Mock Test Number: 009

1. How many 4-bit digit numbers that do not contain the digits 3 or 6 are there?

A. 5040
B. 4096
C. 7200
D. 3584

Answer:

$7 \times 8 \times 8 \times 8 = 3584$

Except 93, 6 → No 3 2 6

2. A gardener changed the size of his rectangle shaped garden by increasing its length by 40% and decreasing its width by 20%. The area of the new garden

A. Has increased by 12%
B. Has increased by 20%
C. Has increased by 8%
D. Cannot be expressed in % terms without actual numbers.

Answer:

$X = +40\%$. $Y = -20\%$.

Overall change in area $= X + Y + \frac{XY}{100}$

$= 40 - 20 + \frac{40(-20)}{100} = 12\%$ increase

3. In how many ways can we distribute 10 different pencils to 3 students?

A. 30
B. 1000
C. 3! 10!
D. None of these

Answer:

3^{10}

4. Alvin, Ben and Clinton run a race, with Alvin finishing 48 meters ahead of Ben and 72 meters ahead of Clinton, while runner Ben finishes 32 meters ahead of runner Clinton. Each runner travels the entire distance at constant speed. What is the length of the race?

A. 480
B. 96
C. 192
D. None of these

Answer:

A : B : C

D : D − 48 : D − 72

B : C

D : D − 32

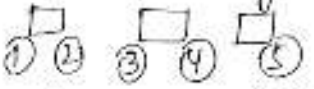
$\therefore \frac{D-48}{D-72} = \frac{D}{D-32}$

From options, D = 192.

5. In how many ways can 5 different toys be packed in 3 identical boxes such that no box is empty, if any of the boxes may hold all of the toys?

A. 25
B. 15
C. 125
D. 243

Answer: Three identical boxes & 5 distinct toys.

Here we have to apply  concept of grouping. The two possible ways such that no boxes remain empty are

1 2 2 → No. of ways = $^5C_1 \times \left[\frac{^4C_2 \times {}^2C_2}{\lfloor 2}\right] = 15$

1 1 3 → No. of way = $^5C_3 \times \left[\frac{^2C_1 \times {}^1C_1}{\lfloor 2}\right] = 10$

25 ways

If we consider, 1, 2 2 → $\frac{^5C_1 \times {}^4C_2 \times {}^2C_2}{\lfloor 2}$

$^5C_1$: Total ways of selection of 1 toy

$\frac{^4C_2 \times {}^2C_2}{\lfloor 2}$ = Total ways of grouping 2 toys in 2 identical groups each.

6. If the price of petrol increases by 25% and Kelvin intends to spend only an additional 15% on petrol, by how much % will he reduce the quantity of petrol purchased?

A. 12%
B. 6.6%
C. 10%
D. 8%

Answer:

Expenses = Price × Quantity

Price change = X = +25%.

Quantity change = Y = ??

Overall % change = $X + Y + XY/100 = 15\%$ (given in Q)

$= 25 + Y + 25Y/100 \Rightarrow Y = -8\%$.

7. A, B, C, D and D each choose a large different number. A says, "My number is not the largest and not the smallest". B says, "My number is not the largest and not the smallest". C says, "My number is the largest". D says, "My number is the smallest". E says, "My number is not the smallest". Exactly one of the students is lying. The others are telling the truth. Who has the largest number?

A. E
B. D
C. C
D. B

Answer: Going by options, option (a)
if we assume E is lying then all others are telling the truth. So, A will be in between B will be in between.
C is largest $\Rightarrow$ E is the smallest (as E is lying)
Also D is smallest, so two smallest values are not possible..
So (a) is not possible. So by trying various options we see that if D is lying & all others are telling the truth, the $\frac{C}{5}$ $\frac{-}{4}$ $\frac{-}{3}$ $\frac{-}{2}$ $\frac{-}{1}$. It's not possible to adjust 4 persons for three values. A & B are telling truth so they will be between 2, 3, 4. D is lying, E is true but if (c) is lying there are no contradictions.

