

so there are 25 choices for last 2 digits and 9 choices (1-9) for the 1st digit

so total $9*25$

□ How many 3 digits numbers have exactly one digit 2 in the number?

- A) 225
- B) 240
- C) 120
- D) 160
- E) 185

Answer & Explanation

A) 225

Explanation:

0 cannot be placed at first digit to make it a 3 digit number.

3 cases:

Case 1: 2 is placed at first place

1 choice for the first place, 9 choices each for the 2nd and 3rd digit (0-9 except 2)

$$\text{So numbers} = 1*9*9 = 81$$

Case 2: 2 is placed at second place

8 choices for the first place (1-9 except 2), 1 choice for the 2nd digit and 9 choices for the 3rd digit (0-9 except 2)

$$\text{So numbers} = 8*1*9 = 72$$

Case 3: 2 is placed at third place

8 choices for the first place (1-9 except 2), 9 choices for the 2nd digit (0-9 except 2) and 1 choice for the 3rd digit

So numbers = $8 \times 9 \times 1 = 72$

So total numbers = $81 + 72 + 72 = 225$

☐ **There are 8 men and 7 women. In how many ways a group of 5 people can be made such that the particular woman is always to be included?**

- A) 860
- B) 1262
- C) 1001
- D) 1768
- E) 984

Answer & Explanation

C) 1001

Explanation:

Total 15 people, and a particular woman is to be taken to form a group of 5, so choice is to be done from 14 people of 4 people

Ways are ${}^{14}C_4$.

☐ **There are 6 men and 7 women. In how many ways a committee of 4 members can be made such that a particular man is always to be excluded?**

- A) 280
- B) 420
- C) 220
- D) 495
- E) 460

Answer & Explanation

D) 495

Explanation:

There are total 13 people, a particular man is to be excluded, so now 12 people are left to chosen from and 4 members to be chosen. So ways are ${}^{12}C_4$.

☐ **How many 4 digit words can be made from the digits 7, 8, 5, 0, and 4 without repetition?**

- A) 70
- B) 96
- C) 84
- D) 48
- E) 102

Answer & Explanation

B) 96

Explanation:

0 cannot be on first place for it to be a 4 digit number,

So for 1st digit 4 choices, for second also 4 (because 0 can be placed here), then 3 for third place, 2 for fourth place

Total numbers = $4 \times 4 \times 3 \times 2$

☐ **In how many ways 8 students can be given 3 prizes such that no student receives more than 1 prize?**

- A) 348
- B) 284
- C) 224
- D) 336
- E) None of these

Answer & Explanation**D) 336****Explanation:**

For 1st prize there are 8 choices, for 2nd prize, 7 choices, and for 3rd prize – 6 choices left

So total ways = $8 \times 7 \times 6$

□

A box contains 27 marbles some are blue and others are green. If a marble is drawn at random from the box, the probability that it is blue is $\frac{1}{3}$. Then how many number of green marbles in the box?

- A. 10
- B. 15
- C. 14
- D. 18

Answer & Explanation

Answer – **D. 18**

Explanation :

Blue marble – x

$$\frac{x}{27} = \frac{1}{3}$$

$$x/27 = 1/3 \rightarrow x = 27/3 = 9$$

No of green marbles = Total – Blue marble = $27 - 9 = 18$

□ **In a bag there are 4 white, 4 red and 2 green balls. Two balls are drawn at random. What is the probability that at least one ball is of red colour?**

- A. $\frac{4}{3}$
- B. $\frac{7}{3}$
- C. $\frac{1}{3}$
- D. $\frac{2}{3}$

Answer & Explanation

Answer – **D. $\frac{2}{3}$**

Explanation :

Total Balls = 10

Other than red ball = 6

$$\frac{6}{10} = \frac{3}{5} \rightarrow 1 - \frac{3}{5} = \frac{2}{5}$$

□ **Sahil has two bags (A & B) that contain green and blue balls. In the Bag 'A' there are 6 green and 8 blue balls and in the Bag 'B' there are 6 green and 6 blue balls. One ball is drawn out from any of these two bags. What is the probability that the ball drawn is blue?**

- A. $\frac{15}{28}$
- B. $\frac{13}{28}$
- C. $\frac{17}{28}$
- D. $\frac{23}{28}$

