Mock Test Number: 010

1. A calculator has a key for squaring and another key for inverting. So if x is the display number then pressing the square key will replace by x by x^2 and pressing the invert key will replace by x by1/x. If initially the number displayed is 6 and one alternately presses the square and invert key 16 time each, then the final number displayed (assuming number round off or overflow errors) will be

   A. 6^65536
   B. 2^65530
   C. 6^65530
   D. None of these

Answer: A

Even number of effects does not have any effects as finally the number will be numerator or denominator as it was in the initial stage. So only the square has to be considered.
The power of 6 will be increased like 2,4,8, 16 ... and will be 2^16 after 16 pressing.
Hence the final number is **6**^65536.

2. How many two digits numbers are there which when subtracted from the number formed by reversing its digit as well as when added to the number formed by reversing its digits, result in a perfect square?

   A. 1
   B. 2
   C. 3
   D. None of these

Answer: A

Lets the number be ab
10a + b + 10b + a is a perfect square. i.e. 11(a + b) is a perfect square.
10b + a – 10a – b is a perfect square. i.e. 9(b – a) is a perfect square.
a or b cannot be more than 9.
For 11(a + b) to be perfect square, the possible value of (a + b) is 11.
And for 9(a – b) to be perfect square, the possible value of (a – b) is 1, 4, 9 (in this case 9(a – b) will be 9, 36, 81).
When a + b = 11 and b – a =1 then b = 6 and a = 5.
When a + b = 11 and b – a = 4 then b = 15/2 which is invalid as b cannot be fraction.
When a + b = 11 and b – a = 9 then b = 10 which is invalid as b is a single digit from 0 to 9
Hence answer is 1 (as only possible number is 56).

3. Find the 55^{TH} word of SHUVANK in dictionary.

A. AKHNSUV
B. AHKNSUV
C. AUVHKNS
D. None of these

Answer: D

First arrange the letters in alphabetic order A H K N S U V.

Now total words possible with each letter in beginning with 7! – 1 = 720.

As 55 is less than 720 then starting letter is A.

As 55 is more than 4! But less than 5!.

So AH will be the first two letter followed by 120 combination with KNSUV.

Starting with AHK – we will have 24 words.

Then starting with AHN – we will have 24 words.

Now starting with AHSK – we will have 3! = 6 words. So till now 54 words have occurred.

Now 55^{TH} word will be AHSNKUV.

4. How many ways are there to form a 6 digit number using the digit 0-6, so that last two places are occupied by even numbers and repetitions are not allowed?

A. 2400 ways,2500 ways
B. 1152 ways,1200 ways
C. 2400 ways,1152 ways
D. None of these

Answer: C

This question is not clear in mentioning if the last two places should contain even numbers or digits. So we present the solutions for both cases.

Case-1: Even number

Ans: 2400 ways

Last two places will be even number when we have 0,2,4,6 in the last position.

PLEASE NOTE THAT 56 is the even number. The question never says evendigits but just say even number.

Hence number of ways to fill last place is 4.

As we have 7 digits in all and 0 cannot be in 1^{ST} position.

Thus required number of ways = 4*5*5*4*3*2 = 100*24 = 2400 ways.

Case-2: Even digit

Ans: 1152 ways

Assuming only even digits should occupy the last two positions. The last and last but one places should filled with 0,2,4,6.

Thus ways to fill last two places 4*3 = 12.

Out of the remaining 5 digits, 0 cannot be the initial position.

Hence required number of ways 12*4*4*3*2 = 1152 ways

5. Car A leaves city C at 5pm and is driven at speed of 40kmph. 2 hours later another car B leaves city C and is driven at the same speed as car A. In how much time will car B be 9kms ahead of car A if the speed of car B is 60kms?

   A. 4.45 hour
   B. 2 hour
   C. 3.45 hour
   D. 3 hour

Answer: A

Relative speed 60 – 40 = 20

Initial gap as car B leaves after 2 hour = 40 * 2 = 80kms

Final additional distance required = 9kms

Overall difference in distance = 89kms

Time = Difference in distance/ Relative speed = 89/ 20 hrs = 4.45 hrs / 267 minutes.