8. When numbers are written in base b, we have 12*25=333. The value of b is

A. 8
B. 7
C. 5
D. 4

Answer:
$(12)_a \times (25)_a = (333)_a$

$\Rightarrow (a+2)(2a+5) = 3a^2+3a+3$

$2a^2+9a+10 = 3a^2+3a+3$

$a^2-6a-7=0$

$(a-7)(a+1)=0$

$a = 7, -1$

Base can only be a natural no. So base is 7.

9. At the end of the 1894 Suresh was half as old as his grandmother. The sum of the years was born in 3644. How old Suresh was at the end of 1899?

A. 48
B. 55
C. 49
D. 53

Answer:

$(1894 - S) + (1894 - G) = 3644$

$\Rightarrow S + G = 144$

Also, $S = G/2 \Rightarrow 3G/2 = 144$

$\Rightarrow G = 96$, $S = 48$ [Age in 1894)

Suresh's age $= 48 + 5 = 53$.

10. In how many rearrangements of word ERASED is the letter A' positioned in between the 2 E'?

A. 80
B. 120
C. 360
D. None of these

Answer:

(EAE)RSD Arrangement of one group of (EAE) = 1

& Arrangement of 4 objects, i'e one group & 3 letters, can be arranged in 24 ways.

So, total no. of ways is $1 \times 24 = 24$

11. A tourist wants to visit 3 or more of the 5 major cities in India: Chennai, Bangalore, Mumbai, Delhi and Kolkata. In how many ways can be plan his tour such that Chennai is always includes? Two plan of the tour are different if the cities in the tour or the order of the cities are different.

A. 5! +2!
B. 5! +4! +3!
C. 5! + (4*4!) + (6*3!)
D. 5(4! +3! -2!)

Answer:

If Chennai is always included, then out of remaining 4 cities he can choose and arrange

2 cities $\rightarrow {}^4C_2 \times 2!$

3 cities $\rightarrow {}^4C_3 \times 3!$

4 cities $\rightarrow {}^4C_4 \times 4!$

Arrangements of [(2, 3, 4) + 1] cities

$= 4! + 4 \times 3! + 6 \times 2!$

12. Professor absent minded has a very peculiar problem. In that he cannot remember number larger than 15. However he tells his wife I can remember any number up to 100 by remembering the 3 numbers obtained as remainders when the number is divided by 3, 7 and 11 respectively. For example (2,3,6) is 17. Professor remember that he had (2,4,8) rupees in the purse. And he paid (2,5,4) rupees to the servant. How much money is left in the purse?

A. 51
B. 55
C. 48
D. 37

Answer: Let there be N Rs. to start with $\Rightarrow N = 3a + 2$ —①
$N = 7b + 4$ —②
$N = 11c + 8$ —③

Consider ① & ②

Also consider ① & ③,

$3a + 11c = 6$
$11c = 3a - 6$

$3a - 7b = 2$
$a = 3 \quad b = 1$
$a = 10 \quad b = 4$
$a = 17 \quad b = 7$
$a = 24 \quad b = 10$ — soln (4)

Only soln ④ above, we have integral value of c is $c = 6$
So $a = 24, b = 10, c = 6 \Rightarrow$ he had $N = 24 \times 3 + 2 = 74$ rupees
Going by options, he gave $74 - 51 = 23$ rupees to servant—
but ₹3/- leaves (2,2,1) remainder.
By this we get 46/- ans.

13. The rupee/coin changing machine at the bank has a flaw. It gives 10 rupee note if you put a 100 rupee note and 10 one rupee coins if you insert a 10 rupee note but gives 10 hundred rupee notes when you put a one rupee coin. Sivaji, after being ruined by his rivals in the business, is left with a one rupee coin and discovers the flaw in the machine by accident. By using the machine repeatedly, which of the following amounts is a valid amount that Sivaji can have when he gets tired and stops at some stage (Assume that the machine has an infinite supply of notes and coins?

A. 9989
B. 35965
C. 24975
D. 17984

Answer:

Divisible by 999

24975

14. Eesha invited 8 friends to her birthday party – Usha, Nisha, Aasha, Abhilasha, Suresh, Ramesh, Naresh and Rilesh. They all are arrived one after the other around the party start time within 1 minute of each other. From 19:48 hours, one friend every minute.