Answer & Explanation

Answer – **A. $\frac{15}{28}$**

Explanation :

Total balls in A bag = 14, Total balls in B bag = 12

$$A \text{ bag} = \frac{8}{14} = \frac{4}{7}$$

$$B \text{ bag} = \frac{6}{12} = \frac{1}{2} \rightarrow \text{total Probability} = \frac{4}{7} + \frac{1}{2} = \frac{15}{14}$$

□ **In an examination, there are three sections namely Reasoning, Maths and English. Reasoning part contains 4 questions. There are 5 questions in maths section and 6 questions in English section.**

If three questions are selected randomly from the list of questions then what is the probability that all of them are from maths?

- A. 7/91
- B. 8/91
- C. 2/91
- D. 4/91

Answer & Explanation

Answer – C. 2/91

Explanation :

Total no of questions = 15

Probability = $\frac{5C3}{15C3} = \frac{2}{91}$

□ A basket contains 5 red 4 blue 3 green marbles. If three marbles picked up random, What is the probability that either all are green or all are red?

- A. 1/20
- B. 7/20
- C. 3/20
- D. 9/20

Answer & Explanation

Answer – A. 1/20

Explanation :

Total Marbles = 12

Either all are green or all are red = $5C3 + 3C3$

probability = $\frac{5C3 + 3C3}{12C3} = \frac{11}{220} = \frac{1}{20}$

□ A basket contains 5 red 4 blue 3 green marbles. If three marbles picked up random, What is the probability that at least one is blue?

- A. 41/55
- B. 53/55
- C. 47/55
- D. 49/55

Answer & Explanation

Answer – A. 41/55

Explanation :

Total Marbles = 12

other than blue $\frac{8C3}{12C3} = \frac{14}{55}$

probability = $1 - \frac{14}{55} = \frac{41}{55}$

□ A basket contains 5 red 4 blue 3 green marbles. If two marbles picked up random, What is the probability that both are red?

- A. 4/33
- B. 5/33
- C. 7/33
- D. 8/33

Answer & Explanation

Answer – B. 5/33

Explanation :

Total Marbles = 12

Probability = $\frac{5C2}{12C2} = \frac{5}{33}$

□ A bag contains 5 red caps, 4 blue caps, 3 yellow caps and 2 green caps. If three caps are picked at random, what is the probability that two are red and one is green?

- A. 22/55
- B. 15/81
- C. 10/91
- D. 5/91

Answer & Explanation

Answer – D. 5/91

Explanation :

Total caps = 14

$$\text{Probability} = \frac{{}^5C_2 * {}^2C_1}{{}^{14}C_3} = \frac{5}{91}$$

□ A bag contains 5 red caps, 4 blue caps, 3 yellow caps and 2 green caps. If four caps are picked at random, what is the probability that two are red, one is blue and one is green?

- A. 22/1001
- B. 80/1001
- C. 21/1001
- D. 55/1001

Answer & Explanation

Answer – B. 80/1001

Explanation :

Total caps = 14

$$\text{Probability} = \frac{{}^5C_2 * {}^4C_1 * {}^2C_1}{{}^{14}C_4} = \frac{80}{1001}$$

□ A bag contains 2 red caps, 4 blue caps, 3 yellow caps and 5 green caps. If three caps are picked at random, what is the probability that none is green?

- A. 2/13
- B. 3/13
- C. 1/13
- D. 5/13

Answer & Explanation

Answer – B. 3/13

Explanation :

Total caps = 14

$$\text{Probability} = \frac{{}^5C_0 * {}^9C_3}{{}^{14}C_3} = \frac{3}{13}$$

□ A bag contains 5 red and 7 white balls. Four balls are drawn out one by one and not replaced. What is the probability that they are alternatively of different colours?

- a) 7/99
- b) 11/99
- c) 14/99
- d) 19/99
- e) None of these

Answer & Explanation

Answer – c) 14/99

Explanation :

Balls are picked in two manners – RWRW or WRWR

$$\text{So probability} = \frac{(5/12) * (7/11) * (4/10) * (6/9)}{2} + \frac{(7/12) * (5/11) * (6/10) * (4/9)}{2} = \frac{14}{99}$$

□ P and Q are sitting in a ring with 11 other persons. If the arrangement of 11 persons is at random, then the probability that there are exactly 4 persons between them?

