1. Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?

Ans:
P(3 or 5) = P(3) + P(5) - P(3 and 5)

multiples of 3 = {3,6,9,12,15,18}
Therefore, P(3) = 6/20

multiples of 5 = {5,10,15,20}
Therefore, P(5) = 4/20

multiples of both 3 and 5 = {15}
Therefore, P(3 and 5) = 1/20

therefore, P(3 OR 5) = 6/20 + 4/20 - 1/20 = 9/20

2. In a lottery, there are 10 prizes and 25 blanks. A lottery is drawn at random. What is the probability of getting a prize?

Ans:
10 prizes and 25 blanks
that means total = 35
favorable outcome/total = 10/35 =>
2/7

3. One card is drawn at random from a pack of 52 cards. What is the probability that the card drawn is a face card?

Ans:
there are 12 face cards, 52 total cards
12/52 ===>
3/13

4. A man and his wife appear in an interview for 2 vacancies in the same post. The probability of husband's selection is 1/7 and the probability of wife's selection is 1/5. What is the probability that only one of them selected?

Ans:
This one was just a little bit tricky
probability that man will get the job and wife will also = 1/7 * 1/5 = 1/35
now probability that man will not get the job is 1-1/7 = 6/7
and probability that woman will not get the job is 1-1/5 = 4/5
so probability that they both will not get the job is 6/7 * 4/5 ==== > 24/35
now total probability is 1
so ====> 1- both will get job - no one will get job = only one got job
which gives
2/7

Alternatively,
probablility that man will not get the job is 1-1/7 = 6/7
and prob that woman will not get the job is 1-1/5 = 4/5
So probability = man gets and woman does not or woman get and man does not
= 1/7 * 4/5 + 1/5 *6/7

= 10/35 = 2/7

7. A speaks truth in 75% cases and B in 80% of the cases. In what percentage of cases are they likely to contradict each other, narrating the same incident?

(a) 5% (b) 15% (c)35% (d)45%

8. Two dice are tossed. The probability that the total score is a prime number?

(a) 1/6 (b) 5/12 (c) 1/2 (d) 7/9
Ans:
n(S) = 6*6 =36
Let E=Event that the sum is a prime number
E= {(1,1),(1,2)(1,4),(1,6),(2,1),(2,3),(2,5),(3,2),(3
,4),(4,1),(4,3),(5,2),(5,6),(6,1),(6,5)}
n(E) = 15
P(E) = n(E)/n(S) = 15/36 = 5/12

9. In a class, 30% of the students offered English, 20% offered Hindi and 10% offered both. If a student is selected at random, what is the probability that he has offered English or Hindi?

(a) 2/5 (b) 3/4 (c)3/5 (d) 3/10
Ans:
the P(A OR B)= P(A)+P(B)-P(A AND B)
so it's 0,3 + 0,2 - 0,1 =0,4 = 2/5

10. A box contains 20 electric bulbs, out of which 4 are defective. Two bulbs are chosen at random from this box. The probability that at least one of these is defective is :

(a) 4/9 (b) 7/19 (c) 12/19 (d)21/95
Ans:
Probability of choosing 2 bulbs so that none of them are defective is 16C2/20C2
so probability of atleast one being defective is 1-16C2/20C2 = 7/19

11. A bag contains 6 black and 8 white balls. One ball is drawn at random. What is the probability that the ball drawn is white?
Ans: 4/7

12. A box contains 5 green, 4 yellow and 3 white marbles. Three marbles are drawn at random. What is the probability that they are not of the same color?
Ans;
Ways in which 3 marbles can be picked of same color is 5C3 + 4C3 + 3C3
and number ways of picking 3 marbles is 12C3
So probability is (5C3 + 4C3 + 3C3)/12C3 = 3/44
probability that they are not of the same color **= 1-3/44 = 41/44**

13. Two cards are drawn together from a pack of 52 cards. The probability that one is a spade and one is a heart is?

14. From a pack of 52 cards, two cards are drawn together at random. What is the probability of both the cards being kings?

15. Two squares are chosen at random on a chessboard. What is the probability that they have a side in common?
ans:
P(corner)=4/64
P(edge) =24/64
P(inner)=36/64

for a corner, you have two adjacent squares. P(corner) = 2/63
for an edge, you have three adjacent squares. P(corner) = 3/63
for an inner, you have four adjacent squares. P(corner) = 4/63

Following the rule:
P(A) = P(A | x1) P(x1) + P(A | x2) P(x2) + ... P(A | xn) P(xn)
P(A) = (4/64 * 2/63 + 24/64*3/63 + 36/64*4/63) = 1/(64*63) * (8+72+144) = 1/18

17. From a group of 10 women and 5 men, 2 people are selected at random to form a committee. Find the probability that a) only men are selected and b) exactly 1 man and 1 woman is selected.
Ans:
a) 2/21 b) 10/21
b) we have to select exactly one man and one women
so probab that we have a man selected first is 5/15
and prob that of the remaining u select a woman is 10/14
so total prob is 5/15 * 10/14 = 5/21
now u can also select the woman first and then a man
so that gives another 5/21
so total is 10/21

more simpler solution.

5C1 * 10 C1 / 15C2 = 10/21

18. One student's name will be picked at random to win a CD player. There are 12 male seniors, 15 female seniors, 10 male juniors, 5 female juniors, 2 male sophomores, 4 female sophomores, 11 male freshmen and 12 female freshman. Find the probability that a) a senior or a junior is picked, b) a freshman or a female is picked, and c) a freshman is NOT picked. Round answers to three decimal places.
Ans:
a) 42/71 b) 47/71 c) 48/71

19. If two cards are drawn from a deck of cards, WITH REPLACEMENT, find the probability that the 1st card is a heart AND the 2nd card is an ace. Round answer to three decimal places.
Ans:
1/52 or 0.011

20. Find the probability of picking one card

Q1) a heart or club Q2) a heart and club
Ans:
Q1) 1/2 Q2) 0

21. TWO couples and a single person are to be seated on 5 chairs such that no couple is seated next to each other. What is the probability of the above??
Ans:
Ways in which the first couple can sit together = 2*4! (1 couple is considered one unit)
Ways for second couple = 2*4!
These cases include an extra case of both couples sitting together
Ways in which both couple are seated together = 2*2*3! = 4! (2 couples considered as 2 units- so each couple can be arrange between themselves in 2 ways and the 3 units in 3! Ways)
Thus total ways in which at least one couple is seated together = 2*4! + 2*4! - 4! = 3*4!
Total ways to arrange the 5 ppl = 5!
Thus, prob of at least one couple seated together = 3*4! / 5! = 3/5
Thus prob of none seated together = 1 - 3/5 = 2/5

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22. Kurt, a painter, has 9 jars of paint:
4 are yellow
2 are red
rest are brown
Kurt will combine 3 jars of paint into a new container to make a new color, which he will name accordingly to the following conditions:

Brun Y if the paint contains 2 jars of brown paint and no yellow
Brun X if the paint contains 3 jars of brown paint
Jaune X if the paint contains at least 2 jars of yellow
Jaune Y if the paint contains exactly 1 jar of yellow

What is the probability that the new color will be Jaune

a) 5/42
b) 37/42
c) 1/21
d) 4/9
e) 5/9
Ans:
1. This has at least 2 yellow meaning..

a> there can be all three Y => 4c3
OR
b> 2 Y and 1 out of 2 R and 3 B => 4c2 x 5c1

Total 34

2.This has exactly 1 Y and remaining 2 out of 5 = > 4c1 x 5c2

Total 40
Total possibilities = (9!/3!6!) = 84
Adding the two probabilities: probability = 74/84 = 37/42

23. Four cards are drawn from a standard deck of playing cards without replacing a card after it is drawn. If the first 3 cards are hearts, what is the probability that the next card drawn is not a heart?
Ans:
probability of drawing a heart at fourth attempt is 10/49
so not drawing will be 1-10/49 = 39/49

24. A group of 7 boys and 5 girls went to the amusement park. Only 4 people were able to get on the last remaining car on the roller coaster. To the nearest hundredth, what is the probability that the 4 people consisted of 2 boys and 2 girls?
Ans:
(7C2 * 5C2)/ 12C4 = 42/99 ~ 0.42

25. In a bag of cookies, there are 4 chocolate chip cookies, 8 sugar cookies, and 6 oatmeal cookies. Steve reaches into the bag without looking and takes out 2 cookies. What is the probability that they are both chocolate chip cookies?
Ans:
4/18 * 3/17 = 12/306

26. One integer will be randomly selected from the integers 11 to 60, inclusive. What is the probability that the selected integer will be a perfect square or a
perfect cube?
Ans:
16,25,36,49 r perfect squares

27 is the only cube of 3 rest r bigger than 60

hence 5/50

or 0.1

28. A model for a random spinner can be made by taking a uniform prob. space on the circumference of a circle with radius 1, so that the probability that the pointer of the spinner lands in an arc of length s is s/(2*pi). Suppose the circle is divided into thirty-seven zones. What is the probability that the spinner stops in an even zone?
Ans:
As there are in all 37 zones, 18 even and 19 odd zones.
P(even zone) = 18/37

29. A college is composed of 70% men and 30% women. It is known that 40% of the men and 60% of the women smoke. What is the probability that a student seen smoking is a man?
Ans:

Smoking men = 0.7*0.4 = 0.28
Smoking women = 0.3*0.6 = 0.18
P(Man|Smoking)=0.28/0.46=14/23

30. A circular target of unit radius is divided into four annular zones with outer radii 1/4, 1/2, 3/4, and 1, respectively. Suppose ten shots are fired independently and at random into the target.

a) What is the prob. that at most three shots land in the zone bounded by the circles of radius 1/2 and 1.
b) If five shots land inside the disk of radius 1/2, find the probability that at least one is in the disk of radius 1/4.
Ans:
a) P(1/2-1) = (1-0.5^2)/1=0.75.
[10C3*0.75^3*0.25^7+10C2*0.75^2*0.25^8+10C1*0.75*0.
25^9+0.25^10]~0.0035
I used the calculator to do the last one.

b) P(in the 1/4 | it falls in 1/2) = 0.25.
P(at least one in 1/4) = 1 - P(none in 1/4) = 1 - 0.75^5 = 0.7626.

33. Three coins are tossed up in the air. What is the probability that two of them will land heads and one will land tails?
Ans:
as...they r in total 8 possible outcome and among which 3 of them satisfies the condition.

So...the probability = **3/8**

34. A letter is selected at random from the word TRAPEZOID find the probability that the letter selected will have vertical or horizontal line symmetry.
Ans:
9 letter
non vertically or horizontally symmetrics
RPZ
probability of selecting these 3/9=1/3
so the required answer is 1-1/3=2/3

35. A softball team plays two games each weekend, one on Saturday and the other on Sunday. The probability of winning the game scheduled for next Saturday is 3/5 and the probability of winning the following game, scheduled for Sunday, is 4/7. What is the probability that the team will win at least one of the two games?
Ans:
1- (2/5)*(3/7)
=1-6/35
=29/35

Alternatively,
Since A and B are independent events,
P(A or B) = P(A) +P(B) - P(A)P(B) = 3/5+4/7-3/5*4/7 = 29/35

36. In a certain class, there are four students in the first row: three girls (Ann, Barbara, and Cathy), and one boy (David). The teacher will call on one of these students to solve a problem at the board. When the problem is completed, the teacher will call on one of the remaining students in the first row to do a second problem at the board. What is the probability that David will be one of the two students called?

Ans:

1 - (3/4)*(2/3)

= 1/2

37. Elton bought a pack of 16 baseball cards. He sorted them by position and noted that he had pictures of four pitchers, five outfielders, and seven infielders. Two cards are randomly chosen from the pack of 16 cards without replacement. Find the probability that:

a) at least one of the cards shows a pitcher

b) neither card shows a pitcher

Ans:

a) 1-(12*11)/(16*15)

b) (12*11)/(16*15)

38. What is the probability of seven people being randomly chosen from the general population, and only one of them having a birthday on a Thursday?

Ans:

the assumption is that a randomly chosen person has a 1/7 chance of being born on Thursday (the same goes for the rest of the days).

39. Sam wants to buy three doughnuts, and there are five varieties to choose from. He wants each doughnut to be a different variety. How many combinations are there?

Ans: 56

40. how many 3 digit positive integers are odd and do not contain the digit "5"?

Ans:

Well now the options of nos. available to us are: 0,1,2,3,4,6,7,8,9.

We have a 3-digit no. _ _ _

For this to be odd we have 4 cases: ending with 1,3,7 & 9.

Case 1: no. ending with 1.

so the last blank contains the digit 1. We now have to fill the 1st two blanks. The first blank can be filled in 8 ways(we cant have 0 here as it'll then become a 2-digit no.).

The second blank can be filled in 9 ways now.('coz we can have any no. from the space as it is not mentioned that repetition of digits not allowed.)

Hence for case 1 total no. of possible ways are = 8* 9 = 72

Now for other cases(ending with 3,7,9) too u'll see we get 72 ways each.

Hence the Total ways for the given condn. = sum of all cases = 72 +72+72+72 = 288 ways.