- Nisha joined the party before Naresh
- Suresh joined the party before Abhilasha
- Naresh and Abhilasha joined the party before Usha
- Naresh joined the party before Ramesh
- Abhilasha joined the party before Ramesh
- Usha joined the party before Aasha.

Which of the following is not possible?

A. Nisha joined the party at 19:43 hours
B. Usha joined the party at 19:40 hours
C. Nisha joined the party at 19:41 hours
D. Ramesh joined the party at 19:44 hours

Answer:

19:40
19:41
19:42
19:43
19:44
19:45
19:46
19:47

The 1st person came at 19:40. It can't be Usha as Naresh & Abhelasha came before Usha. So option (b) is not possible.

15. A 3*3 grid is colored using red and blue colors, such that if we rotate the grid about its centre in the plane by 180 degrees, the grid looks the same. The number of ways to color the grid this way is:

A. 256
B. 64
C. 16
D. 32

Answer:

2*	2†	2ϕ
2^{55}	2	55
ϕ	†	*

The cells worked in one pattern are symmetrical to each other. So, for every distinct cell we have 2 choices & for every identical one, we have one. There are 5 distinct cells including the centre one.

So $2^5 = 32$.

16. Ashok, Esha, Farookh and Gouri ran a race. Ashok said, "I did not finish 1ST or 4TH". Esha said, "I did not finish 4TH". Farookh said, "I finished 1ST". Gouri said, "I finished 4TH". There were no ties in the competition and exactly three of the children told the truth. Who finished 4TH?

A. Gouri
B. Farookh
C. Ashok
D. Esha

Answer: A → Neither 1st or 4th If we assume A is lying
E → Not 4th then all others are telling truth.
F → 1st
G → 4th That we ans A either stood 1st or 4th.

This will contradict with both F & G's statement. Similarly E cannot be lying as that will result in contradicting with G's statement. If we assume that F is lying then. all others are telling the truth the E 1 — 2 — 3 G 4
A will be 2nd or 3rd & F will not be 2nd or 3rd place.
So E will be 1st & A & F will occupies.
so (b).

17. The letters in word ADOPTS are permuted in all possible ways and arranged in the alphabetical order. Find the word at position 42 in the permuted alphabetical order.

A. AOTDSP
B. AOTPDS
C. AOTDPS
D. AOSTPD

Answer: Here A < D < O < P < S < T words starting with

A D _ _ _ = 4! = 24
with A D D _ _ _ = 3! = 6
A O P _ _ _ = 3! = 6
A O S _ _ _ = 3! = 6
24 + 6 + 6 + 6 = 42

So, the last word of AOS _ _ _ series is the answer & the word is AOSTPD.

18. Certain positive integers have these properties:

I. The sum of the squares of their digits is 50

II. Each digit is larger than the one to its left.

The product of the digits of the larger integer with both properties is

A. 7
B. 25
[C. 36]
D. 48

Answer: If we see various squares of Natural no.s we realize that beyond 7^2 it is not possible to go. If we assume 7 is a part of our number, then it can only be 17 as $1^2+7^2=50$ & $7>1$. But if we assume one of digits is 6 as $6^2=36$ & other digits can be $1^2+2^2+3^2=14$ such that $1^2+2^2+3^2+6^2=50$ & $1<2<3<6$, So we have a 4 digit no. satisfying the above criteria. The product of the digits $=1\times2\times3\times6=$ [36].

19. A village milkman carries out adulteration of milk with water make higher profits. He has two cans, one with water and another with pure milk. He pours from can N0. 1 into can No.2 sufficient to double its contents. He again pour from N0.2 into No.1 enough of mixture to double the contents. He again pour from No.1 into NO.2 to double the contents of No.2 and find the same number of litres of milk in each can although there is one more of water No.2 than there is milk.
How much more water than milk is there in can No.1?