- a) $1/3$
- b) $1/4$
- c) $1/5$
- d) $1/6$
- e) None of these

Answer & Explanation

Answer – d) $1/6$

Explanation :

Fix the position of P, then Q can be sit in 12 positions, so total possible outcome = 12

Now, exactly 4 persons are sitting between them. This can be done in two ways as shown in figure, so favourable outcomes = 2

So, probability = $2/12 = 1/6$

□ 10 persons are seated around a round table. What is the probability that 4 particular persons are always seated together?

- a) $1/21$
- b) $4/21$
- c) $8/21$
- d) $11/21$
- e) None of these

Answer & Explanation

Answer – a) $1/21$

Explanation :

Total outcomes = $(10 - 1)! = 9!$

Favourable outcomes = $6! \cdot 4!$ (4 person seated together and 6 other persons seated randomly, so they will sit in $(7-1)!$ Ways and those 4 persons can be arranged in $4!$ ways)

So probability = $1/21$

□ A box contains 4 red, 5 black and 6 green balls. 3 balls are drawn at random. What is the probability that all the balls are of same colour?

- a) $33/455$
- b) $34/455$
- c) $44/455$
- d) $47/455$
- e) None of these

Answer & Explanation

Answer – b) $34/455$

Explanation :

$(4C3 + 5C3 + 6C3)/15C3 = 34/455$

□ An apartment has 8 floors. An elevator starts with 4 passengers and stops at 8 floors of the apartment. What is the probability that all passengers travels to different floors?

- a) $109/256$
- b) $135/256$
- c) $105/256$
- d) $95/256$
- e) None of these

Answer & Explanation

Answer – c) 105/256

Explanation :

Total outcomes = $8 \times 8 \times 8 \times 8$

Favourable outcomes = $8 \times 7 \times 6 \times 5$ (first person having 8 choices, after that second person have 7 choices and so on)

So, probability = 105/256

☐ A speak truth in 60% cases and B in 80% cases. In what percent of cases they likely to contradict each other narrating the same incident?

- a) 9/25
- b) 7/25
- c) 11/25
- d) 13/25
- e) None of these

Answer & Explanation

Answer – c) 11/25

Explanation :

$P(A) = 3/5$ and $P(B) = 4/5$. Now they are contradicting means one is telling truth and other telling the lie. So,

Probability = $(3/5) \times (1/5) + (2/5) \times (4/5)$

☐ A box contains 30 electric bulbs, out of which 8 are defective. Four bulbs are chosen at random from this box. Find the probability that at least one of them is defective?

- a) 432/783
- b) 574/783
- c) 209/784
- d) 334/784
- e) None of these

Answer & Explanation

Answer – b) 574/783

Explanation :

$1 - 22C4/30C4 = 1 - 209/783 = 574/783$

☐ Two person A and B appear in an interview. The probability of A's selection is 1/5 and the probability of B's selection is 2/7. What is the probability that only one of them is selected?

- a) 11/35
- b) 12/35
- c) 13/35
- d) 17/35
- e) None of these

Answer & Explanation

Answer – c) 13/35

Explanation :

A selects and B rejects + B selects and A rejects = $(1/5) \times (5/7) + (4/5) \times (2/7) = 13/35$

☐ A 4- digit number is formed by the digits 0, 1, 2, 5 and 8 without repetition. Find the probability that the number is divisible by 5.

- a) 1/5
- b) 2/5
- c) 3/5

- d) $4/5$
 e) None of these

Answer & Explanation

Answer – b) $2/5$

Explanation :

Total possibility = $5 \times 4 \times 3 \times 2$

Favourable outcomes = $2 \times 4 \times 3 \times 2$ (to be divisible by 5 unit digit can be filled with only 0 or 5, so only two possibilities are there, then the remaining can be filled in 4, 3 and 2 ways respectively)

so probability = $2/5$

□ A bag contains 6 red balls and 8 green balls. 2 balls are drawn at random one by one with replacement. Find the probability that both the balls are green

- a) $16/49$
 b) $25/49$
 c) $12/49$
 d) $21/49$
 e) None of these

Answer & Explanation

Answer – a) $16/49$

Explanation :

$(8C1)/(14C1) \times (8C1)/(14C1) = 16/49$

□ In how many ways can 3 prizes be given away to 12 students when each student is eligible for all the prizes ?