Alternatively,
there is a good method for these kind of problems

draw 3 boxes since it requires 3 digits

|A|B|C|

A,B,C are the sets these set has special property A can contain 1,2,3,4,5,6,7,8,9

B anc C can contain 0,1,2,3,4,5,6,7,8,9

now problem reduces to finding subsets of these sets such that the constraints that the problem emphasizes

now for the above problem

A'={1,2,3,4,6,7,8,9}
B'={0,1,2,3,4,6,7,8,9}
C'={1,3,7,9}

the answer is multiplication of number of elemens in A',B',C' so
8*9*4

288

41. Grace has 16 jellybeans in her pocket. She has 8 red ones, 4 green ones, and 4 blue ones. What is the minimum number of jellybeans she must take out of her pocket to ensure that she has one of each color?
Ans:
we should think for the worst case scenario

RRRRRRRR (for the first 8 selection always selects red ones)
GGGG (for the following 4 selections selects greens)
B (there is no chance since only blues are in the pocket at the 13th selection)

42. lets say we have a die we roll this die and note the numbers which shows up lets say this one is N and we write numbers from 1 to N to little pieces of paper and we draw a paper randomly what is the probability that the paper has 3 written on it
Ans:
prob of getting 3 is 1/6

prob of getting 3 N times = 1/6^N
prob of getting 3 N-1 times = 1/6^(N-1)
....and so on

prob of choosing 3 when all are threes = 1
prob of choosing 3 when all but one are 3's = (N-1)/N
.........and so on

so choosing 3 from paper is combi of two events or
if you are a maths student youll know the total probability theorem

ill write the expression

P (3) = [1 * 1/6^N + (N-1) / N * 1/ 6 ^ (N-1) + ... + 1/N]

= N
SUMM {[1/ 6 ^ N] * [{(N - k) / N }* 6^k]}
k=0

43. A student arrives to bus stop between 7.55 and 8.05 every morning. And the bus leaves bus stop between 8.00 and 8.10 what is the probability that the student catches the bus
Ans:

P(A)= prob of student arriving after 0800 = 0.5
P(B)= prob of bus arriving before 0805 = 0.5

therefore P(AB) = P(A)P(B) = 0.25 .....[A and B independent]

44. A 3-member rowing team is to be selected from 4 men and 5 women. How many different 3-member teams be formed subject to the requirement that each team have at least 1 woman in it?
Ans:
all event is 9c3 and all men in group is 4c3 then at least woman in it is 9c3-4c3=84-4=80

Alternatively,
4C2 * 5C1 + 4C1 * 5C2 + 5C3 = 30 + 40 + 10 = 80

45. There are 17 steps. A person is starting from the bottom climbing to the top. A person can climb, at a time, one or two steps. In how many ways can he climb the steps and reach the top

46. What is the probability of two people arriving at a restaurant within 11 minutes of each other between 1 PM and 5 PM? The answer needs to be rounded to 4 decimal places with no trailing zeroes. (e.g .15 needs to be represented as 0.15, 0.154567 needs to be represented as 0.1546)

47. A credit card number has 6 digits (between 1 to 9). The first two digits are 12 in that order, the third digit is bigger **than 6, the forth is divisible by 3 and the fifth digit is 3** times **the** sixth**. How many different credit card numbers exist?**
Ans:

1st digit --> 1 choice {1}
2nd digit --> 1 choice {2}
3rd digit --> 3 choices {7,8,9}
4th digit --> 3 choices {3,6,9}
5th digit --> 1 choice. It depends on the 6th digit
6th digit --> 3 choices {1,2,3}

Number of CC numbers possible = 1*1*3*3*1*3 = 27

48. 4 ETS big book and 5 barrons books are arranged in a row on a shelf at random. Find the probability that the books of the same publisher will be put together?
Ans:
9!/(5!*4!) ways to do the whole arrangement
And 2 ways to do in the desired way
so prob = 2/(9!/(5!*4!)) = 1/63

49. 4 verbal book and 5 quant books are arranged in a row on a shelf at random. Find the probability that the books on the same section will not be put together?
Ans:
9! ways to do the whole arrangement
And 5!*4!*2 ways to do in the opposite way
so prob = 1 - 5!*4!* 2 / 9! = 62/63

50. Two different integers are to be selected from a set of 10 different integers in which half of the integers are even and half are odd. how many of the 45 possible selection consists of one even and one odd integer.
Ans:
Given set contains 5 even integers and 5 odd integers
So an even integer can be selected in 5 ways and an odd integer can be selected in 5 ways. Hence totally an even integer and an odd integer can be selected in 5x5= 25 ways.

Elaborating on the given question
combinations containing both even will be 5C2 = 10
combinations containing both odd will be 5C2 =10
combinations containing one odd and one even will be 25
total combinations =45

51. A set of integers is created after discarding nonprime odd from 1 to 13. Two different integers are to be selected from this set of integers. How many of the 45 possible selections consist of one even and one odd integer.
Ans:
Given set is 1,2,3,4,5,6,7,8,9,10,11,12,13
We have to discard non prime odd ie only 1 and 9 will be discarded and we will be left with 11 integers and hence the no. of combinations will be 55
Now the set is 2,3,4,5,6,7,8,10,11,12,13
even integers are 6 and odd integers are 5
Hence the no. of combinations containing one even and one odd will 6x5=30

Elaboration again
combinations containing both even will be 6C2=15
combinations containing both odd will be 5C2=10
combinations containing one even and one odd = 30
Hence total combinations = 55

52. A certain deck of cards contains 2 blue cards, 2 red cards, 2 yellow cards, and 2 green cards. If two cards are randomly drawn from the deck, what is the probability that they will both are not blue?
Ans:
For the first card draw...6 cards out of 8 are non blue...hence probability for non blue is 6/8

For the second card drawn...7 cards remain which have 2 as blue cards and 5 as non blue...Again probability for non blue will be 5/7

Hence (6/8)*(5/7) = 15/28

Or,
Prob of not getting blue = 6C2/8C2 = 15/28

53. Find the probability of winning the California lottery. The possible numbers are numbers 1 - 51. Six numbers are selected and all six must match to win the grand prize.
Ans:
i think the probability is 1/51C6.... since all 6 should match....there is only 1 way of getting all 6 correct....so my ans.

Or,

For the California lottery question:
the desired combination is : 1
the total number of possible combinations: 51 raised to power 6
(because each of the six positions has 51 possibilities.. so total no. of possible combinations is 51*51*51*51*51*51..we cannot use concept of "combinations" because then we assume that once a number is used in one of the positions it cant be repeated.. however such a condition is not mentioned...i am talking of a possible combinations of the form 111111 or 122112 etc..)

So the probability is **1/(51^6)**

54. If the chance of a coin toss landing on heads is 1/2, then the probability of getting at least three heads after four tosses is ?
Ans:
The probability of getting exactly 3 heads would be 4C3 * .5^3 * .5^1 = 1/4
plus the probability of getting exactly one head is 4C0 * .5^1 * .5^3 = 1/16
so the total prob = 1/4 + 1/16 = 5/16.

55. A guy throws a pair of dice. If the sum of the numbers on the dice is even, then the person tosses a coin. What is the probability of him getting a head?
Ans:
1/2*1/2 =1/4

56. A guy throws a pair of dice. If he doesn't get the sum as even number, he throws the dice again and again until he gets it. And then he tosses the coin. What is the probability of him getting a head?
Ans:

prob even = 1/2
prob odd = 1/2

prob head = 1/2
prob tail = 1/2

independent events!

answer: ½

How many odd numbers between 50 and 450 can be written with the elements of the set {0,1,2,3,4,5}?
Ans:
__....__...__

0,1,2,3,4,5

2 digit number > 50
5 _?
we can put here 1,3,5 hence 3 numbers

3 digit number < 400
__..__..__
we can place 1,2,3 in leftmost position
0,1,2,3,4,5 in middle position
1,3,5 in rightmost position
hence total 3*6*3=54 possible numbers

3 digit number >= 400 and <=450
4..__..__
we can put 0,1,2,3,4 in middle position
and 1,3,5 in rightmost position
hence here we get 5*3=15 possible numbers

so ans = 3 + 54 + 15 = 72

A certain stock exchange designates each stock with a one-, two- or three-letter cod, where each letter is selected from the 26 letters of the alphabet. If the letters may be repeated and if the same letters used in a different order constitute a different code, how many different stocks is it possible to uniquely designate with these codes?
Ans:
If order doesn't matter and you have 1,2 and 3 letter combinations then you have 26 + 26^2 + 26^3 i.e. 1 letter options, 2 letter options, and 3 letter options.

If two of the four expressions $x + y$, $x + 5y$, $x - y$, and $5x - y$ are chosen at random, what is the probability that their product will be of the form of $x^2 - (by)^2$, where b is an integer?

- (selected) $\frac{1}{2}$
- $\frac{1}{3}$
- $\frac{1}{4}$
- $\frac{1}{5}$
- $\frac{1}{6}$

Ans:
4C2=6 (total possibilities) only (x+y)(x-y) i.e one combination gives the given form. Hence 1/6

OR,

Probability of choosing x+y , x-y in two successive picks:
1/4 * 1/3 *2 (since you can choose x+y first, then x-y or vice versa) = 1/6

A chemical plant has an emergency alarm system. When an emergency situation exists, the alarm sounds with probability 0.98. When an emergency situation does not exist, the alarm system sounds with probability 0.01. A real emergency situation is a rare event occurring with probability 0.002. Given that the alarm has just sounded, what is the probability that a real emergency situation exists?

Ans:
Bayes' Theorem: P(A|B) = P(B|A)*P(A) / P(B)
Here we have P(A) = .002 (probability of a happening without dependence of b)
P(B) = .98*.002 + .01*.(1-.002) = .01194 (probability of b happening without dependence of a)
P(B/A) = 0.98 (Probability of b happening given a)
so we have P(A/B) = .98*.002 / .01194 = .164

A rectangular table seats 4 people on each of two sides, with every person directly facing another person across the table. If eight people choose their seats at random, what is probability that any two of them directly face other?

Ans:
Does not matter how you seat the first person (A).

Now for another person (say B) to be seated opposite to this first person(A), there is only one place.

Total possible places (empty chairs) = 7
probability = 1/7

OR,

Total number = 8!

If two are facing each other, there are 6! configurations to seat the rest.
You can place the couple in 8 different configurations.

8*6!/8! = 1/7

Probability of an employee to get infected by a disease X is 20%. What is the probability that out of randomly selected four employees, 2 employees will suffer from disease X?

Ans:

4c2*(0.2)^2*(0.8)^2 = 96 / 625.

If a 3-digits integer is selected at random from the integers 100 to 199, inclusive, what is the probability that the first digit and the last digit of the integer are each equal to one more than the middle digit?

A) 2/225 B) 1/111 C) 1/110 D) 1/100 E) 1/50

Ans:

1/100 (only possible 101)

S is a set of all prime numbers less than 10.If a number is selected from the set at random and then another number, not necessarily different, what is the probability that the sum of the two randomly selected numbers is odd ?

Ans:

Set of Primes < 10 = {2,3,5,7}

Number of ways of selecting 2 numbers with repetitions = 4 * 4 = 16

We need to select 2 exactly once to get an odd sum (either 2X or X2) = 3+3 = 6

A certain club has 10 members, including Harry. One of the 10 members is to be chosen at random to be the president, one of the remaining 9 members is to be chosen at random to be the secretary, and one of the remaining 8 members is to be chosen at random to be the treasurer. What is the probability that Harry will be either the member chose to be the secretary or the member chosen to be the treasurer??

Ans:

case1

don't pick him as pres. p=9/10

pick him as secr. p=1/9

p1 = 9/10*1/9 = 1/10 (1)

case2

don't pick him as pres. p=9/10

don't pick him as secr. p=8/9

pick him as tr. p=1/8

p2=9/10*8/9*1/8 = 1/10 (2)

so p=p1+p2 = 2/10=1/5

OR,

Total number of ways to choose people = 10C1*9C1*8C1

Harry can be either sec or tr. So 2 choice. Fixing a position for Harry, we can choose the rest of the people in 9C1*8C1 ways

So reqd prob = 2*9C1*8C1/10 C1*9C1*8C1 = 1/5

An urn contains 10 balls colored either black or red. When selecting two balls from the urn at random the probability that you select a ball of each color is 8/15. Assuming that the urn contains more black balls than red balls, what is the probability of obtaining at least one black ball when selecting two balls from the urn?

Ans:

P(selecting exactly 1 black & one red) = rC1*bC1/10C2 = 8/15
rb = 24
r(10-r) = 24
r = 4 (r<b)
P(at least 1 black) = 1-P(2 red) = 1- 4/10*3/9 = 1-12/90 = 39/45

---

5 identical balls are distributed at random into 4 boxes marked A,B,C,D. Find the probability that these boxes contain respectively 1,2,2,0 balls.

Ans:
I think the answer is C=1/56. Imagine that you have these 5 undistinguishable balls in one line. To find the number of all possible combinations you need to know how to divide them between 4 boxes. balls are all the same so you only care how many ball are there in each of the boxes. To find out this figure lets say we add 3 extra balls or whatever else which serve as dividers and show us how many balls are there in each of the boxes . B for ball, D for divider. Eg bDbbDbDb or DDbbbbbD, in the first case it means 1 inA, 2 in B, 1 in C and 1 in D, in the second all are in C. So the figure is C 3 out of 8 (how to find 3 places for dividers out of 5+3=8 places). And it equals to 56. The 1/2/2/0 combination we are after is one of 56. so here we go with 1/56.