[A. 1]
B. 4
C. 2
D. 3

Answer:

20. George, Paul, Hari start a business by contributing Rs. 30000, Rs. 40000, Rs. 50000 respectively. After ½ year George withdraws half his contribution. At the end of the year the business showed a profit of Rs. 90000 which has divided amongst the 3 men proportionate to amount and duration and duration of their investment in enterprise. Paul got:

A. 18000
C. 32000
B. 25000
D. 24000

Answer:

G : P : H

30 X 6 + 15 X 6 : 40 X 12 : 50 X 12

270 : 480 : 600 [Product of amounts for respective durations]

9 : 16 : 20

So, a profit of 90000 would fetch

$$\text{paul} = \frac{16}{9+16+20} \times 90 = 32000.$$

21. George can do some work in 8 hours: Paul can do some work in 10 hours while Hari can do the same work in 12 hours. All the three of them start working at 9 a.m. while George stops work at 11 a.m. and the remaining two complete the work. Approximately at what time the work be finished?

A. 11:30 a.m.
C. 1 p.m.
B. 12:30 p.m.
D. 12 noon

Answer: Thickness is not to be decreased so only the area of ice-cream of 6X5 surface has to decreased by same %. point resulting in 19% decrease overall.

So, $-19 = -x - x + (-x)(-x)/100$ Solved at last page.

[overall % age change $= x + y + xy/100$]

$\therefore -19 = -2x + x^2/100$ from here $x = 10\%$.

So, length/width should be reduced by 10% each. If old width is 5 cm, new width will be $0.9 \times 5 = 4.5$ cm.

22. Arun makes a popular brand of ice-cream in a rectangular shaped bar 6cm long, 5cm wide and 2cm thick. To cut costs, the company had decided to reduced the volume of bar by 19%. The thickness will remain the same, but the length and width will be decreased by the same %. The new width will be

A. 6.5
C. 5.5
B. 4.5
D. 7.5

Answer: Thickness is not to be decreased so only the area of ice-cream of 6X5 surface has to decreased by same %. point resulting in 19% decrease overall.

So, $-19 = -x - x + (-x)(-x)/100$

[overall %age change $= x + y + xy/100$]

$\therefore -19 = -2 + x + x^2/100$ from here $x = 10\%$.

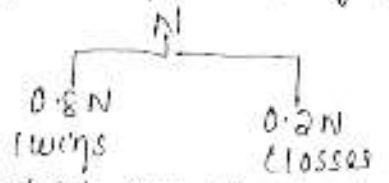
So, length/width should be reduced by 10% each. If old width is 5cm, new width will be

$0.9 \times 5 = \boxed{4.5\text{cm}}$.

23. A team won 80% of the games if played. If played 5 more games of which if won 3 and lost 2. Its loss percentage changed by 25%. How many games did it played overall?

A. 20	C. 16
B. 14	D. 25

Answer: Let the team has played N games. So,



In loss% which 20% presently increases by 25% i.e 1/4 th

The new loss% is $20 + 5 = 25\%$.

$\therefore \frac{0.2N + 2}{N + 5} = 25/100 = 1/4$

$0.8N + 8 = N + 5$ or $N = 5$, overall match played $= 15 + 5 = \boxed{20}$.

24. Consider all permutation (i.e. arrangements) of the digits 1,2 and 3. We will say that a hit has been scored if at least one digit occurs in its proper position in the permutation, i.e. if one occurs in the 1st position or 2 in the 2nd position or 3 in the 3rd position. In how many of these permutations is a hit scored?

A. 1	C. 2
B. 4	D. 3

Answer: If the number goes to designated place, we can find the number of ways by using dearrangement.

$\lfloor n \left(1 - \frac{1}{\lfloor 1} + \frac{1}{\lfloor 2} - \frac{1}{\lfloor 3} + \ldots (-1)^n \frac{1}{\lfloor n}\right.$, where $n = 3$

So the expression's value $= 2$

Out of $\lfloor 3 = 6$ ways, 2 ways in which score will not be hit.

So, $6 - 2 = 4$ ways in which score will be hit.

25. Raj earns 25% on an investment but loses 10% on another investment. If the ratio of the two investments is 3:5, what is the gain or loss on the two investments taken together?

A. 13.125% loss
C. 3.125% gain
B. 3.123% gain
D. 6.25 % loss

Answer:

The final gain/loss % is $\frac{3 \times (25) + 5 \times (-10)}{3+5}$

$= 25/8$

$= 3.125$ (gain as sign is +ve

26. Two cars starts from A and B and travel towards each other at a speed of 50kmph and 60kmph respectively. At the time of their meeting the second car has travelled 120kmph more than the first. The distance between A and B is

A. ,600kms
C. 729kms
B. 1320kms
D. 1230kms

Answer:

Every hour, the 2nd car travels 10Km more. So it travels for 120km more than the 1st car by the time they meet, it means they have travelled for 12hrs together.