- A.1234
 B.1728
 C.5314
 D.1331
 E.None of these

Answer & Explanation

Answer – B.1728

Explanation :

$12^3 = 1728$

□ Total no of ways in which 30 sweets can be distributed among 6 persons ?

- A. $35 C_5$
 B. $36 C_5$
 C. $36 C_6$
 D. $35!/5!$
 E. None of these

Answer & Explanation

Answer – A. $^{35}C_5$

Explanation :

$^{30+6-1}C_{6-1} = ^{35}C_5$

□ A bag contains 4 red balls and 5 black balls. In how many ways can i make a selection so as to take atleast 1 red ball and 1 black ball ?

- A.564
 B.345
 C.465

D.240

E.None of these

Answer & ExplanationAnswer – **C.465****Explanation :**

$$2^4 - 1 = 16 - 1 = 15$$

$$2^5 - 1 = 32 - 1 = 31$$

$$15 * 31 = 465$$

☐ In how many ways can 7 beads be strung into necklace ?

A.2520

B.5040

C.720

D.360

E.None of these

Answer & ExplanationAnswer – **D.360****Explanation :**

$$\text{No of way in Necklace} = (n-1)!/2 = 6!/2$$

$$= 720/2 = 360$$

☐ Find the no of 3 digit numbers such that atleast one of the digit is 6 (with repetitions) ?

A.252

B.345

C.648

D.560

E.None of these

Answer & ExplanationAnswer – **A.252****Explanation :**

$$\text{Total no of 3 digit number} = 9 * 10 * 10 = 900$$

$$\text{No of 3 digit number- none of the digit is 6} = 8 * 9 * 9 = 648$$

$$\text{No of 3 digit number – atleast one digit is 6} = 900 - 648 = 252$$

☐ In how many ways can 7 girls and 4 boys stand in a row so that no 2 boys are together ?

A.8467200

B.9062700

C.7407000

D.8407200

E.None of these

Answer & ExplanationAnswer – **A. 8467200****Explanation :**

$$\text{No of ways} = 7! * {}^8P_4$$

$$7! = 5040$$

$${}^8P_4 = 8 * 7 * 6 * 5 = 1680$$

$$\text{No of ways} = 5040 * 1680 = 8467200$$

☐ In how many ways the letters of the word PERMUTATION be arranged ?

A.10!/2!

B.10!

- C.11!
D.11!/2!
E.None of these

Answer & Explanation

Answer – D. 11!/2!

Explanation :

No of ways = $11!/2!$

- ☐ How many numbers can be formed with the digits 1, 7, 2, 5 without repetition ?

- A.89
B.56
C.64
D.72
E.None of these

Answer & Explanation

Answer – C.64

Explanation :

1 digit number = 4

2 digit no = $4 \times 3 = 12$

3 digit no = $4 \times 3 \times 2 = 24$

4 digit no = $4 \times 3 \times 2 \times 1 = 24$

Total = $4 + 12 + 24 + 24 = 64$

- ☐ There are 3 boxes and 6 balls. In how many ways these balls can be distributed if all the balls and all the boxes are different?

- A.243
B.512
C.729
D.416
E.None of these

Answer & Explanation

Answer – C.729

Explanation : $3^6 = 729$

- ☐ In how many ways can 4 books be selected out of 10 books on different subjects ?

- A.210
B.320
C.716
D.5040
E.None of these

Answer & Explanation

Answer – A.210

Explanation :

$${}^{10}C_4 = \frac{10 \times 9 \times 8 \times 7}{4 \times 3 \times 2 \times 1} = \frac{5040}{24} = 210$$

☐

A six-digit is to be formed from the given numbers 1, 2, 3, 4, 5 and 6. Find the probability that the number is divisible by 4.

- a) 3/17
b) 4/15
c) 4/19

- d) $4/17$
 e) None of these

Answer & Explanation

Answer – b) $4/15$

Explanation :

For a number to be divisible by 4, the last two digit should be divisible by 4.