A box contains ten assemblies of which two are defective. A sample of three assemblies is selected at random. What is the probability that the two defective parts will be selected?

Ans:
2C2*8C1/10C3 = 1/15

OR,

There are 2 possibilities
(a) NonDefective,Defective,Defective : (8/10) * (2/9) * (1/8)
(b) Defective,NonDefective,Defective : (2/10) * (8/9) * (1/8)
(c) Defective,Defective,NonDefective : (2/10) * (1/9) * (8/8)

so total probaility is (a) + (b) + (c) = > (16+16+16)/(8*9*10)
=> (3*16)/(8*9*10) = 1/15

In the x-y plane, a rectangular region has the following coordinates: O (0,0), M (0,4), P (6,4), N (6,0). What is the probability that the sum of the integer coordinates of a particular point is less than 4 within the rectangular region?

Ans:
for the denominator (6,0) there are 7 integers (since we start at 0)
and similarly (0,4) we have 5 integers so total 7*5=35
for the numerator another way to look at is if you draw the line y=x
then values are symmetric about it so suffices to look at values say to the left of it
(0,1),(0,2),(0,3) (1,2) so 4+4=8 + 2 values that lie on the line y=x
(0,0) and (1,1) = 10
and p=10/35

A family has 3 children. What is the possibility that of the 3 children, exactly 2 of them are boys?

Ans:
3c2*(1/2)^2 * (1/2)^1 = 3/8

OR,

There are 8 possible outcomes, 2*2*2 = 8, only 3 of them could have exactly 2 boys.
Ans = 3/8

A student has to select 3 subjects out of 6 subjects A, B, C, D, E and F. If he has already chosen E, what is the probability that he will choose B also?
Ans:
Already chosen E. So remaining are 5.

Out of 4 he need to chose 2.

Number of ways to chose B & one among (A,C,D,F) are 1*4C1

Total number ways to chose 2 out of 5 are 5c2 = 10.

4 / 10 = 0.4

OR,

P(B/E) = P(E & B)/P(E)

This says that the probability of happening B when E happens is the probability when both happens divided by when E alone happens

1) Find P(E & B)
no of ways to always choose both E & B from 6 subject / no of ways to choose 3 subjects from 6
= 4C1/6C3 = 4/20

2) P(E)
no of ways to always choose E / no of ways to choose 3 subjects from 6
5C2/6C3 = 10/20

P(B/E) = P(E & B)/P(E) = 4/20 * 20/10 = 4/10 = .4

OR,

1/5 + (4/5)*(1/4) = 2/5 = .4

1/5 = Probability of picking B on first try

(4/5)*(1/4) = Probability of picking B on second try

Urn A contain 6 white and 4 black balls. Urn B contains 2 white and 2 black balls. From urn A two balls are selected at random and placed in urn B. From urn B two balls are then selected at random. What is the probability that exactly one of these two balls is white?
Ans:
from **6w 4b**
p(2w) = (6/10)*(5/9) = 5/15 (1)
p(1b1w) = 2*(6/10)*(4/9) = 8/15 (2)
p(2b) = (4/10)*(3/9) = 2/15 (3)
just to check that everything is OK if we sum then we have 1.
now from **2w 2b**

if we add 2 w then we have 4w 2b we want
p(1b1w) = 2*(4/6)*(2/5) = 8/15 (4)
if we add 1 w and 1 b then we have 3w 3b we want
p(1b1w) = 2*(3/6)*(3/5) = 9/15 (5)
if we add 2 b then we have 2w 4b we want
p(1b1w) = 2*(2/6)*(4/5) = 8/15 (6)
so (5/15)*(8/15) + (8/15)*(9/15)+(2/15)*(8/15) = 128/225

Suppose 5 % of Channel inheritants are Cricket fans. Determine the approximate probability that a sample of 100 inheritants will contain at least 3 cricket fans.
Ans:

let cf stand for "cricket fan"
P(cf) = 0.05 so p(not cf)=0.95
p(#cf >= 3)
= 1 - p(#cf=0) - p(#cf=1) - p(#cf=2)
= 1 - (0.95)^100 - (0.05)(0.95)^99 - (0.05)^2(0.9)

How many randomly assembled people do u need to have a better than 50% prob. that at least 1 of them was born in a leap year?
Ans:

Probability that a person, taken at random, born in a leap year: 1/4

Let x be the number of assembled people:

We need that x(1/4)>0.5 ==> x>2 Therefore we need at least 3 people

---

A coin is biased to an extent that head occurs two times as frequently as tail. if this coin is tossed 5 times then what is the probability that head and tail come alternately?
a) 77/81
b)1/81
c)1/16
d)4/81
Ans:

number of heads : number of tails is 2 : 1
so P(head) = 2/3 and P(tail) = 1/3

favorable outcomes are HTHTH or THTHT

ie (2/3)^3 * (1/3)^2 + (1/3)^3 * (2/3)^2 = 4/81

---

a fair deck of 52 playing cards contains 4 suits: diamonds, spades, hearts and clubs. Each suit contains 13 cards.

Column A
Without replacing any cards drawn, the probability of randomly drawing 2 diamonds in a row.

Column B
Without replacing any cards drawn, the probability of randomly drawing a heart, a club and a spade, but not necessarily in that order.
Ans:

column A:
(13/52) * (12/51) = 0.0588
column B:
(39/52) * (26/51) * (13/50) = 0.099

coulmn B is bigger.
on column B they are asking for the probability of getting either:
a heart or a club or a spade therefore 39/52
next card can only be of two diff suits:
26/51
third card can only be of one suit:
13/50

If n is an integer from 1 to 96, what is the probability for n*(n+1)*(n+2) being divisible by 8?

a) 25%
b) 50%
c) 62.5%
d) 72.5%
e) 75%

Ans:

All the even numbers substituted in n*(n+1)*(n+2) are divisible by 8. There are 48 even numbers from 1 to 96.
And the odd numbers that produce the multiples of 8, for ex. 7, when substituted gives a product 7*8*9. There are 12 such odd numbers.
So the probability = (48+12)/96
= 62.5 %

Two cards are drawn from a pack of well-shuffled cards. Find the probability that one is a CLUB and other is an ACE.
Ans:

u hv two cases

1) club and a non-club ace
2) club and a club ace

in case (1)
num ways = C(13,1) . C(3,1) = 39

in case (2)
num ways = C(12,1) . C(1,1) = 12

Total = 51 .... (A)

Total num ways to draw two cards = C(52,2) = 26.51 .... (B)

reqd prob = (a) / (b) = 1/26

A bag of 10 marbles contains 3 red marbles and 7 blue marbles. If two marbles are selected at random, what is the probability that at least one

marble is blue?
A. 21/50
B. 3/13
C. 47/50
D. 14/15
E. 1/5
Ans:
Ok so atleast one blue = 1 - (probability of no blue)
=1 - 1/15 = 14/15

A bag contains six marbles: two red, two blue, and two green. If two marbles are drawn at random, what is the probability that they are the same color?
Ans:
Probability of drawing anything = 1 but if anyone color marble is chosen then there will br only 1 choice of that color left among the 5 marbles. Therefore ans = 1/5

---

how do I find the probability of choosing a number which is a factor of 2 and 8 out of the first 1000 consecutive numbers?
Ans:
every 8th number is a multiple of both 2 and 8 so probability that u will get a multiple of 8 is 1 out of every 8 numbers so 1/8
Any multiple of 8 is a multiple of 2, so the 2 part seems irrelevant. 1000/8 = 125. So there are 125 multiples of 8 from 1-1000. 125/1000 = 1/8

I have 4 types of marbles:
Red: 3
Blue: 5
Green: 4
Cyan: 7

If 8 marbles are picked at random, what is the probability of getting exactly 2 of each color?
Ans:

3c2*5c2*4c2*7c2/19c8

A box contains 100 balls, numbered from 1 to 100. If three balls are selected at random and with replacement from the box, what is the probability that the sum of the three numbers on the balls selected from the box will be odd?
Ans:
(0.5*0.5*0.5) + [3*(0.5 * 0.5* 0.5)]
= 4/8
= 1/2

There are 10 marble balls, including 5 green, 3 blue, and 2 red, in a container. One ball is picked out then put back, then another ball is selected. What is the probability that a green ball and a blue ball will be selected?
Ans:
(1st pick blue AND then green) OR (1st pick green ball and the blue ball)
= 2*(3/10)*(5/10)

In a lottery, there are 10 prizes and 25 blanks. A lottery is drawn at random. What is the probability of getting a prize?
Ans:

10 prizes and 25 blanks

that means total = 35

fav. outcome/total = 10/35 =>

2/7

A jar contains 4 marbles: 2 Red and 2 White.
2 marbles are chosen at random.

Column A: The probability that the marbles chosen are the same color.
Column B: The probability that the marbles chosen are different colors.
Ans:
In both case when chose the first marble there are 4 ways out of 4 marbles..
But in case of chosing the 2nd ball its depends on the colour..
in case of same colour there are only one ways out of 3 marbles.. so in case of SAME colour the probability will be..4/4 * 1/3 => 1/3
in case of Different colour there are only 2 ways out of 3 marbles.. so in case of SAME colour the probability will be..4/4 *2/3 =>2/3

So column **B** is greater.....

OR,
<u>Col A</u>
2/4c2 = 2/6 = 1/3

<u>Col B</u>
2c1*2c1/4c2 = 2/3

<u>Or if taken together</u>
I think even when you draw the marbles both at the same time the probability of having two of a different color is higher. Altogether you have six options:

W1W2
R1R2
W1R1
W1R2
W2R1
W2R2

and thus the probability of having two of different colors is 4/6 while the probability of the same color is 2/6.

If 4 digit numbers greater than 5000 are randomly formed from the digits 0,1,3,5 and 7. What is the probability of forming a number divisible by 5 when the repetition of digits is not allowed?
Ans:
total nos. possible:
5abc, 7abc = 2 * 4p3 = 2 * 24 = 48 total possibilities.
nos. possible that satisfy the req of divisible by 5 are:
5ab0, 7ab0, 7ab5 :
so, 3p2 + 3p2 + 3p2 = 18
thus prabability should be 18/48 = 3/8

In an entrance test that is graded on the basis of two examinations, the probability of a randomly chosen student passing the first examination is 0.8 and the probability of passing the second examination is 0.7. The probability of passing at least one of them is 0.95. What is the probability of passing both?

Ans:

For the second question:

P(A and B) = P(A) + P(B) - P(A or B) = 0.8 + 0.7 - 0.95 = 0.55

P(A or B) = .6 and P(A) = .2
Find P(B) given that events A and B are independent.

Ans:

Isnt P(A and B) = 0 only for mutually exclusive?

For example, look at the probability of the following two events:

Event A: It is Monday
Event B: It is raining

These two events are independent but P(A and B) is not 0. It can rain on a Monday

x = 0.4 + 0.2x => 0.8x = 0.4 => x = 0.5 (P(B) =x)

Throw: ----- Outcome:
-- 1 ---------- Lose $3.00
-- 2 ---------- Lose $2.00
-- 3 ---------- Lose $1.00
-- 4 ---------- No Effect
-- 5 ---------- Win $1.00
-- 6 ---------- Win $5.00

The results of throwing a single die in a certain gambling game are shown in the table above. What is the probability that a player will have won at least $5.00 after two throws?

A) 1/36, B) 1/12, C) 1/9, D) 5/36, E) 1/6

Ans:

well there are 36 options (6*6) and there are 5 ways you can get at least 5:
6 & 5 =6
5 & 6 =6
6 & 4 = 5
4 & 6 =5
6 & 6 =10
so probability is 5/36

Thirteen cards are drawn from pack of 52 cards. The probability that out of 13 cards, 8 belong to the same suit is ?

Ans:

i think when it is given specifically that there shuld be 8 cards and not atleast 8 cards we can take 4C1*13C8*39C5/52C13

I have 6 coins of different denominations in my pocket. If i take them out of my pocket one after another, what is the probability of taking out the 6

coins in descending order of their denominations?

Ans: 6 coins can be taken from the pocket one after the other in 6! ways out which there will be only one way of taking out the coins in descending order of their denominations. Hence the probability is 1/720.

In a function if 20 speakers give their speech, what is the probability that a speaker A will speak before speaker B?

Ans:

for any combination of 20 man A and B can themselves have only two choices. Either A is before B or B is before A. So, its 1/2.

Two couples and one single person are seated at random in a row of five chairs. What is the probability that neither of the couples sits together in adjacent chairs?

Ans:

The probabilty equal (1 - probability of one couple sitting together - probability of the other couple sitting together + the probability of both couple sitting together)

=1 - (2x4!)/5! -(2x4!)/5! + (4x3!)/5! = 2/5

A man speaks the truth 3 out of 4 times. He throws a die and reports it to be a 6. What is the probability of it being a 6?

Ans:

P(S|R)=(P(R|S)*P(S)) / P(R)

So,

P(R|S)*P(S)=(1/6*3/4)

P(R) is interesting. It is the probability that the person spoke the truth and it was 6 and the person lied and said it was 6and it was something else

so that would be (1/6*3/4) +the person lied and said it was 6 and it was something else

The probability that it was something else is (1/6)*5.