6. Find the average of the terms in series 1 -2 +3 -4 +5 -6 +7.....+199 -200

   A. -1/6
   B. 5
   C. -1/2
   D. None of these

Answer: C

If we observe each negative term is one more than previous positive term.

100 such negative and positive numbers are there.

So sum = -1 * 100

As overall 200 terms are there average -100/200 = -1/2.

7. If x/2y = 2 what is the value of (4x + 2y) / (4x – 2y)?

   A. 9/2
   B. 9/6
   C. 9/7
   D. None of these

Answer: C

Divided (4x + 2y) / (4x – 2y) by 2y we get (4x/2y +1) / (4x/2y -1)

As x/2y is 2, substituting we get (4*2+1) / (4*2 – 1) = 9/7

8. n is a natural number and n^3 has 16 factors. Then how many factors can n^4 have?

A. 21
C. 45
B. 22
D. 41

Answer: A

n can be represented in the form of a^p1 * b^p2 * c^p3....

Where a,b,c are prime numbers and P are there powers.

Then number of factors are given as (p1+1)*(p2+1)*(p3+1)...and so on.

Now n^3 having 16 factors represented with the following combinations for p1+1, p2+1, p3+1....(2,8) (4,4) (1,16) (2,2,4)

Which implies p1, p2, p3 can be (1,7) (3,3) (0,15) (1,1,3)

Case 1: When it is (1,7)

This is invalid as 7 is not a multiple of 3 (As n^3 the power should be divisible of 3).

Case 2: When it is (3,3)

So the max power is 3,3 for n^3 and hence for n it is 1,1.

So n^4 it is 4,4.

So total factors can be (4+1)*(4+1) = 25

Case 3: When it is (0,15)

So the max power is 15 for n^3 and hence for n it is 1,1.

So n^4 it is 20.

So total factors can be 20+1 = 21

Case 4: When it is (1,1,3)

This is invalid as 1 is not a multiple of 3 (As n^3 the power should be divisible of 3).

Hence possible number of factors are 21 0r 25.

9. Dinalal donates his properties among his 4 sons after donating Rs.20,000 and 10% of his remaining properties. The amount received by the last three sons are in arithmetic progression ane amount is received by fourth son is equal to total amount donated. The 1^{ST} so received his as his share is Rs. 20,000 more than the square of second son. The last son received Rs. 1 lakh less than the eldest son. Find the share of 3^{RD} son.

A. 150000
C. 120000
B. 130000
D. None of these

Answer: C

Let the share be a,b,c,d.

Let the net property worth be p.

d = 20000 + 0.1(p-20000) which is also the donated amount.

Let the difference in the A.P in last three sons be k.

C = d- k and b = d- 2k

Also a = b+ 20000 = d- 2k + 20000

Now adding all a+b+c+2d = p (As donated amount is also equal to d)

d – 2k + 20000 + d – 2k + d – k + 2d = p

5d – 5k + 20000 = p

5(20000 + 0.1(p – 20000)) – 5k + 20000 = p

100000 + 0.5p – 100000 – 5k + 20000 = p ----------(1)

The last son received Rs. 1 lakh less than the eldest son.

d – 2k + 20000 = d + 100000

k = - 40000 ----------(2)

Using equation (1) and (2)

90000 + 200000 + 20000 = 0.5p

P = 6,20,000

So d = 20000 + 0.1(620000 – 20000) = 80000

c = d – k = 12000

10. Two cars start from same point at the same time towards the same destinations which is 420km away. The 1^{ST} & 2^{ND} car travel at the respective speeds 60kmph & 90kmph. After travelling some time the speed of the two cars get interchanging. Finally the 2^{ND} car reaches destination 1 hr earlier than 1^{ST}. Find the time after which the speed gets interchanged?