In one hour together they covers $50+60 = 110$Km.

In 12 hours they will cover $110 \times 12 = 1320$Km.

27. If 15 women or 10 men can complete project in 55 days, in how many days will 5 women and 4 men working together complete the same project?

A. 85
C. 55
B. 95
D. 75

Answer:

$15W = 10M \longrightarrow 55$ days

$3W = 2M$

$5W + 4M \longrightarrow ?$ days

This is same as replacing 4M with 6W,

$\Rightarrow 5W + 6W \longrightarrow ?$

or 11W can complete a task in how many days, if 15 women can do it in 55 days.

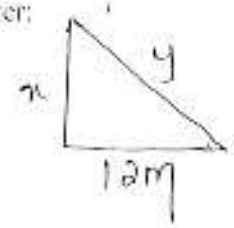
So, $11 \times D = 55 \times 15$

$\Rightarrow D = 75$ days

28. A tree of height 36m of the edge of a road at a certain height and it fell in such a way that its top touched the other edge of the road. If the breadth of the road is 12m, then the height at which the tree broke was

A. 24
B. 16
C. 18
D. 12

Answer:



$x + y = 36$ —— (1)

$x^2 + 12^2 = y^2$

$y^2 - x^2 = 144$

$(y+x)(y-x) = 144$

$36 \times (y-x) = 144$

$y - x = 4$ —— (2)

From (1) & (2)

$y = 20$, $\boxed{x = 16}$.

29. A and B completed a work together in 5 days. Had A worked at twice the speed and B at the half the speed, jf would have taken them four days to complete the job. How much time would it take for A alone to do the work?

A. 10 days
B. 15 days
C. 20 days
D. 25 days

Answer: LCM of (5, 4) = 20

Let's assume there are 20 units of work available.

both and A's & B's per day efficiency is a & b respectively.

A & B can complete 20 units in 5 days.

So, $a+b = 20/5 = 4$ units/day —— (1)

Also, $2a+b/2 = 20/4 = 5$ units/day —— (2)

(2) + (1) × 2

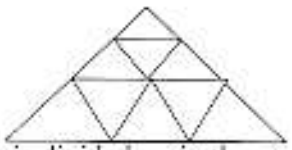
$3b/2 = 3$

$b = 2$ units/day

So, $a = 2$ units/day

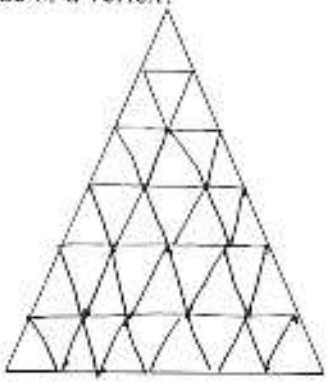
A alone can complete 20 units in $\boxed{20/2 = 10 \text{ days}}$

30. The figure below shows a "size 3" equilateral triangle divided up into 9 "size 1" equilateral triangles. The figure has 6 upward facing and 3 downward facing "size 1" equilateral triangle, 3 upward facing and no downward facing "size 2" triangle and 1 upward facing "size 3" triangle. It has a total of 13 equilateral triangle of all sizes.



The following size 6 triangle is divided up in the same way. What is the number of triangle that had the marked point on a side or a vertex?

A. 20
B. 21
C. 22
D. 23
E. 27



Answer:

There are 6 parts in every side. So, no. of triangle is $6 \times 2 - 1 = 11$ in every side. There are 3 sides, So total $11 \times 3 = 33$. 33 triangles should be there along the edges, but few of these triangles will be common. In the above case there are a total of $11 + 9 + 7 = 27$ triangles along the edges. So a general expression of no. of triangles along edges if the triangles side is devided in to n parts is given by

$$2n - 1 + 2n - 3 + 2n - 5$$
$$= 6x - 9$$

If $x = 6$, the value is $\boxed{27}$.