For every number, 1-5, the person can select from 5 other numbers to lie. so , the probabilty that the person lied and said it was 6 is

1/6*5*1/5 *1/4=1/6*1/4 (1/4 is the prob. of lying)

That brings us back to

(1/6*3/4) / {1/6*3/4)+(1/6*1/4)}

Solving this comes to 3/4.

OR,

Step 1: Let's assume that the man throws the die 120 times, in which he gets a 1, a 2, a 3, a 4, a 5 and a 6 20 times each.

He will report 120 times.

Step 2: Let's call the times he reports a 6 is M, the times it's really a 6 out of M times is N.

Now the probability we must calculate is:

x=N/M.

Step 3: (Calculating M, N)

In 20 times he gets a 1, he will report it to be a 1 itself 15 times (=20*(3/4)). In 5 times remained he will not report a 1 again, therefore the probability of him speaking each of a 2 to a 6 is 1/5 => he will report a 2 to a 6, each 1 time (=5*(1/5)).

So in those 20 times he gets a 1, he will report it to be a 6 1 time.

Similarly for 20 times he gets a 2, a 3, a 4, a 5, he will report it to be a 6 1 time.

We already have 5 times he speaks a 6 out of 100 times. In those 5 times there is 0 time it **is** really a 6. (1)

In the last 20 times he gets a 6, he will speak the truth 75% => the number of times he report a 6 itself is 15 times (=20*(75%)). In those 15 times there are 15 times it **is** really a 6. (2)

From (1) and (2) we have

M= 5+15 = 20 (times)
N= 0+15 =15 (times)

Step 3: The answer is

x = N/M =3/4.

Bill has a small deck of 12 playing cards made up of only 2 suits of 6 cards each. Each of the 6 cards within a suit has a different value from 1 to 6; thus, there are 2 cards in the deck that have the same value. Bill likes to play a game in which he shuffles the deck, turns over 4 cards, and looks for pairs of cards that have the same value. What is the chance that Bill finds at least one pair of cards that have the same value?
Ans:
first card 12/12 = 1
second card take away duplicate (-1 pair) choose from 10/11
third card take away 2nd duplicate (-2 pairs) choose from 8/10
fourth card take away 3rd duplicate (-3 pairs) choose from 6/9

OR,

prob(no pair in the card) = no of ways of choosing 4 different valued cards / no of ways of choosing 4 cards from deck of 12 cards.

no of ways of choosing 4 cards from deck of 12 cards= 12C4

no of ways of choosing 4 different cards from value 1 to 6= 6C4
but each card can be of different color so 2^4 ways for each combination of 4 different cards. total no of ways = 16*6C4

prob= 16*6c4 /12c4= 16/33

required probability = 1- 16/33= 17/33

In a room filled with 7 people, 4 people have exactly 1 friend in the room and 3 people have exactly 2 friends in the room (Assuming that friendship is a mutual relationship, i.e. if John is Peter's friend, Peter is John's friend). If two individuals are selected from the room at random, what is the probability that those two individuals are NOT friends?

Ans:
4/7*5/6 is the probability of selecting a person with only one friend (4/7) and then selecting anyone but the friend (5/6).
3/7*4/6 is the probability of selecting a person with two friend (3/7) and then selecting anyone but the friends (4/6).

(4/7)(5/6) + (3/7)(4/6) = 32/42 = 16/21.

OR,

There're 21 mutually exclusive friendship relationships in total

7!/(2! 5!) = 21

We are told that 4 people have exactly 1 friend. This would account for 2 "friendship" relationships (e.g. AB and CD). We are also told that 3 people have exactly 2 friends. This would account for another 3 "friendship" relationships (e.g. EF, EG, and FG). Thus, there are 5 total "friendship" relationships in the group.
The probability that any 2 individuals in the group are friends is 5/21. The probability that any 2 individuals in the group are NOT friends = 1 – 5/21 = 16/21.

A certain roller coaster has 3 cars and a passenger is equally likely to ride in any of the 3 cars each time that passenger rides the roller coaster. If a certain passenger is to ride the roller coaster 3 times, what is the probability that the passenger will ride in each of the cars?

Ans:
p = favourable/possible

possible =

1st time any of the 3 so 3
2nd time any of the 3 so 3
3rd time any of the 3 so 3

total possible = 3*3*3

favourable =

1st time any of the 3 so 3
2nd time remaining 2 so 2
3rd time remaining 1 so 1

total favourable = 3*2*1

p = f/t
3*2*1/3*3*3

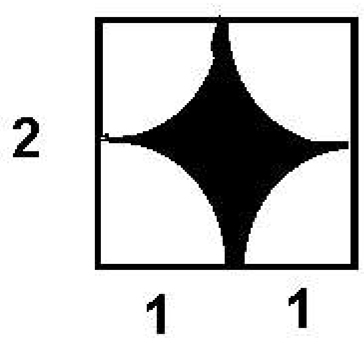
6/27
2/9

OR,

say person goes in 2 the first round
in the second round he should go in either 1st or 3rd with p = 2/3
in the third round goes in the one that's left with p=1/3
so p = 2/9

---

one point inside a square of side 2 cm is taken randomly. whats the probability of it being away from all corners by atleast 1 cm?
Ans:



Well.. the problem seems to be simple if observed careful..

Area of Square = 4
Area of Unshaded = 4 - 3.14 = 0.86

Sample space = 4.. and P(A) = 0.86

i suspect that Probabability of point away from all corners by more than 1 cm is 0.86/4 = 0.215

From the word ANTALYA meaningless words are to be formed. What is the probability **that the word will begin with N and will end with Y?**
Ans:
Actually, there are at least 2 or 3 other ways that the problem can be solved (all require more than 2 minutes). However logic says: The **probability** that N is in the first slot is 1/7 and the **probability** that Y comes last (GIVEN that N is first) is 1/6. Thus, p=1/42.

The median of five numbers is 15. The mode is 6. The mean is 12. What are the five numbers?
Ans:
6, 6, 15, 16, 17

A membership of 620 people shows that 31 of them have first and last name begining with same letter. If a person is selected at random then whats the probability that the person choosen doesnt has his first and last name begining with the same letter.
0.05, 0.25, 0.50 , 0.75, 0.95

Ans:
1-(31/620) = 1-(1/20) = 1-0.05 = 0.95

A guy throws a pair of dice. If he doesn't get the sum as even number, he throws the dice again and again untill he gets it. And then he tosses the coin. What is the probability of him getting a head?
Ans:
prob even = 1/2
prob odd = 1/2

prob head = 1/2
prob tail = 1/2

independent events!

answer: ½

S is a set of all prime numbers less than 10.If a number is selected from the set at random and then another number, not necessarily different, what is the probability that the sum of the two randomly selected numbers is odd ?
Ans:
Set of Primes < 10 = {2,3,5,7}
Number of ways of selecting 2 numbers with repetitions = 4 * 4 = 16
We need to select 2 exactly once to get an odd sum (either 2X or X2) = 3+3 = 6

Answer: 6/16 = 3/8

OR,

<u>case1</u> first number 2 with p=1/4 the other number is odd p=3/4
<u>case2</u> reverse order
p=1/4*3/4 + 3/4*1/4 = 3/8

How many randomly assembled people do u need to have a better than 50% prob. that at least 1 of them was born in a leap year?
Ans:
Prob. of a randomly selected person to have NOT been born in a leap yr = 3/4
Take 2 people, probability that none of them was born in a leap = 3/4*3/4 = 9/16.
The probability at least one born in leap = 1- 9/16 = 7/16 < 0.5
Take 3 people, probability that none born in leap year = 3/4*3/4*3/4 = 27/64.
The probability that at least one born = 1 - 27/64 = 37/64 > 0.5
Thus min 3 people are needed.

A man has invited 7 for the party. 3 are his close friends. 4 others. He has to give two prize them. what is the probability that the 2 of them will be his close friends?
Ans:
3C2/7C2 = **1/7**.

---

5 girls and 3 boys are arranged randomly in a row. Find the probability that:
A) there is one boy on each end.
B) There is one girl on each end.
Ans:
For the first scenario:
A) there is one boy on each end.

The first seat can be filled in 3C1 (3 boys 1 seat) ways = 3

the last seat can be filled in 2C1 (2 boys 1 seat) ways = 2
the six seats in the middle can be filled in 6! (1 boy and 5 girls) ways
Total possible outcome = 8!
Probability= (3C1 * 2C1 * 6!)/ 8! = 3/28

For the second scenario:
A) there is one girl on each end.

The first seat can be filled in 5C1 (5 girls 1 seat) ways = 5
the last seat can be filled in 4C1 (2 girls 1 seat) ways = 4
the six seats in the middle can be filled in 6! (3 boys and 3 girls) ways
Total possible outcome = 8!
Probability= (5C1 * 4C1 * 6!)/ 8! = 5/14

There are 8 students. 4 of them are men and 4 of them are women. If 4 students are selected from the 8 students. What is the probability that the number of men is equal to that of women?
A.18/35 B16/35 C.14/35 D.13/35 E.12/35
Soln: there has to be equal no of men & women so out of 4 people selected there has to be 2M & 2W.
Total ways of selecting 4 out of 8 is 8C4
total ways of selecting 2 men out of 4 is 4C2
total ways of selecting 2 women out of 4 is 4C2

so probability is (4C2*4C2)/ 8C2 = 18/35

A business school club, Friends of Foam, is throwing a party at a local bar. Of the business school students at the bar, 40% are first year students and 60% are second year students. Of the first year students, 40% are drinking beer, 40% are drinking mixed drinks, and 20% are drinking both. Of the second year students, 30% are drinking beer, 30% are drinking mixed drinks, and 20% are drinking both. A business school student is chosen at random. If the student is drinking beer, what is the probability that he or she is also drinking mixed drinks?
A. 2/5
B. 4/7
C. 10/17
D. 7/24
E. 7/10
Soln: The probability of an event A occurring is the number of outcomes that result in A divided by the total number of possible outcomes.

The total number of possible outcomes is the total percent of students drinking beer.

40% of the students are first year students. 40% of those students are drinking beer. Thus, the first years drinking beer make up (40% * 40%) or 16% of the total number of students.

60% of the students are second year students. 30% of those students are drinking beer. Thus, the second years drinking beer make up (60% * 30%) or 18% of the total number of students.

(16% + 18%) or 34% of the group is drinking beer.

The outcomes that result in A is the total percent of students drinking beer and mixed drinks.

40% of the students are first year students. 20% of those students are drinking both beer and mixed drinks. Thus, the first years drinking both beer and mixed drinks make up (40% * 20%) or 8% of the total number of students.

60% of the students are second year students. 20% of those students are drinking both beer and mixed drinks. Thus, the second years drinking both beer and mixed drinks make up (60% * 20%) or 12% of the total number of students.

(8% + 12%) or 20% of the group is drinking both beer and mixed drinks.

If a student is chosen at random is drinking beer, the probability that they are also drinking mixed drinks is (20/34) or 10/17.

Find the probability that a 4 person committee chosen at random from a group consisting of 6 men, 7 women, and 5 children contains
A) exactly 1 woman
B) at least 1 woman
C) at most 1 woman
Soln:
A) 7C1* 11C3/ 18C4
B) 1 - (11C4/18C4)
C) (11C4/18C4) + (7C1*11C3/18C4)

A serial set consists of N bulbs. The serial set lights up only if all the N bulbs are in working condition. Even if one of the bulbs fails then the entire set fails. The probability of a bulb failing is x. What is the probability of the serial set failing?
Ans:
Probability of x to fail. Probability of a bulb not failing = 1-x
probability that none of the N bulbs fail, hence serial set not failing = (1-x)^N
probability of serial set failing = 1-(1-x)^N

As a part of a game, four people each much secretly chose an integer between 1 and 4 inclusive. What is the approximate likelihood that all four people will chose different numbers?
Soln:
The probability that the first person will pick unique number is 1 (obviously) then the probability for the second is 3/4 since one number is already picked by the first, then similarly the probabilities for the 3rd and 4th are 1/2 and 1/4 respectively. Their product 3/4*1/2*1/4 = 3/32

From a group of 3 boys and 3 girls, 4 children are to be randomly selected. What is the probability that equal numbers of boys and girls will be selected?
A. 1 / 10
B. 4 / 9
C. 1 / 2
D. 3 / 5
E. 2 / 3
Ans:
Total number of ways of selecting 4 children = 6C4 = 15

with equal boys and girls. => 2 boys and 2 girls. => 3C2 * 3C2 = 9.

Hence p = 9/15 = 3/5

A bag contains 3 red, 4 black and 2 white balls. What is the probability of drawing a red and a white ball in two successive draws, each ball being put back after it is drawn?
(A) 2/27
(B) 1/9
(C) 1/3
(D) 4/27
(E) 2/9

Ans: Case I: Red ball first and then white ball

P1 = 3/9*2/9= 2/27

Case 2: White ball first and then red ball

P2 = 2/9*3/9 = 2/27

Therefore total probability: p1 + p2 = 4/27

A and B alternately toss a coin. The first one to turn up a head wins. if no more than five tosses each are allowed for a single game.

1- Find the probability that the person who tosses first will win the game?

2- What are the odds against A's losing if she goes first?

Ans**:**

look at the conditions; it says that the first person who tosses a head wins.

Let's say A tosses first.

what is the probability that he wins

H + TTH + TTTTH + TTTTTTH + TTTTTTTTH

i.e. either the first toss is head,
or the first time A tosses the coin he gets a tail and B also gets a tail , n in the second throw A gets a head.....