So possible cases – 12, 16, 24, 32, 36, 52, 56, 64 (last two digits)

So favourable outcomes = $24 + 24 + 24 + 24 + 24 + 24 + 24 + 24 = 192$

So $p = 192/720 = 4/15$

□ A bag contains 6 red balls and 7 white balls. Another bag contains 5 red balls and 3 white balls. One ball is selected from each. Find the probability that one ball is red and one is white?

- a) $53/104$
 b) $47/104$
 c) $63/104$
 d) $51/104$
 e) None of these

Answer & Explanation

Answer – a) $53/104$

Explanation :

$(6/13) \times (3/8) + (7/13) \times (5/8) = 53/104$

□ A lottery is organised by the college ABC through which they will provide scholarship of rupees one lakhs to only one student. There are 100 fourth year students, 150 third year students, 200 second year students and 250 first year students. What is the probability that a second year student is chosen.

- a) $1/7$
 b) $2/7$
 c) $3/7$
 d) $4/7$
 e) None of these

Answer & Explanation

Answer – b) $2/7$

Explanation :

Second year students = 200

so, $P = 200/700 = 2/7$

□ A card is drawn from a pack of 52 cards. The card is drawn at random; find the probability that it is neither club nor queen?

- a) $4/13$
 b) $5/13$
 c) $7/13$
 d) $9/13$
 e) None of these

Answer & Explanation

Answer – d) $9/13$

Explanation :

$1 - [13/52 + 4/52 - 1/52] = 9/13$

□ A box contains 50 balls, numbered from 1 to 50. If three balls are drawn at random with replacement. What is the probability that sum of the numbers are odd?

- a) $1/2$
- b) $1/3$
- c) $2/7$
- d) $1/5$
- e) None of these

Answer & ExplanationAnswer –a) $1/2$ **Explanation :**

There are 25 odd and 25 even numbers from 1 to 50.

Sum will be odd if = odd + odd + odd, odd + even + even, even + odd + even, even + even + odd

$$P = (1/2) * (1/2) * (1/2) + (1/2) * (1/2) * (1/2) + (1/2) * (1/2) * (1/2) + (1/2) * (1/2) * (1/2)$$

$$= 4/8 = 1/2$$

□ From a pack of cards, if three cards are drawn at random one after the other with replacement, find the probability that one is ace, one is jack and one is queen?

- a) $16/7725$
- b) $16/5525$
- c) $18/5524$
- d) $64/5515$
- e) None of these

Answer & ExplanationAnswer – b) $16/5525$ **Explanation :**

$$(4C1 + 4C1 + 4C1)/(52C3)$$

□ A and B are two persons sitting in a circular arrangement with 8 other persons. Find the probability that both A and B sit together.

- a) $1/9$
- b) $2/7$
- c) $2/9$
- d) $2/5$
- e) None of these

Answer & ExplanationAnswer – c) $2/9$ **Explanation :**Total outcomes = $(10 - 1)! = 9!$ Favourable outcomes = $(9 - 1)! * 2!$ So $p = 2/9$

□ Find the probability that in a random arrangement of the letter of words in the word 'PROBABILITY' the two I's come together.

- a) $2/11$
- b) $1/11$
- c) $3/11$
- d) $4/11$
- e) None of these

Answer & ExplanationAnswer –a) $2/11$ **Explanation :**Total outcomes = $11!/(2!*2!)$

favourable outcomes = $(10! \cdot 2!)/(2! \cdot 2!)$
 $p = 2/11$

□ In a race of 12 cars, the probability that car A will win is $1/5$ and of car B is $1/6$ and that of car C is $1/3$. Find the probability that only one of them won the race.

- a) $2/7$
- b) $7/10$
- c) $9/10$
- d) $3/7$
- e) None of these

Answer & Explanation

Answer – b) $7/10$

Explanation :

$1/5 + 1/6 + 1/3 = 7/10$ (all events are mutually exclusive)

□ A bag contains 3 red balls and 8 blacks ball and another bag contains 5 red balls and 7 blacks balls, one ball is drawn at random from either of the bag, find the probability that the ball is red.