31. A number when successively divided by 5.3.2 gives remainders of 0, 2 and 1 respectively in that order. What will be the remainder when the same number is divided successively by 2, 3 and 5 in that order?

A. 2,1,3
B. 4,3,2
C. 1,0,4
D. 4,1,2

Answer: If a number is devided by 2, the remainder is going to 0 or 1. We see that in options, only C has remainder = 1 when devided by 2. So (c) should be the answer.

OR// The no. when devided by 5, 3, 2 leave remainder 0, 2, 1 respectively. Starting from the right end of no. is devided by 2 remainder = 1. So, the no. should be in the form of $2\eta+1$; Div'sor = 3, Rem = 2, so the form should be $3(2\eta+1)+2$

finally Div = 5, Rem = 0. So the form should be $5[3(2\eta+1)+2]+0$
$= 3\eta + 25$.

If $\eta=1$ value = 55. So 55 satisfies the criteria. If 55 is devided by 2 quotient = 27. 27 devided by 3, Q = 9, R = 0 Rem = 1

9 devided by 5, Q = 1, R = 4

∴ Answer is (c) — 1, 0, 4

32. 2 workers, one young and one old, live together and work at the same office. It takes 20 minutes for the young man to walk to office. The old man takes 30 minutes for the same distance.
When will the young man catch up with the old man, if the old man starts at 10:00 a.m. and the young man start 10:05 a.m.?

A. 11:00a.m.
B. 10:10 a.m.
C. 10:15 a.m.
D. 10:20 a.m.

Answer: LCM (20, 30) = 60

Let 60M be the distance between home & office.

So, $Speed_{YM} = 60M/20min = 3m/min$ & $Speed_{OM} = \frac{60m}{30min} = 2m/min$

If OM starts at 10:00, in 5 mins he will cover $2 \times 5 = 10m$

Relative Speed = (3-2) m/min = 1m/min. So time = $\frac{10m}{1m/min}$

So they will meet 10 min after 10.05 i.e 10:15

33. Oranges can be packed in sets of 10 oranges in box type A or 25 orange in box type B. A carton comprising of 1000 oranges of type A and type B boxes is packed. How many different combinations are possible in the number of type A and type B boxes while organizing the oranges?

[A. 21]
B. 20
C. 19
D. 18

Answer: Here we have to find no. of integral solution of

$10A + 25B = 1000$ (or) $2A + 5B = 200$

If A=0 B=40 So tracking the series of A 0, 5, ... 100

A=5 B=38 $T_n = [a + (n-1)d]$ [Here we assume that box A or B may contain 0 oranges

A=100 B=0 $100 = 0 + (n-1)5$

$n = 21$

34. How many divisors (including 1, but excluding 1000) are there for the number 1000?

A. 16
[B. 15]
C. 31
D. 10

Answer:

$1000 = 10^3 = (2 \times 5)^3 = 2^3 \times 5^3$

No. of factors = $(3+1)(3+1) = 16$

This includes 1 & 1000 both, but if we have to exclude 1000, there are 15 factors / divisors.

35. In the polynomial f(x) =2*x^4 – 49*x^2+54, what is the product of the roots, and what is the roots (Note that x^n denotes the x raised to the power n, or x multiplied by itself n times)?

[A. 27.0]
B. 54.2
C. 49/2.54
D. 49,27

Answer: If the polynomial is of the form $P(x) = ax^4 + bx^3 + cx^2 + qx + e$.

Sum of root = $-b/a$, Product of roots = e/a

In $f(x) = 2x^4 - 49x^2 + 54$, $a = 2, b = 0, c = -49, d = 0$

$e = 54$

∴ Sum of roots $= -9/2 = 0$

Product of roots $= 54/2 = \boxed{27}$

(21)

LCM (8, 10, 12) = 240

Let 240 units of work is there.

$G_1 = 240/8 = 30$ units/hr ;

$P = 240/10 = 24$ units/hr ;

$H = 240/12 = 20$ units/hr .

$G_1 \times 2\text{hrs} + (P+H)x = 240$

$\Rightarrow 30 \times 2 + 44 \times x = 240$

$\Rightarrow x = 180/44 \simeq 4\text{hrs}$

so, approximately the work would be finished by [1 PM]