    A. 5
    C. 4
    B. 6
    D. 1

Answer: C

Let the total time taken by the cars be a & b.

Let the time after which the speed is interchanged is t.

For car A, 60t + 90(a – t) = 420, 90a – 30t = 420 --------(1)

For car B, 90t + 60(b – t) = 420, 60b + 30t = 420 --------(2)

Using the both equation, 90a + 60b = 840

But as a – b = 1, 90a + 60(a – 1) = 840

Solving a = 6

Substituting equation (1), 90*6 – 30t = 420 => t = 4

11. A man sold 12 candies at Rs. 10 had loss of a%. When he again sold 12 candies at Rs. 12, he had a profit of a%. Find the value of a.

A. 10%
C. 9.09%
B. 12.9%
D. None of these

Answer: C

Let the C.P of candy be c.

Case:1

S.P of 1 candy = 10/12

Loss % = (10/12 – c)*100/c = -a

Case:2

S.P of 1 candy = 12/12 = 1

Profit % = (1– c)*100/c = a

Hence c – 10/12 = 1-c,

c = 11/12

a = (1 - c)*100/c = 9.09%

12. 20 passengers are travel by a double decker bus which can accommodate 13 in the upper deck and the 7 in the lower deck. If 5 refuse to sit in the upper deck & 8 refuse to sit in the lower deck, in how many ways can the passengers be distributed?

A. 42 ways
C. 21 ways
B. 22 ways
D. 45 ways

Answer: C

The 5 who refuse to sit in the upper deck must be in the lower.

The 8 who refuse to sit in lower deck must be in the higher.

Hence these 13 people have been utilised and now upper deck can accommodate

13 – 8 = 5 people & lower can accommodate 7 – 5 = 2 people.

The remaining 20 – 5 – 8 = 7 people can distributed in 7C5*2C2 = 21 ways.

13. There are 4 boys & 5 girls in two separate queues. The two queues are merged so that the position of the boys (in relation to each other) & those of the girls (in relation to each other) remain unchanged. In how many ways can this be done?

A. 4C7
C. 9C4
B. 9C5
D. None of these

Answer: B

Now when the queues are merged there are 9 slots. _ _ _ _ _ _ _ _ _

In these slots the girls can be arranged in a fashion without distributing their order. Hence number of ways to arrange girls = 9C5.

The boys can remaining in the remaining 4 slots in only one way as their order should be preserved.

Hence total number of ways = 9C5 * 1 = 9C5.

Note: If you consider arranging boys 1^{ST}, then also = 9C4 * 1 = 9C4 = 9C5.

14. What will be the last two digits of (5306)^2214?

A. 49
C. 86
B. 46
D. 96

Answer: D

The last two digits of (5306)^2214 is last two digits of 06^216.

We will use the following shortcut rule – 76^n always has last two digits as 76.

6^5 will have the last two digits as 76.

Hence we use (06)^216 = ((06)^5)^42 * 06^4 = 76*96 = 7296.

Hence the last two digits will be 96.

15. In an exam 70% of the candidates passed in history & 50% in geography & 20% failed in both the subjects. If 500 students passed in both the subjects, then how many candidates appeared for the exam?

A. 1524
C. 1892
B. 1263
D. 1250

Answer: D

Let total number of students be x

x – 0.2x = total number of students who passed = 0.7x + 0.5x – 500

Solving x = 500/0.4 = 1250

16. A & B run a 1km race. If A gives B a start of 50m, A wins by 14 seconds & if A gives B a start of 22seconds, B wins by 20m. Find the time taken by A to run 1km.

A. 120 seconds
C. 100 seconds
B. 45 seconds
D. None of these

Answer: C

Let speed of A & B be a & b m/sec.

Time taken to cover 1000m by A = 1000/a

Time taken to cover 950m by B = 950/b

Now 950/b - 1000/a = 14 ----------(1)

Also 980/a + 22 = 1000/b,

1000/b – 980/a = 22 ----------(2)

Let 1/a = x & 1/b = y,

950y – 1000x = 14 & 1000y – 980x = 22

Solving, x = 1/10 & a = 1/x = 10m/s.