- a) $93/264$
- b) $95/264$
- c) $91/264$
- d) $97/264$
- e) None of these

Answer & Explanation

Answer – c) $91/264$

Explanation :

Probability = probability of selecting the bag and probability of selecting red ball

$(1/2) \cdot (3/11) + (1/2) \cdot (5/12) = 91/264$

□ In how many ways can 5 boys and 4 girls can be seated in a row so that they are in alternate position.

- a) 2780
- b) 2880
- c) 2800
- d) 2980
- e) None of these

Answer & Explanation

Answer – b) 2880

Explanation :

First boys are seated in 5 position in $5!$ Ways, now remaining 4 places can be filled by 4 girls in $4!$ Ways, so number of ways = $5! \cdot 4! = 2880$

□ In how many ways 5 African and five Indian can be seated along a circular table, so that they occupy alternate position.

- a) $5! \cdot 5!$
- b) $4! \cdot 5!$
- c) $5! \cdot 4!$
- d) $4! \cdot 4!$

Answer & Explanation

Answer – b) $4! \cdot 5!$

Explanation :

First 5 African are seated along the circular table in $(5-1)!$ Ways = $4!$. Now Indian can be seated in $5!$ Ways, so $4! 5!$

□ **There is meeting of 20 delegates is to be held in a hotel. In how many ways these delegates can be seated along a round table, if three particular delegates always seat together.**

- a) $17! 3!$
- b) $18! 3!$
- c) $17! 4!$
- d) can't be determined

Answer & Explanation

Answer – a) $17! 3!$

Explanation :

Total 20 persons, 3 always seat together, $17 + 1 = 18$ delegates can be seated in $(18 - 1)!$ Ways = $17!$ And now that three can be arranged in $3!$ Ways. So, $17! 3!$

□ **In how many 8 prizes can be given to 3 boys, if all boys are equally eligible of getting the prize.**

- a) 512
- b) 343
- c) 256
- d) 526
- e) None of these

Answer & Explanation

Answer – a) 512

Explanation :

Prizes can be given in $8 \times 8 \times 8$ ways = 512 ways

□ **There are 15 points in a plane out of which 6 are collinear. Find the number of lines that can be formed from 15 points.**

- a) 105
- b) 90
- c) 91
- d) 95
- e) None of these

Answer & Explanation

Answer – c) 91

Explanation :

From 15 points number of lines formed = $15C_2$

6 points are collinear, number of lines formed by these = $6C_2$

So total lines = $15C_2 - 6C_2 + 1 = 91$

□ **In party there is a total of 120 handshakes. If all the persons shake hand with every other person. Then find the number of person present in the party.**

- a) 15
- b) 16
- c) 17
- d) 18
- e) None of these

Answer & Explanation

Answer – b) 16

Explanation :

$N C_2 = 120$ (N is the number of persons)

□ There are 8 boys and 12 girls in a class. 5 students have to be chosen for an educational trip. Find the number of ways in which this can be done if 2 particular girls are always included

- a) 812
- b) 816
- c) 818
- d) 820
- e) None of these

Answer & Explanation

Answer – b) 816

Explanation :

${}^{18}C_3 = 816$ (2 girls already selected)

□ In how many different ways the letters of the word INSIDE be arranged in such a way that all vowels always come together

- a) 64
- b) 72
- c) 84
- d) 96
- e) None of these

Answer & Explanation

Answer – b) 72

Explanation :

Three vowels I, I and E can be arranged in $3!/2!$ Ways, remaining letters and group of vowels can be arranged in 4! Ways. So $4! \times 3!/2!$

□ How many 3 digit number can be formed by 0, 2, 5, 3, 7 which is divisible by 5 and none of the digit is repeated.

- a) 24
- b) 36
- c) 48
- d) 60
- e) None of these

Answer & Explanation

Answer – a) 24

Explanation :

Let three digits be abc, a can be filled in 4 ways (2, 3, 5 and 7) c can be filled in 2 ways (0 or 5) and b can be filled in 3 ways. So, $4 \times 3 \times 2 = 24$ ways

□ In a group of 6 boys and 8 girls, 5 students have to be selected. In how many ways it can be done so that at least 2 boys are included

- a) 1524
- b) 1526
- c) 1540
- d) 1560
- e) None of these

Answer & Explanation

Answer – b) 1526

Explanation :

${}^6C_2 \times {}^8C_3 + {}^6C_3 \times {}^8C_2 + {}^6C_4 \times {}^8C_1 + {}^6C_5$

☐

A bag contains 5 red balls and 7 blue balls. Two balls are drawn at random without replacement, and then find the probability of that one is red and other is blue.