This continues for a max till 5 throws, because the game is for 5 throws only.
So,

1. 1/2 + (1/2)^3 + (1/2)^5 + (1/2)^7 + (1/2)^9

2. (1/2)^2 + (1/2)^4 + (1/2)^6 + (1/2)^8 + (1/2)^10

My name is AJEET. But my son accidentally types the name by interchanging a pair of letters in my name. What is the probability that despite this interchange, the name remains unchanged?
Ans:

There are actually 20 ways to interchange the letters, namely, the first letter could be one of 5, and the other letter could be one of 4 left. So total pairs by product rule = 20.

Now, there are two cases when it wouldn't change the name. First, keeping them all the same. Second, interchanging the two EEs together. Thus 2 options would leave the name intact.

Prob = 2/20 = 0.1, or 10%.

Three letters are selected at random from the word SCHOOL. Find the probability that the selection
a) does not contain the letter O
b) contains both the letters O.

Ans:

we have 3 cases
xxx --> 3 letters excluding O so 4C3 = 4
Oxx -->take one O and chose from 4 other letters 2, so 4C2 = 6
OOx -->take two O's and choose from 4 other letters 1, so 4C1 = 4
so total # of cases is 4+6+4 = 14 and combining statements we get required probabilities.
One could say here. Isn't the denominator 6C3=20 since we choose 3 letters out of 6? Answer is no since when we speak about combinations we speak about selecting out of DIFFERENT objects (all objects different)

So total no of combinations without restrictions is 6c3 = 20. This contains picks with 2 Os (no repetition here), picks with only O1 and picks with only O2. So, the duplication is betn 'only O1' & 'only O2' ..

P(only O1) = _ _ O. This can be done in 4C2 ways = 6. So, subtract this from 20.
So, no of ways to pick 3 from 6 is 14.
P(no O) = 4/14 (4C3)
P(both O) = 4/14 (4C1)

In a certain school, 40% of the students are male and 20% of the male are members of a committee. If 10% of the committee members are from senior grade, what is the probability that a student selected from the total students randomly is a senior student?
Ans:
lets take: tot. number of students=100
Males would be 40
members of a committee= 8
senior grade=0.8

P=0.8/100=0.008

---

when tossed , a certain coin has equal probability of landing on either side. If the coin is tossed 3 times .what is the probability that it will land on the same side each time ?
Ans:
we can have HHH or TTT so (1/2)^3+(1/2)^3=1/4

In a certain city 6% of teenagers are married, 25% of married teenagers have children, and 15% of unmarried teenagers have children. If a teenager has a child, what is the probability that the teenager is not married?

a. 0.156
b. 0.200
c. 0.500
d. 0.904
e. 0.940

Ans:

If there are 100 teenagers in the city 6 are married. So 94 are unmarried.

6x0.25=1.5 have children (married teenager)
94x0.15=14.1 have children (unmarried teenager)

Now the question is if the teenager has a child, what is the prob that she is Unmarried.

Prob =
= Unmarried teenagers with child/Total teenagers with child
= 14.1/(1.5+14. 1)
= 14.1/15.6
= 0.904

In jar A there are 3 white balls and 2 green ones, in jar B there is one white ball and three green ones. A jar is randomly picked, what is the probability of picking up a white ball out of jar A?

Ans:

The probability of picking the first jar is ½, the probability of picking up a white ball out of jar A Is 3/(3+2) = 3/5. The probability of both events is 1/2 x 3/5 = 3/10.

Out of a box that contains 4 black and 6 white mice, three are randomly chosen. What is the probability that all three will be black?

Ans:

The probability for the first one to be black is: 4/(4+6) = 2/5. The probability for the second one to be black is: 3/(3+6) = 1/3. The probability for the third one to be black is: 2/(2+6) = 1/4. The probability for all three events is (2/5) x (1/3) x (1/4) = 1/30.

The probability of pulling a black ball out of a glass jar is 1/X. The probability of pulling a black ball out of a glass jar and breaking the jar is 1/Y. What is the probability of breaking the jar? a) 1/(XY). b) X/Y. c) Y/X. d) 1/(X+Y). e) 1/(X-Y).

Ans:

Let Z be the probability of breaking the jar, therefore the probability of both events happening is Z x (1/X) = (1/Y). Z = X/Y.

Danny, Doris and Dolly flipped a coin 5 times and each time the coin landed on "heads". Dolly bet that on the sixth time the coin will land on "tails", what is the probability that she's right?

Ans:

The probability of the coin is independent on its previous outcomes and therefore the probability for "head" or "tail" is always ½.

In a blue jar there are red, white and green balls. The probability of drawing a red ball is 1/5. The probability of drawing a red ball, returning it, and then drawing a white ball is 1/10. What is the probability of drawing a white ball?

Ans:

Indicate A as the probability of drawing a white ball from the jar. The probability of drawing a red ball is 1/5. The probability of drawing both events is 1/10 so, 1/5 x A = 1/10. Therefore A = ½.

Out of a classroom of 6 boys and 4 girls the teacher picks a president for the student board, a vice president and a secretary. What is the probability that only girls will be elected?
Ans:
The basic principle of this question is that one person can't be elected to more than one part, therefore when picking a person for a job the "inventory" of remaining people is growing smaller. The probability of picking a girl for the first job is 4/10 = 2/5. The probability of picking a girl for the second job is (4-1)/(10-1) = 3/9. The probability of picking a girl for the third job is (3-1)/(9-1) = 1/4. The probability of all three events happening is: 2/5 x 3/9 x ¼ = 1/30.

Two dice are rolled. What is the probability the sum will be greater than 10?
Ans:
When rolling two dice, there are 36 possible pairs of results (6 x 6). A sum greater than 10 can only be achieved with the following combinations: (6,6), (5,6), (6,5). Therefore the probability is 3/36 = 1/12.

The probability of having a girl is identical to the probability of having a boy. In a family with three children, what is the probability that all the children are of the same gender?
Ans:
(1/2)^3 + (1/2)^3 = 1/4

On one side of a coin there is the number 0 and on the other side the number 1. What is the probability that the sum of three coin tosses will be 2?
Ans:
The coin is tossed three times therefore (2 x 2 x 2). We are interested only (0,1,1), (1,0,1), (1,1,0). The probability requested is 3/8.

In a jar there are balls in different colors: blue, red, green and yellow. The probability of drawing a blue ball is 1/8. The probability of drawing a red ball is 1/5. The probability of drawing a green ball is 1/10. If a jar cannot contain more than 50 balls, how many yellow balls are in the Jar?
a) 23. b) 20. c) 24. d) 17. e) 25.
Ans: LCM (8,5,10) = 40.
If 1/8 is the probability of drawing a blue ball then there are 40/8 = 5 blue balls in the jar. And with the same principle there are 8 red balls and 4 green ones. 40 – 5 – 8 – 4 = 23 balls (yellow is the only color left).

In a jar there are 3 red balls and 2 blue balls. What is the probability of drawing at least one red ball when drawing two consecutive balls randomly?
a) 9/10 b) 16/20 c) 2/5 d) 3/5 e) ½
Ans:
Since we want to draw at least one red ball we have four different possibilities: 1. Drawing blue-blue. 2. Drawing blue-red. 3. Drawing red-blue. 4. Drawing red-red. There are two ways to solve this question: One minus the probability of getting no red ball (blue-blue): 1-2/5 x ¼ = 1-2/20 = 18/20 = 9/10/ Or summing up all three good options: Red-blue --> 3/5 x 2/4 = 6/20. Blue-red --> 2/5 x ¾ = 6/20. Red-red --> 3/5 x 2/4 = 6/20. Together = 18/20 = 9/10.

John wrote a phone number on a note that was later lost. John can remember that the number had 7 digits, the digit 1 appeared in the last

three places and 0 did not appear at all. What is the probability that the phone number contains at least two prime digits?
Ans:
Since 1 appears exactly three times, we can solve for the other four digits only. For every digit we can choose out of 8 digits only (without 1 and 0). Since we have 4 prime digits (2, 3, 5, 7) and 4 non-prime digits (4, 6, 8, 9), the probability of choosing a prime digit is ½. We need at least two prime digits: One minus (the probability of having no prime digits + having one prime digit): There are 4 options of one prime digit, each with a probability of (1/2)^4. There is only one option of no prime digit with a probability of (1/2)^4. So: [1- ((1/2)^4+(1/2)^4*4)] = 11/16.

What is the probability for a family with three children to have a boy and two girls (assuming the probability of having a boy or a girl is equal)?
Ans:
There are three different arrangements of a boy and two girls:(boy, girl, girl), (girl, boy, girl), (girl, girl, boy). Each has a probability of (1/2)3. The total is 3*(1/2)3=3/8.

What is the probability of getting a sum of 12 when rolling 3 dice simultaneously?
Ans:
(1.5.6) -> 3!
(2,4,6) -> 3!
(3,3,6) -> 3!/2!
(3,4,5) -> 3!
(4,4,4) -> 1
(5,5,2) -> 3!/2!

Summing up -> 3*3!+2*3!/2!+1 = 25

Probability = 25/6^3 = 25/216

A drawer holds 4 red hats and 4 blue hats. What is the probability of getting exactly three red hats or exactly three blue hats when taking out 4 hats randomly out of the drawer and returning each hat before taking out the next one?
Ans:
Getting three red out of 4 that are taken out has 4 options (4!/(3!*1!)) each option has a probability of (1/2)4 since drawing a red or blue has a 50% chance. 4*1/16= ¼ to get three red hats. The same goes for three blue hats so ¼+¼ =1/2.

In a department store prize box, 40% of the notes give the winner a dreamy vacation; the other notes are blank. What is the approximate probability that 3 out of 5 people that draw the notes one after the other, and immediately return their note into the box get a dreamy vacation?
Ans:
The chance of winning is 0.4 and it stays that way for all people since they return their note. The number of different options to choose 3 winners out of 5 is 5!/(3!*2!) = 10. Each option has a chance of 0.4*0.4*0.4*0.6*0.6 = 0.02304 * 10 = 0.2304.

A buyer buys 3 different items out of the newly introduced 10 different items. If two items were to be selected at random, what is the probability that the buyer does not have both the chosen items?
Ans:

Number of ways 2 can be selected without taking the three in question. : 7C2
Number of ways 2 can be selected out of 10 = 10C2 Prob. = 7C2/10C2 = 21/45 = 7/15

A certain junior class has 1,000 students and a certain senior class has 800 students. Among these students, there are 60 sibling pairs, each consisting of 1 junior and 1 senior. If 1 student is to be selected at random from each class, what is the probability that the 2 students selected will be a sibling pair?
A) 3/40,000
B)1/3,600
C)9/2,000
D)1/60
E)1/15
Ans:
The first member you picked has only ONE sibling, not 60.
60/1000 * 1/800 = 60/800,000 = 3/40,000

There are three secretaries who work for four departments. If each of the four departments has one report to be typed out, and the reports are randomly assigned to a secretary, what is the probability that all three secretaries are assigned at least one report?
Ans
Total no of ways: 3^4
1st sec can get a report in 4c1 ways = 4
2nd sec ....3c1 way = 3
3rd sec...........................2c1 way = 2
last can be distributed to any of the three = 3
So probability is = 4*3*2*3/ 3^4 = 8/9

From (1, 2, 3, 4, 5, 6), one number is picked out and replaced and one number is picked out again. If the sum of the 2 numbers is 8, what is the probability that the 2 numbers included the number 5?
Ans:
It is already given that sum is 8. So total number of events is 5 i.e. (2,6) (6,2) (3,5) (5,3) (4,4) Events in which 5 is included 2. So probability = 2/5.

Set *S* is the set of all prime integers between 0 and 20. If three numbers are chosen randomly from set *S* and each number can be chosen only once, what is the positive difference between the probability that the product of these three numbers is a number less than 31 and the probability that the sum of these three numbers is odd?
Ans:
8 prime nos. One of them is even. So, the only way to have an odd sum is to have all three numbers odd.

P(Odd) = 7C3/8c3.
P(Product less than 31) = 1/8c3
=> 34/56 = 17/28

A and B throw a die alternately till one of them gets a '6' and wins the game. Find their respective probabilities of winning if A starts first.
Ans:
A takes the odd terms -- 1, 3, 5, 7,...
B takes the even terms -- 2, 4, 6, 8,...
so it's ABABABABAB........ infinity

Let AW = A wins, BW = B wins

Assuming we know P(AW), the calculation of P(BW) would be identical (don't have to worry about the end points b/c both sequences theoretically have infinite terms) except it needs to be multiplied by an extra 5/6 factor resulting from the fact the entire sequence is conditioned on the fact that A didn't roll a 6 the first time.
Know P(AW) + P(BW) = 1 <-- either AW or BW, so they're complementary events
P(AW) + (5/6)P(AW) = 1 => P(AW) = 6/11
P(BW) = 1 - 6/11 = 5/11

the tedious (easier?) way -
P(AW) = P(A rolls 6 on 1st) + P(A rolls 6 on 3rd | no 6 yet) + P(A rolls 6 on 5th | no 6 yet)+.....
= (1/6) + (5/6)^2*(1/6) + (5/6)^4*(1/6) + (5/6)^6*(1/6) +.....
= 1/6 [1 + (25/36)^1 + (25/36)^2 + (25/36)^3 +...]
= 1/6 * (1 / (1 - 25/36)) = 1/6 * 36/11 = 6/11
P(BW) = 1 - 6/11 = 5/11

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urn A contains 6 red and 4 black balls and urn B contains 4 red and 6 black balls.one ball is drawn at random from urn A and placed in urn B and then one ball is drawn at random from urn B and placed in urn A . if one ball is now drawn from urn A ,the probability that it is red is?