Time taken by A to run 1km = 1000/10 = 100 seconds.

17. A owes B Rs.50. He agrees to pay B over a number of consecutive days starting on a Monday, paying single note of Rs. 10 or Rs.20 on each day. In how many different ways can A repay B. (Two ways are say to be different if at least 1 day, a note of different denomination is given)

A. 4
C. 7
B. 6
D. 8

Answer: D

Let us consider the possible count of Rs.10 notes being paid to pay Rs.50 & the pattern of payment across the days.

5 ten rupee notes = 5C5 = 1

3 ten rupee notes & 1 twenty rupee notes = 4C3 = 4

1 ten rupee notes & 2 twenty rupee notes = 3C1 = 3

Hence total ways = 1+4+3 = 8.

18. W,X,Y,Z are integers. The expression X – Y – Z is even & expression Y – Z – W is odd. If X is even, what must be true?

A. W must be odd
C. Z must be odd
B. Y – Z must be odd
D. Z must be odd

Answer: A

X is even & X – Y – Z is even.

So Y & Z must both be even or Y & Z both must be odd.

Y – Z – W is odd.

Case :1:

Both Y & Z are even.

In this case W is odd.

Case :2:

Both Y & Z are odd.

In this case too W is odd.

19. Raj writes a number. He sees that the number of two digits exceeds four times the sum of its digits by 3. If the number is increased by 18, the result is the same as the number formed by reversing the digits. Find the next immediate prime number greater than the number.

A. 34 C. 36

B. 35 D. 37

Answer: D

Let the number be xy.

$10x + y = 4(x+y) + 3$, $6x – 3y = 3$, $2x – y = 1$----------(1)

Also $10x + y + 18 = 10y + x$, $9(y – x) = 18$, $y – x = 2$ ----------(2)

Solving equation 1 & 2, $x = 3$, $y = 5$.

The number is 35. Hence the next immediate number is 37.

20. N is an integer & N>2. How many integers at most among N + 2, N + 3, N + 4, N + 5, N + 6 & N + 7 are prime integers?

A. 3 C. 2

B. 4 D. 1

Answer: C

Above three all prime numbers odd. As N>2, any prime numbers among N + 5, N + 6 & N + 7 will be odd.

Case-1: N + 2 is even.

Then N + 2, N + 4, N + 6 are not prime numbers as they are even. But among N + 3, N + 5, N + 7 at least one should be divisible by 3.

Hence maximum possible is 2.

Case-1: N + 2 is odd.

Then N + 3, N + 5, N + 7 are not prime numbers as they are even. But among N + 2, N + 4, N + 6 at least one should be divisible by 3.

Hence maximum possible is 2.

21. Kate wanted to buy 2kgs of apples. The vendor kept the 2kg weight on the right side & weighted 4 apples for that. She doubted on the correctness of the balance & placed 2kg weight on the left side & she could weight 14 apples for 2kgs. If the balance have correct then how many apple she would got?

A. 5
C. 9
B. 6
D. 12

Answer: C

Let the additional weight on the left side be x.

Let the average weight of an apple be a.

x + 4a = 2kgs.

x + 2 = 14a

Solving, a = 2/9kgs.

Hence for the 2kgs she should have got 2/2/9 = 9 apples.

22. The rupee/coin changing machine at a bank has a flaw. It gives 10 ten rupee notes if you put a 100 rupee note & 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 business is left with a one rupee coin & discovers the flaw in machine by accident. By using the machine repeatedly, which of the following amounts is a valid amount that Sivaji can have? (assume that the machine has an infinite supply of notes & coins).

A. 33960
C. 33968
B. 33964
D. 33966

Answer: D

The only point of increment is when he puts 1 re & gets 10 hundred rupee i.e. 1000 rs. Thus he gains 1000 – 1 = 999. So the amount should be a multiple of 999. Only 33966 is a multiple of 999.