- a) 33/65
- b) 35/66
- c) 37/66
- d) 41/65
- e) None of these

Answer & Explanation

Answer – b) 35/66

Explanation :

(First red ball is drawn and then blue ball is drawn) + (first blue ball is drawn and then red ball is drawn)
 $(5/12) * (7/11) + (7/12) * (5/11) = 35/66$

☐ A bag contains 3 red balls and 8 blacks ball and another bag contains 5 red balls and 7 blacks balls, one ball is drawn at random from either of the bag, find the probability that the ball is red.

- a) 93/264
- b) 95/264
- c) 91/264
- d) 97/264
- e) None of these

Answer & Explanation

Answer – c) 91/264

Explanation :

Probability = probability of selecting the bag and probability of selecting red ball
 $(1/2) * (3/11) + (1/2) * (5/12) = 91/264$

☐ 12 persons are seated at a circular table. Find the probability that 3 particular persons always seated together.

- a) 9/55
- b) 7/55
- c) 4/55
- d) 3/55
- e) None of these

Answer & Explanation

Answer – d) 3/55

Explanation :

total probability = $(12-1)! = 11!$
Desired probability = $(10-1)! = 9!$
So, $p = (9! * 3!) / 11! = 3/55$

☐ P and Q are two friends standing in a circular arrangement with 10 more people. Find the probability that exactly 3 persons are seated between P and Q.

- a) 5/11
- b) 4/11
- c) 2/11
- d) 3/11
- e) None of these

Answer & Explanation

Answer – c) 2/11

Explanation :

Fix P at one point then number of places where B can be seated is 11.

Now, exactly three persons can be seated between P and Q, so only two places where Q can be seated. So, $p = 2/11$

☐ A basket contains 5 black and 8 yellow balls. Four balls are drawn at random and not replaced. What is the probability that they are of different colours alternatively.

- a) 56/429
- b) 57/429
- c) 61/429
- d) 68/429
- e) None of these

Answer & Explanation

Answer – a) 56/429

Explanation :

sol=> BYBY + YBYB = $(5/13) \times (8/12) \times (4/11) \times (7/10) + (8/13) \times (5/12) \times (7/11) \times (4/10) = 56/429$

☐ Direction(Q6 – Q8):

A bag contains 6 red balls and 8 green balls. Two balls are drawn at random one after one with replacement. What is the probability that- Both the balls are green

- a) 13/49
- b) 15/49
- c) 16/49
- d) 17/49
- e) None of these

Answer & Explanation

Answer – c) 16/49

Explanation :

$P = (8/14) \times (8/14)$

☐ First one is green and second one is red

- a) 16/49
- b) 14/49
- c) 11/49
- d) 12/49
- e) None of these

Answer & Explanation

Answer – d) 12/49

Explanation :

$P = (8/14) \times (6/14)$

☐ Both the balls are red

- a) 14/49
- b) 9/49
- c) 11/49
- d) 12/49
- e) None of these

Answer & Explanation

Answer – b) 9/49

Explanation :

$P = (6/14) \times (6/14)$

□ Find the probability that in a leap year, the numbers of Mondays are 53?

- a) $1/7$
- b) $2/7$
- c) $3/7$
- d) $4/7$
- e) None of these

Answer & Explanation

Answer – b) $2/7$

Explanation :

In a leap year there are 52 complete weeks i.e. 364 days and 2 more days. These 2 days can be SM, MT, TW, WT, TF, FS, and SS.

So $P = 2/7$

□ A urn contains 4 red balls, 5 green balls and 6 white balls, if one ball is drawn at random, find the probability that it is neither red nor white.

- a) $1/3$
- b) $1/4$
- c) $1/5$
- d) $2/3$
- e) None of these

Answer & Explanation

Answer – a) $1/3$

Explanation :

$5C1/15C1 = 1/3$