Ans:
Let A and B be the urns,

RED and BLUE are balls

now following events are possible:

A -Red
B -Red

6/10 x 5/11 x 6/10

A -Red
B- Blue

6/10 x 6/11 x 5/10

A -Blue
B -Red

4/10 x 4/11 x 7/10

A -Blue
B -Blue

4/10 x 7/11 x 6/10

on calculating the probabilities and summing them up - its 32/55

A box contains 100 balls, numbered from 1 to 100. If three balls are selected at random and with replacement from the box, what is the probability that the sum of the three numbers on the balls selected from the

box will be odd?
A) 1 / 4
B) 3 / 8
C) 1 / 2
D) 5 / 8
E) ¾
Ans:
We may draw odd or even number with the same probability.
We can have 8 possible combinations to draw 3 numbers which are o or e.
Only 4 combinations sastisfy the condition:
o+o+o
e+e+o
o+e+e
e+o+e
Thus, the probability is 4/8 = ½

In an insurance company, each policy has a paper record and an electric record. For those policies having incorrect paper record, 60% also having incorrect electric record; For those policies having incorrect electric record, 75% also having incorrect electric record. 3% of all policies have both incorrect paper and incorrect electric records. If we randomly pick out one policy, what's the probability that the one having both correct paper and correct electric records?
(A)0.80 (B)0.94 (C)0.75 (D)0.88 (E)0.92
Ans:
Let x = incorrect paper record
y = incorrect electric record

Incorrect paper record also having incorrect electric record (common set)=0.6x
Incorrect electric record also having incorrect paper record (common set)=0.75y

so, 0.6x=0.75y
x=5/4 y

Now, let T= total policy
Common set=0.03T
So,
0.03T=0.6x=0.75y
x=T/20
y=T/25
So total number of Incorrect paper record and Incorrect electric record
T/20+T/25-0.03T
=3T/50
So total number of correct paper record and correct electric record

=T-3T/50 = 47T/50

So, probability = 47/50=0.94

OR,

Let B = Incorrect both Records
IP = Incorrect Paper Records
IE = Incorrect Electronic Records

C = Correct

Given B = 3%
Out of IP, 60% are IE, meaning ... (.6)*IP = B --> (.03)
Therefore, IP = (.03)/(.6) = (.05)

Similarly, out of IE, 75% are IP, meaning ... (.75)*IE = B --> (.03)
Therefore, IE = (.03)/(.75) = (.04)

Using Sets ...
IP U IE = IP + IE - B
= (.05) + (.04) - (.03) = (.06)

C = 1 - (IP U IE) = 1 - .06 = .94

OR,

P(E and P)=0.03 ||| P(E | P)=0.6 ||| P(P | E)= 0.75 ||| P(P)=0.03/0.6=0.05 |||
P(E)=0.03/0.75=0.04
P(E')=1-P(E)=0.96
P(P' and E') = P(P' | E') * P(E') = [1-P(P | E')]*P(E') = [1-P(E' |
P)*P(P)/P(E')]*P(E')=[1-0.4*0.05/0.96]*0.96=0.94

If 2 numbers a and b are chosen at random from the set {1,2,3.....9,10} with replacement. What is the probability that the roots of the quadratic equation x^2 + ax + b = 0 has real roots?
A) 1/2
B) 31/50
C) 17/41
D) 9/100
E) 7/11
Ans:
For real roots the discriminant of a quadratic equation should be greater than or equal to zero.
so .. a^2-4*1*b >= 0
a^2 >= 4b
(a/2)^2 >= b ---1

Following pairs satisfy the inequality 1.

a = 2 b = 1
a = 3 b = 1,2
a = 4 b = 1,2,3,4
a = 5 b = 1,2,3,4,5,6
a = 6 b = 1,2,3,4,5,6,7,8,9
a = 7 b = 1,2,3,4,5,6,7,8,9,10
a = 8 b = 1,2,3,4,5,6,7,8,9,10
a = 9 b = 1,2,3,4,5,6,7,8,9,10
a = 10 b = 1,2,3,4,5,6,7,8,9,10

so out of 100 (10*10), a total of 62 ordered pairs fulfill the condition.
hence P(E) = 62/100 or 31/50.

10% of the people in a certain population use an illegal drug. A drug test yields the correct result 90% of the time, whether the person uses drugs or not. A random person is forced to take the drug test and the result is positive. What is the probability he uses drugs?
a)1/2 b)1/3 c) 1/9 d) 1/8
Ans:
Assume 100 people (10 D ; 90 Non D)
...of the 10 D:
# of correct results (i.e. actual number of D) = 10 x 90% = 9
# of incorrect results(i.e. actual number of Non D) = 10 x 10% = 1

...of the 90 Non D:
# of correct results (i.e. actual number of Non D) = 90 x 90% = 81
# of incorrect results (i.e. actual number of D) = 90 x 10% = 9

Prob that a random person uses a drug
= correct positive/ (correct positive + incorrect positive)
= 9/(9+9) = 1/2

There are ants at each vertex of a triangle and they all simultaneously crawl along a side of the triangle to the next vertex. The probability that no two ants will encounter one another is 2/8, since the only two cases in which no encounter occurs is when all the ants go left, i.e., clockwise -- LLL -- or all go right, i.e., counterclockwise -- RRR. In the six other cases -- RRL, RLR, RLL, LLR, LRL, and LRR -- an encounter occurs.

If there is an ant at each vertex of a cube and the ants all simultaneously move along one edge of the cube to the next vertex, each ant choosing its path randomly, what is the probability that no two ants will encounter one another, either on route or at the next vertex?
Ans:
Each ant can move in three ways, so the eight ants can move in 3^8 ways. For example, the reference at position (0,0,0) could move to (1,0,0), (0,1,0), or (0,0,1). If it moves along one of the two edges bordering the left face, it will force the other three ants who start at the other three vertices of that face to move along the edges to the next vertices. The other four ants must stay on the edges bordering the right face, so they could rotate in either of the two directions. Thus there are four ways the ants could move so that the one at (0,0,0) could stay on the left face. Similarly, there are four ways the ants could move so that the reference ant could stay on the bottom face and four ways they could move so that the reference ant stays on the back face. TOTAL=12

So I get 12/(3^8) as the required probability.

An access card code has 10 digits. Gretchen does not remember the last two digits, but she knows they are from the set 3, 4, 6, 8 or 9.
What is the probability to guess the code in at most 2 attempts?
(A) 1/625
(B) 2/625
(C) 4/625
(D) 25/625
(E) 50/625
Ans:

P(one attempt)=1/25
p(exactly two attempts)=P(not first attempt)*P(second attempt/not first attempt)=(24/25)*(1/24)=1/25
P(at most two attempts)=2/25 (E)

It is probably easier to see it as a random selection , without replacement, of 2 of the 25 possible endings, one of which corresponds to the code. As the probability that any one ending corresponds to the code is 1/25, the desired probability is 2/25

Some toys include large, middle, and small model with red, yellow, green, or blue color. If numbers of all model-color combinations are the same, for example, number of red large toys is equal to number of green little toys. A boy wants a red-large toy. If his mother select one for him at random, what is the probability that at least one of the color and model will satisfy the boy?
Ans:
Total no of outcomes = 3*4=12
Desired outcomes= 3 out comes with Red (includes Large+Red also) + Large models with other 3 colours = 6

Ans: 6/12=1/2.

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n is a 3 digit integer chosen at random. k is the integer that results when the hundreds and units digits of n are switched. For example, if n=143, k=341 and if n=870, k=78. To the nearest percentage point, what is the probability that |n-k|<600?
Ans:
Let the 3 digit no be : 100x + 10y + z.
|n-k| = 99.|(x-z)| < 600
Therefore, |x-z| <= 6
So, its only dependent on the first and last digit. There are only 3 combinations for which the diff between first and last digit will be greater than 6. ie. (1,8), (1,9) and (2,9)
Total combinations of first and last digit = 9.10 = 90
Total combinations which will have diff between first and last < 6 = 90 - 3 = 87

Therefore, probability that |n-k| < 600 = 87/90.

A 7 digit Telephone Number has the digit 0 exactly 3 times and the number 1 is not used at all. What is the probability that the phone number contains one or more prime digits?
A) 1/24
B) 1/16
C) 1/2
D) 15/16
E) 23/24
Ans:
A simple answer choice isn't much help. The poster likely has the correct answer. Four of the seven digits are not 0's or 1`s. Of the remaining 8 choices for each digit {2,3,4,5,6,7,8,9}, 4 of them are prime numbers. Thus the probability that any one of these four undetermined numbers in the telephone number is prime is 1/2. The probability that at least one is prime= 1- probability that they are all non-prime i.e 1-(1/2)^4=15/16

Involved a figure:- a square MNOP is plotted on x-y plane, vertex are (0,0) (0,4) (4,0) and (4,4) the points aren't shown as (0,0) and all, but the graph

is divided in parts so for sake of explaining i have put the vertex. There is a triangle in this square with vertex (0,0) (3,3) and (4,0). The question is:- what is the probability that if a point is randomly selected, will lie within the triangular region.. Answer choices.. (1/8, 1/5, 1/6)

Ans:

area of triangle
--------------- = 3/8 = prob(event)
area of square

area of triangle = 4*3/2 = 6
area of square = 4* 4 = 16

so the prob(e) = 6/16 = 3/8

A group of 6 is chosen from 8 men and 5 women so as to contain at least 2 men and 3 women. How many different groups can be formed if two of the men refuse to serve together?

a) 3510
b) 2620
c) 1404
d) 700
e) 635

Ans:
There are two possibilities,
1) group of 3men and 3 women
2) group of 2 men and 4 women

now for 1) total cases are:

6c3*5c3 + 6c2*2c1*5c3

6c3 is the number of ways to pick 3 men from 6 (excluding the 2 men)
5c3 is the ways to pick 3 women from 5

6c2*2c1 is the case when 2 men are picked from remaining 6 men and 1 is picked from those 2.

Similarly in the second case when there are 2 men and 4 women:
6c2*5c4 + 6c1*2c1*5c4

adding 1 and 2 we get 635.

A fair coin is tossed 5 times. What is the probability of getting at least three heads on consecutive tosses?

Ans:
HHHHH
THHHH
HHHHT
HHHTT
TTHHH
THHHT
HTHHH
HHHTH

So there are 8 desired outcomes. There are a total of 32 possible outcomes (5 slots (tosses), 2 options for each toss (H or T), so 2^5=32). Hence the correct answer is Probability of at least 3 consecutive heads = 8/32 = 1/4.

There are 200 houses. Two different operators are working independently. What is the probability that they will call the same number?

Ans:
We want the probability of both calling the same number. For that, we don't need to calculate for both.
The first call's probability is 1 and not 1/200.
The second operator's probability of calling that particular number i.e the number which the first operator called is 1/200
So the answer is 1/200

A guy throws a pair of dice. If the sum of the numbers on the dice is even, then the person tosses a coin. if he doesn't get the sum as even number, he throws the dice again and again until he gets it. What is the probability of him getting a head?

Ans:
lets say he threw the dice and got even no. and then tossed the coin..

the probability will be 1/2*1/2

but if he doesn't get even (probability 1/2) in the first attempt then he throws the dice again and lets say gets an even no. then the probability will be 1/2*1/2*1/2

similarly if he gets even in 3rd attempt P =1/2*1/2*1/*1/2*1/2

so the prob will be

1/2*1/2+1/2*1/2*1/2+1/2*1/2*1/2*1/2+.......
which is an infinite GP with first term as 1/4 and ratio as 1/2

hence sum = 1/4/(1-1/2)=2/4=1/2

so the answer should be ½

Given a circle, find the probability that a chord chosen at random be longer than the side of an inscribed equilateral triangle.

Ans:
Just take a point over the circle. Let's suppose this point A is the one point of the chord. Now if the other point is within the 1/3 distance of the perimeter of the circle of A, then the chord will be less than the side of the triangle. So...the chord to be greater than the side of the triangle...we have to take the other point B in the (1 - 1/3 - 1/3) = 1/3 portion of the perimeter.

So...ultimately the probability stands out to be 1/3.

---

2 cards are drawn successively without replacing. What's the probability that first one will be spade and the second one will be a king?

Ans:
there can be two alternative scenerio to get the desired combination.

First one: The first card drawn is a spade but not a king and the second one is a king.

The probability is: 12/52* 4/51

Second one: The first card drawn is the king of spade and the second one is a king.

probability : 1/52 * 3/51

So..total probability is : 12/52 * 4/51 + 1/52 * 3/51
= **1/52.**

OR,

let, F = the first card drawn is a spade.

E = the second card drawn is a king.

we have to determine, P(EF).

from conditional probability: P(E | F) = P(EF)/ P(F).