23. Find the remainder when 32^33^34 is divided by 11.

A. 11
C. 20
B. 10
D. 50

Answer: B

11 is a prime number & 11 – 1 =10

33^34 has to be written as 10k + a

Unit digit of 33^34 is 9.

Hence a = 9.

Rem 32^(10k + 9) divided by 11.

Now using Fermat's little theorem we have the above expression as

= Rem 32^9 divided by 11

= Rem 10^9 divided by 11 (32 mod 11 is 10)

= Rem (-1)^9 divided by 11

= -1 which is nothing but 10

24. Find the option to replace to question mark in the series below.

5 ? 15 75 525 4725

A. 5
C. 75
B. 15
D. None of these

Answer: A

5*1=5

5*3=15

15*5=75

75*7=525

525*9=4795

25. There are several bags of same weight. A bag is 6kgs plus three fourth of the weight of another bag. What is the weight of a bag?

A. 20 kg
C. 26 kg
B. 24 kg
D. 28 kg

Answer: B

Let a bag's weight be x.

It is given 6 + 0.75x = x,

Solving x = 24.

26. Find the remainder when 6^50 is divided by 215.

A. 26
C. 46
B. 36
D. 86

Answer: B

6^3=216

6^50=216^16 * 6^2

Hence remainder 6^50 is divided by 215 = Remainder 216^16 divided by 215 * Remainder 6^2 divided by 215 = 1*36 = 36.

27. 6 positive numbers are taken at random & multiplied together. Then what is the probability that the product ends in an odd digit other than 5?

A. 65/15628
B. 82/15625
C. 64/15625
D. None of these

Answer: C

Let us find the probability that the product ends with odd digit.

For a product's unit digit to be odd, no unit digit in the 6 digit should be even. Elase even * odd will be even.

For the unit digit to be an odd digit other than 5, 5 should not be in the unit digit.

So possible digits in unit digit of all the six numbers are 1,3,7,9 out of 1,2,3,4,5,6,7,8,9,0.

Hence required probability = (4/10)^6 = (2/5)^6 = 64/15625.

28. Find last two digits of the following expression.

(201*202*203*204*206*207*208*209)^2.

A. 45
B. 46
C. 75
D. 76

Answer: D

Considering 201*202*203*204 last two digits are 24.

Considering 206*207*208*209 last two digits can be found from 42*72 = 3024 & hence 24.

Now overall last two digits = 24*24 = 576 & hence 76.

Now as it is squared, 76*76 = 5776 & Hence answer is 76.

29. Two wages of 24 men & 16 women amounts to 11600 per day. Half the number of men & 37 women earn the same amount per day. What is the daily wage of a man?

A. Rs.245
B. Rs .584
C. Rs.350
D. None of these

Answer: C

Let the wage of men be m & women be w.

24m – 16w = 11600

12m + 37w = 11600

24m*37 – 12m*16 = 11600*(37 – 16)

12m(2*37 – 16) = 11600*(37 – 16)

Solving m = 11600*21/(12*58) = 200*7/4 = 350

30. The sum of three digits in a number is 17. The sum of square of the digits is 109. If we subtract 495 from the number, the number is reversed. Find the number.

A. 840
C. 863
B. 860
D. 864

Answer: C

Let the digits be abc.

a+b+c=17----------(1)

a^2 + b^2 + c^2 = 109 ----------(2)

Also 100a + 10b+c – 495 = 100c + 100b + a

99(a - c) = 495. Thus a – c = 5.

The possible combinations are (6,1), (7,2), (8,3), (9,4).

Case-1: (6,1)

From equation (1), b = 17-7=10 which not possible as b is a single digit.

Case-1: (7,2)

From equation (1), b = 17-9=8

Verifying with equation (2), 49+4+64=117 & hence not valid.

Case-1: (8,3)

From equation (1), b = 17-11=6

Verifying with equation (2), 64+9+36=109 & hence valid.

Thus the number is 863.