=> P(EF) = P(E | F) * P(F).

now, P(E | F) is the probability of drawing a king given that the first one drawn is a spade = 1/4.
and, P(F) is the probability of drawing a spade = 1/13

So.. P(EF) = 1/4 * 1/13 = **1/52.**

It's ok upto this, i got the correct result except that there is a subtle problem(I'm not sure about it though). **How can we determine P(E|F) to be 1/4 for sure?** We could do that only if F = the event that the first card drawn is a spade except a king. Then, surely P(E | F) = 1/4.

Now, i tried it in a alternative way.

let…F = the event that the first card drawn is a spade except a king.
E = the second card drawn is a king.

thus i calculated P(E | F).
Again, i let..
F = the event that the first card drawn is a king of spade.
E = the event that the second one is a king.

Then, calculated P(E | F).

So, the result is the summation of these two probabilities, which is, indeed, 1/52.

A bag contains a counter, known to be either white or black. A white counter is put in, the bag is shaken, and a counter is drawn out, which proves to be white. What is now the chance of drawing a white counter?
Ans:
Let us denote the initial counter (if it is black) by B or (if it is white) by W1. The second white counter is W2.

There is actually 3 possibilities here.

possibility 1: B was in the bag. W2 was put in and then W2 was pulled out of the bag.
possibility 2: W1 was in the bag. W2 was put in and then W2 was pulled out of the bag.
possibility 3: W1 was in the bag. W2 was put in and then W1 was pulled out of the bag.

Now...out of the three possibilities, two of them make sure that we have a white bag left in the bag.
So, the answer is **2/3.**

OR,

Let, W1= event to get white first time
W2= event to get white second time

we need to calculate, P(W2|W1)= P(W2W1)/P(W1)

P(W1)= probability to choose the second ball first time+ probability to choose the first ball first time and get it white
= 1/2 +1/2*1/2
=3/4

P(W2W1) = Probability to choose white ball both times
= 1/2

So, P(W2|W1) = (1/2)/(3/4) = 2/3

Stanton Marketing conducted a taste preference test among married and single persons for Super Cola Company. Among single people, 11% of the population questioned preferred Super Cola to all other brands. For married couples the data was:

	Wife Prefers	**Wife doesn't prefer**
Husband prefers	**0.08**	**0.06**
Husband doesn't prefer	**0.07**	**0.79**

Using this study as a basis for a probability measure, find the Probability that is two single people are questioned:
a)

1. **They both prefer Super Cola**
2. **They both do not prefer Super Cola**
3. **Only the first person questioned would prefer Super Cola**
4. **Only one would prefer Super Cola**

b) What is the Probability that for a married couple, at least one of them prefer Super Cola?
c) What is the probability that for a married couple, none prefer Super Cola?

d) Given that a husband prefers SC, what is the Probability that his wife also prefers it?
e) If the wife prefers SC, what is the probability that her husband would not prefer it?
f) Is preference for SC independent of the gender? Why?
Ans:
Answers - Section a
a.1) 0.11^2
a.2) (1-0.11)^2 = 0.89^2
a.3) 0.11*0.89
a.4) (0.11*0.89)*2

Explanation - Section a
Possibly the easiest way to look at this would be to first consider a population of 100 single folks.
Number who like SC = 11
Number who don't like SC = 89
a.1) (11/100)*(10/99)
a.2) (89/100)*(88/99)
a.3) (11/100)*(89/99)
a.4) 2*(11*89)/(100*99) --> Need to multiply by 2 as you can have an "aye" first and a "nay" second or a "nay" first and an "aye" second

You'll notice that the answers in the explanation (with the population of 100) don't exactly match the earlier answers. The implicit assumption is that the population is >> 100

b) P(at least 1 member of a couple likes SC) = 1 - P(Neither member likes SC) = 1-0.79 = 0.21

c) P(Neither member likes SC) = 0.79

d) Given that a husband likes SC, P(Wife also likes SC)
= P(Both members like SC)/[P(Husband likes SC)] = 0.08/(0.08+0.06) = 0.08/0.14 = 4/7

e) Given that a wife likes SC, P(Husband dislikes SC) = P(Wife likes SC but husband doesn't)/[P(Wife likes SC)] = 0.07/(0.08+0.07) = 7/15

f) I assume we're looking at ... erm ... conventional families here. Assuming also that we're to look only at married men and women.
P(Men like SC) = P(Husbands like SC) = 0.14
P(women like SC) = P(wifes like SC) = 0.15
Clearly, Preference is dependent on gender

---

the probability that 3 people chosen at random were born in same month
the probability that 2 people chosen at random were born in same day of the week.
ans:
1. example:

favorable : 12x1x1
all: 12x12x12

favorable/all =1/144

example 2:
favorable: 7x1
all: 7x7
favorable/all =1/7

P (A or B)=0.60, P (A)=0.20
(a) Find P (B) given that events A and B are mutually exclusive.
(b) Find P (B) given that events A and B are
Ans:
(b) P(A or B) = P(A) + P(B) - P(A)*P(B)
P(B) = 0.6 - 0.2 / 0.8 = 0.4/0.8 = 0.5
(a) P(A or B) = P(A)+P(B)
P(B) = 0.4

Lin and Mark each attempt independently to decode a message. If the probability that Lin will decode the message is 0.80, and the probability that Mark will decode the message is 0.70, find the probability that
(a) both will decode the message
(b) at least one of them will decode the message----xplain..
(c) neither of them will decode the message
Ans:
(a) 0.8*0.7 = 0.56
(b) Probability (At least one of them) = 1 – Probability (none) = 1 - 0.2*0.3 = 1-0.06 = 0.94
(c) Probability (neither of them) = 0.2*0.3 = 0.06

John wrote a phone number on a note that was later lost. John can remember that the number had 7 digits, the digit 1 appeared exactly 3 times and 0 did not appear at all. What is the probability that the phone number contains at least two prime digits?
a)15/16
b)11/16
c)11/12
d)½
e)5/8
Ans:
P(atleast 2 prime) means the remaining numbers can have 2, 3 or 4 primes.
Probability of a prime = 4/8 = 1/2
P(composite) = 1/2
P(atleast 2 prime)= (1/2)^2(1/2)^2 (4c2) + (1/2)^3(1/2)^1 (4C3)+(1/2)^4 (4c4)
= 11/16.

P(2 primes) is (1/2)^2(1/2)^2 (4c2)
p(3 primes) is (1/2)^3(1/2)^1 (4C3)
p(4 primes) is (1/2)^4 (4c4)

A no. is drawn at random from factors of 441 .What is probability that the no. selected is divisible by 3
Ans:
441 = 21 * 21 = 3^2 * 7^2

total factors = 3 * 3 = 9

out of these not divisible by 3 are 1, 7, 49

so divisible by 3 are 6

hence the reqd probability = 6/9 = 2/3

A multiple-choice test consists of five choices per question. You think you know the answer for 75% of the questions and for the other 25% you guess at random. When you think you know the answer, you are right only 80% of the time. Find the probability of getting an arbitrary question right.

Ans:
75% of the time you are 80% right, so

(.75)(.8) = .6

And 25% of the time you randomly guess on a 5 choice answer (20% chance of getting it right)

(.25)(.2) = .05

So: .6 + .05 = .65

There are 3 points a(5,0), b(0,2) and c(0,0). And point p(x,y) is a point in triangle abc, what is the probability that y<x?

Ans:
Draw the whole thing and draw the line y=x. Assume that the point of intersection between y=x and the triangle is a from both x axis and y axis. Trangle area = 5. Small upper triangle = a. Lower triangle area = 2.5 a.
5=3.5a==> a=10/7.
Prob = 2.5a/5=(2.5*5/3.5)/5=5/7

A bag contains 3 blue marbles and 3 yellow marbles. If a marble is drawn with replacement, what is the minimum number of draws required so that there is at least a 90% probability of drawing a yellow marble?

Ans:
Assume n draws. Since each has the same prob=1/2, hence, Prob that all marbles are blue = (1/2)^n. At least one yellow =
1-(1/2)^n > 0.9
0.1>(1/2)^n

Hence, n=4

OR,

p=1/2.
p+p^2+p^3+...+p^n >= 9/10
sum of n terms in a GP where First term =1/2 and ratio =1/2
=> p(1-p^n)/(1-p) >= 9/10
=>1-p^n >= 9/10
=> p^n <=1/10
=> 2^n >=10
=> n=4.

In a high school debating team consisting of 2 freshmen, 2 sophomores, 2 juniors, and 2 seniors, two students are selected to represent the school at

the state debating championship. The rules stipulate that the representatives must be from different grades, but otherwise the 2 representatives are to be chosen by lottery. What is the probability that the students selected will consist of one freshman and one sophomore?

Ans:

Total number of ways of selecting 2 reps: 8C2 = 28

Out of this 4 combinations are not allowed (different grades)

So total number of valid combinations = 24

Probability of 1 F and 1 S

(2C1*2C1) / 24

= 1/6

In a certain game, a one-inch square piece is placed in the lower left corner of an eight-by-eight grid made up of one-inch squares. If the piece can move one grid up or to the right, what is the probability that the center of the piece will be exactly 4*sqrt(2) inches away from where it started after 8 moves?

a. 24/256
b. 64/256
c. 70/256
d. 128/256
e. 176/256

Ans:

Total number of possible moves = 2^8 = 256 (as you can move either up or right for every move -> 2 options)

Favorable moves:

If the centre of the piece is exactly 4*sqrt(2) inches away from where it started => it is like a hypotenuse in a right angled triangle with sides 4 & 4. Since it started at (1,1), it is currently at (5,5).

Compare it to a lattice bridge of 5 x 5 squares=> the number of possible moves to reach 5,5 with moves up or to the right = (2n-2)!/(n-1)!(n-1)! = 8!/4!4! = 70

Prob = 70/256

John purchased a lottery ticket and is watching the lottery results on television. For his ticket, John selected 7 numbers from 1 to 12 without replacement. In this lottery, 7 numbers from 1 to 12 are selected randomly without replacement. The first 5 numbers selected match John's lottery ticket. If John's ticket matches the next two numbers, he will win $500. What is the probability that John will win $500?

A. 1/15
B. 1/21
C. 1/42
D. 1/210
E. 1/10

Ans:

The order may not matter in some of the lotteries(like Powerball where the numbers need not be in the same order), then the desired prob = 1/7c2 = 1/21—

A certain club has 10 members, including Harry. One of the 10 members is to be chosen at random to be the president, one of the remaining 9 members is to be chosen at random to be the secretary, and one of the remaining 8 members is to be chosen at random to be the treasurer. What is the probability that Harry will be either the member chosen to be the secretary or the member chosen to be the treasurer?

Ans:

The number of ways of filling the president and treasurer positions without Harry is 9P2, and the number of ways of filling the president and secretary positions without Harry is 9P2. The total number of ways of filling the 3 positions out of 10 people is 10P3.

Probability = (9P2 + 9P2)/10P3 = (72 + 72)/720 = 1/5.

OR,

There are two ways I do this:

First

Probability that harry is not selected for president = 9/10
Probablity that Hary is selected for secretary = 1/ 9
Probablity that Hary is not selected for secretary = 8/ 9
Probablity that Hary is selected for treasurer = 1/ 8

The probability that Harry is selected for either Secretary or Treasurer = 9/10* 1/9 + 9/10 * 8/9 * 1/8 = 1/10 + 1/10 = 1/5

Second

The sequence of selection is used to trick us. But the fact is that every member on the board has equal chance of becoming a president or secretary or treasurer and it is 1/10.

Therefore the probability that Harry (or anybody else) to become a Secretary or Treasurer is 1/10 + 1/10 = 1/5

OR,

P(Harry to be selected as Treasury or Secretary) = 1 - (P(Harry not selected for any positions) + P(Harry selected as President))
= 1- (9p3/10p3 + 9p2*10p3)
= 1 - 8/10 = 2/10 = 1/5

A box contains 2 tennis, 3 baseball and 4 squash balls. 3 balls are drawn in succession with replacement. Find the probability that all 3 are of the same type.

Ans:

p(all 3 of the same type) = p(all 3 tennis) + p(all 3 baseball) + p(all 3 squash) = (2/9*2/9*2/9) + (3/9*3/9*3/9) + (4/9*4/9*4/9) = 99/729 = 11/81

P(A)=1/3 ; P(B) = 1/2 ; P(A intersection B) = 1/4. Find P(A' union B')

Ans:

P(A' union B') = P(A intersection B)' = 1 - 1/4 = ¾

If the integers m and n are chosen at random between 1 and 100, then the probability that a number of the form 7^m + 7^n is divisible by 5 equals
(a) 1/4
(b) 1/7
(c) 1/8
(d) 1/16
(e) 1/49
Ans:
The number 7^m ends with 1 or 3 or 7 or 9. Same thing with 7^n. Since both m and n are randomly selected, there are 4*4 = 16 possibilities, as far as end digit is concerned.

Out of them only combinations of m and n with last digit pair of (1,9), (3,7),(7,3),(9,1) will make the sum end with zero, and divisible by 5.

The overall probability that 7^m + 7^n is divisible by 5 is = 4/16 = ¼

Triplets Adam, Bruce, and Charlie enter a triathlon. If there are 9 competitors in the triathlon, and medals are awarded for first, second, and third place, what is the probability that at least two of the triplets will win a medal?
Ans:
(1) 2 of them get medals ==> (3c2 * 6c1)/9c3 ==> 3/14
(2) 3 of them get medals ==> 3c3/9c3 ==> 1/84

3/14 + 1/84 ==> 19/84

the question is based on either 2 or all 3 triplets winning an award. Order does not matter, hence combination

Decided to solve it another way (order is important):

Total # of ways = 9P3 = 504
Two medals = 3P2*6P1*3!/2! = 108
Three medals = 3P3 = 6
P(>=2) = (6+108)/504 = 114/504 = 19/84

A bag contains 2 red beads, 2 blue beads, and 2 green beads. Sara randomly draws a bead from the bag, and then Victor randomly draws a bead from the bag. What is the probability that Sara will draw a red bead and Victor will draw a blue bead?

sol. 1.
2/6*2/5=2/15

sol. 2.
2c1*2c1/6c2 = 4/15

Where is the mistake? and why?
Ans:
Solution 1 is right.

In solution 2, you have assumed that the order does not matter. ie., a red and blue bead are picked and it doesn't matter how they are picked. So you end up with twice the # of favorable ways: red and then blue; blue and then red. For what is asked, you have to divide the result by 2; and doing so yields 2/15.

A drawer holds 4 red hats and 4 blue hats. What is the probability of getting exactly three red hats or exactly three blue hats when taking out 4 hats randomly out of the drawer?

Ans:

If you replace the hats:

Number of different ways to select (3R and 1 B) or (1R and 3B) = (4 * 4 *4) * 4 + (4 * 4 *4) * 4 = 2* 4^4

The total ways to select 4 hats is = 8 *8 *8 *8 = 8^4

The probability is 2 * 4^4 / 8^4 = 2/16 = 1/8

If you don't replace:

Number of different ways to select (3R and 1 B) or (1R and 3B) = (4c3*4c1) * 2 = 32

The total ways to select 4 hats is = 8c4

probability is = 32 / 70 = 16/35

A bag contains six marbles: two red, two blue, and two green. If two marbles are drawn at random, what is the probability that they are the same color?

Ans:

3* 2c2/6c2 = 3/15 = 1/5

The probability that event A will happen is 0.5 and the event B will happen is 0.4. What is the range of the probability that neither A nor B will happen?

Ans:

maximize P(A or B)

P(A or B) = P(A) + P(B) - P(A&B)

for max prob => P(A&B) = 0 (A and B are mutually exclusive)

=> 0.9

neither = 0.1

minimize p(A or B) = p(A) + p(B) - P(A&B)

p(A&B) = p(A)*P(B) for independent events

= 0.5*0.4 = 0.2

p(A or B) = 0.7

neither = 0.3

Range = 0.3-0.1 = 0.2

Two cards are drawn at random from a standard deck of 52 cards, without replacement. What is the probability of drawing a 7 and a king in that order?

whether the answer should be:

a. (4/52) * (4/51)

or

b. (4C1*4C1) / (52C2)

which one is wrong and why?

Ans:

In the fisrt option, cards are taken out in sequence and the first one is 7 and the second one is King. So we are looking for sequence 7-K. In this choice, the order is important.

Therefore the probability is (4C1 * 4C1) / 52P2 = 4 * 4 / 52 * 51

The second choice is where two cards are taken and we expect one card to be 7 and the other to be King. Here two sequences are possible 7-K and K-7. Since each (7K , K7) have the same probability, this option has twice probability when compared to the first one. Since in this option order is not important, the probability is (4C1*4C1) / 52C2 = 4 * 4 / (52 * 51 / 2).

---

9 people, including 3 couples, are to be seated in a row of 9 chairs.
What is the probability that
a. None of the Couples are sitting together
b. Only one couple is sitting together
c. All the couples are sitting together

Ans:

c) 6!*2!*2!*2!

b) The number of arrangements that a given couple is together, irrespective of the status of other couples, is 8! * 2!. Here the focus is on a given couple. It doesn't mean that there are some arrangements in this where not only couple1 is together but couple 2, 3 may also be together. We need to eliminate those arrangements.

Let f(a) is the number of arrangements that couple 'a' is together

Then f(1) = f(2) = f(3) = 8! * 2!

The number of arrangements that two couples are together is

f(1&2) = f(2&3) = f(3&1) = 7! * 2! * 2!

The number of arrangements that all couples are together is
f(1&2&3) = 6! * 2! * 2! * 2!

The number of arrangements that only one couple is together is = f(1) + f(2) + f(3) – 2*f(1&2) –2*f(2&3) –2*f(3&1) + 3* f(1&2&3) = 3* 8! * 2! – 6*7! * 2! * 2! + 3* 6! * 2! * 2! * 2!

Therefore, the probability that only one couple is together = 6! * 192 / 9! = 192/504 = 8/21

a) 6!*2!*2!*2! is the number of arrangements that all three couples are together. But there are other arrangements that either one couple is together or two couples are together that need to be eliminated.

The number of unique arrangements that at least one couple is together are =
f(1) + f(2) + f(3) – f(1&2) – f(2&3) – f(3&1) + f(1&2&3) = 3* 8! * 2! – 3*7!*2!*2! + 6! * 21 * 2! * 2! = 260 * 6!

The number of arrangements that no couple is together are 9! – 260*6! = 244 * 6!

The probability is 244*6!/9!

An unbiased die is tossed 4 times. The probability that the minimum face value is NOT less than two and the maximum face value is NOT greater than 5 is?

Ans:

The probability that the minimum face value is NOT lesss than two and the maxm face value is NOT greater than 5 = The probability that we get 2,3,4 & 5 = 4/6 = 2/3 = p = probability of success.

If we assume the die is tossed 4 times, then the distribution is (p+q)^4.

=>(4C0)*(p^4)*(q^0) = (2/3)^4 = 16/81

There are n letters and n envelopes. The probability that At LEAST one letter is in the wrong envelope is?

Ans:

1-1/n!

n! - is the number of possible permutations. Only one of it has all letters in the right envelopes=> all the other have at least one letter misplaced.

The prob that a man speaks the truth is ¾. He reports that the face value of a die when it is tossed is 6. The probability that he is speaking the truth is?

Ans:

P (truthful | saying_6) = P (truthful & saying_6) / P(saying_6)

= (3/4*1/6) / (3/4*1/6 + 1/4*5/6) = 1/8 / 1/3 = 3/8

Suppose we know there are 3 tails and 2 heads, what is the probability that the order is exactly HTHTT?

Ans:

1/10 since we know that there are 3 tails and 2 heads - which can be ordered in 10 ways - and [HTHTT] is 1 way of ordering them.

A single card is drawn from a standard deck of cards. Find the following probabilities:

a) P(Jack|face card)

b) P(Face card|Jack)

c) P(two|not face card)

d) P(queen|black)

Ans:

a) P(Jack|face card) = 1/3 --> P(Jack) given that the card drawn is a "Face Card"

b) P(Face card|Jack) = 1

c) P(two|not face card) = 4/40 = 1/10

d) P(queen|black) = 2/26 = 1/13

For the experiment "toss a coin and spin a spinner with three equal sectors labelled A,B and C."

a) List the sample space S.

b) List the event E,"toss a head and spin an A or B."

C) Find P(E)

d) List E'

e) Find P(E')

Ans:

4a) [HA HB HC TA TB TC] ---> 2C1*3C1
4b) [HA HB]
4c) 1/3
4d) HC TA TB TC
4e) 2/3

A box contains 100 balls numbered from 1 to 100 if three balls are selected at random and with replacement from the box, what Is the probability that the sum of the three numbers on the balls selected from the box will be odd.
A ¼
B 3/8
C ½
D 5/8
E ¾
Ans:
to get 3 numbers sum to be odd, the following should be the pattern
o e e (3 such possibilities)
o o o (1 possibility)

selecting odd or even number from 1 - 100 number = 1/2
1/2 * 1/2 * 1/2 * 4 = ½

---

4 letters are randomly selected from the word TRAMPLE. What is the probability that the 4 letters can be arranged to form the word TRAM?
Ans:

P = 1/7c4 = 1/35

There are two identical bottles. One bottle contains 2 green balls and 1 red ball. The other contains 2 red balls. A bottle is selected at random and a single ball is drawn. What is the probability that the ball is red?
Ans:
you can choose a red ball by choosing the first bottle OR the second one. The prob for choosing a bottle is 1/2. Say we choose the first one.
choosing a red ball from that one is 1/3
so the total prob for the first bottle is (1/2)(1/3)
suppose I choose the second bottle. Prob for doin that is 1/2 as well. Choosing a red one from the second one is done in 2/2 ways. Total prob is (1/2)(2/2)
Add them up, 1/6 + 1/2 is 2/3.

Two canoe riders must be selected from each of two groups of campers. One group consists of three men and one woman, and the other group consists of two women and one man. What is the probability that two men and two women will be selected?
(A) 1/6 (B) 1/4 (C) 2/7 (D) 1/3 (E) ½
Ans:
Group 1: (3M,1W) ; G2 = {2W,1M}

G1: p(MM)=3/4*2/3 or p(MW)=1/4*3/3=1/4
G2: p(WW)=2/3*1/2=1/3 or p(MW)=1/3

Prob(MM,WW) = p(MM)*p(WW)+p(MW)*p(MW)=1/2*1/3+1/4*1/3=2/12+1/12=1/4

There are 5 different boxes B1, B2, B3, B4, B5 and 5 different hats H1, H2, H3, H4 and H5. The hats are to be distributed among the different boxes. Each box can accommodate all the hats. What's the probability that B1 has

either H1 or H2?
Ans:
if a bag can contain all 5 hats, then;
(2*5^4-5^3)/5^5=9/25

John is trying to remember a 3 digit ID number. He knows that one of the last 2 digits in the number 138 is wrong, but he's not sure which. He also knows that all the digits in the ID number are distinct. If he were to start trying all the combinations that fit these conditions, what is the probability he would get the right combination on the first try?
Ans:
Consider the number 138. One of the last two digits is wrong. Either 3 or 8 could be wrong. If 3 is wrong we have 7 options to fill this place-0,2,4,5,6,7,9.
similarly if 8 is wrong we have 7 options to fill this place-0,2,4,5,6,7,9. In all we have 14 options. He can choose any one in the first take and only one of them is correct. Therefore the probability is 1/14.

A drawer holds 4 red hats and 4 blue hats. What is the probability of getting exactly three red hats or exactly three blue hats when taking out 4 hats randomly out of the drawer?
(a) 1/8
(b) ¼
(c) ½
(d) 3/8
(e) 7/12
Ans:
4c3*4c1/8c4 + 4c1 * 4c3/8c4

If a single throw of two dice, find the probabilty that neither a double nor a total of 9 appear ???
Ans:
total number of permutations of oucomes = 6 * 6 = 36
outcomes with same number on both dice = 6
outcomes with sum of 9 = 4 ((4,5),(5,4),(3,6),(6,3))
probability that neither of events A or B occur = 1 - probability that either of them occur.
Ans. = 1 - (10/36) = 13/18.

A card is drawn from a deck of 52 cards , find the probability of getting a king or a heart or a red card ???
Ans:
the number of cards which are red in colour (include all hearts) or kings are 26 + 2 (two kings are blacks as well)= 28 .
Ans. 28/52.

OR,

P (king or heart or red)

= p(k) + p(h) + p(r) - p(k and h) - p(h and r) - p(r and k) + p(k and h and r)

= 4/52 + 13/52 + 26/52 - 1/52 - 13/52 - 2/52 + 1/52

= 28/52 = 7/13

Four cars are drawn at a time from a pack of 52 playing cards. FIND THE PROBABILITY of getting four cards of the same suit ???
Ans:
(4 * 13C4)/52C4

A deck of cards contains 6 cards numbered from 1 to 6. If three cards are randomly selected from the deck, what is the probability that the numbers on the cards are drawn in order (example: first draw: 3, second draw: 4, third draw: 5)?
A. 1/60 B. 1/216 C. 1/30 D. 1/24 E. 1/6
Ans:
4/6p3=1/30

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6 men and 4 women are waiting for an interview for a job. 4 of the men and 2 of the women are in room A, the rest in room B. Just before the interview starts, one of the candidates moves from room A to room B. The first candidate for interview is now chosen at random from room A. What is the probability that it'll be a man?
Ans:
Room A - 4m 2w
Scenario 1 - a man is moved from A to B
Scenario 2 - a woman is moved from A to B

Now probability of selecting a man from A = P(scenario 1) * P(selecting a man from A) + P(scenario 2) * P(selecting a man from A)
= 4/6 * 3/5 + 2/6 * 4/5 = 2/3

Of two men, it is said that one sometimes tells the truth while the other only tells the truth two times out of three. If one is chosen at random and asked a question, the probability of a truthful answer is 17/24. How often does the first man tells the truth?
Ans:
The probability of selecting a guy is 1/2
The probability (selecting a guy at random and answer is truthful) =
1/2(p1)+1/2(2/3)=17/24
p1+2/3= 17/12
p1= 3/4
The first man tells the truth 3 times out of four.

A point is selected at random inside a circle.Find the probability that the point is closer to the circumference of the circle than to its center.
Ans:
Dividing the circle of radius r, into two parts with a smaller circle of radius r/2 and the remaining portion between the smaller circle and the larger one.
The smaller circle has an area of Pi *(r/2)^2 and the remaining region with an area Pi*r^2 - Pi *(r/2)^2.
The point that leis in this region is more closer to the circumference than the center.
So, P = (Pi*r^2 - Pi *(r/2)^2)/ (Pi*r^2) =3/4