31. Find the last two digits of (1021^3921) + (3081^3921)

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

Answer: B

To find out the last two digits of a term where the number ends with 1, multiply the tens digit of the number with the last digit of the exponent.

This will give you the tens digit. Unit digits will always 1.

Applying this shortcut,

For 1021^3921 last two digits is (2*1)1 = 21

For 3081^3921 last two digits is (8*1)1 = 81

Adding both we get 102.

Hence the last two digits of expression is 02.

32. A series is given as 1, 6, 7, 13, 20, 33, ... & so on. Find the sum of 1^{ST} 52 terms.

A. 123658978542
C. 185674859641
B. 259631485632
D. 352849113670

Answer: D

1^{ST} & 2^{ND} terms are 1,6

3^{RD} term is 7, which is sum of the 1^{ST} + 2^{ND}.

4^{TH} term is 13, which is sum of the 2^{ND} + 3^{RD}

Expanding the series further by adding a few more terms, it is

1, 6, 7, 13, 20, 33, 53, 86, 139 & so on.

Now if we add the terms for up to 1, 2, 3, 4, 5, 6 terms it is

1, 7, 14, 27, 47, 80, 133, 219 & so on.

Hence we can infer the sum up to N^{TH} term is (N+2) nd term -6.

As 1+6+7 is sum up to 3 terms & it is 5^{TH} term minus 6 = 20 – 6 = 14

As 1+6+7+13+20+33+53 is sum up to 7 terms & it is 9^{TH} term minus 6 = 139–6= 133

Hence sum up to 52^{ND} term is nothing but 54^{TH} term -6.

Now our task is to find 54^{TH} term.

Using the golden ratio we can easily find the 54^{TH} term. But we will just find few more terms for accuracy.

1, 6, 7, 13, 20, 33, 53, 86, 139, 225, 364, 589, 953, 1542 which is up to 14 terms.

So 54^{TH} term = 1542 * (1.6180339)^40 = 352849113676 approx.

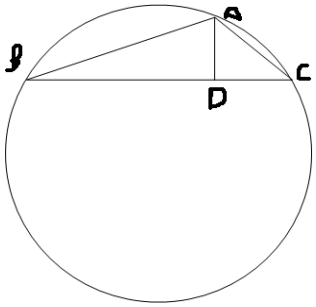
Hence sum will be 352849113676 – 6 = 352849113670.

33. Given

In ABC triangle,

AB=17.5 unit, AC=9 unit &

AD= 3 unit. Find the radius of the circle?



A. 26.25 sq.units
B. 25.35 sq.units
C. 23.63 sq.units
D. None of these

Answer: A

The radius of the circle – R circumscribing a triangle is given by the formula,

R = abc/ (4*Area of traingle)

Area of triangle = ½ * base * height = ½ * BC * AD = 1.5BC (As AD = 3)

a, b, c are the sides which are 17.5, 9 & BC respectively.

Hence radius R = 17.5 * 9**BC/ (4*1.5BC) = 17.5*9/6 = 26.25 sq.units.

34. A city in the US has a basket ball league with three basket ball teams, the Aztecs, the Braves and the Celtics. A sports writer notices that the tallest player of the Aztecs is the shortest than the shortest player of the Braves. The shortest player of the Celtics is the shortest of the Aztecs. While the tallest of the braves is shorter than the tallest of the Celtics. The tallest of the braves is taller than the tallest of the Aztecs. Which of the following can be judged with certainty?

X) Paul, a brave is taller than David, an Aztec
Y) David, a Celtic is shorter than Edward, an Aztec

A. X only
B. Both X and Y
C. Neither X & Y
D. Y only

Answer: A

35. A rectangle of height 100 squares and width 200 squars is drawn in a graph paper. It is colored square by sqaure from top left corner and moving across in a spiral turning right. Whenever a side of this rectangle or a colored square is reached. Which square is colored last? (Give its row and coloumn numbers. The bottom right sqaure is on row 100, column 200)

A. 51, 150
B. 51, 50
C. 50, 150
D. 50, 50

Answer: A