



Mock Test Number: 012

1. $30^{72}87$ divided by 11 gives remainder.

A. 1
B. 5

C. 3
D. 7

Answer:

The cycle of remainder when increasing power of 30 is divided by 11 gives the result as 5.

2. The probability of a bomb hitting a bridge is $\frac{1}{2}$ and two direct hit are required to destroy it the least no. of bomb required so that the probability of the bridge being destroyed is greater than 0.9 is

A. 1
B. 3

C. 5
D. 10

Answer:

The last bomb out of n bombs should hit the target. So, out of 2 bombs that must hit the target to destroy it, the last bomb is out of them.

Out of $n-1$ bombs now, anyone should hit it.

$P(1 \text{ bomb hitting the target}) =$

$$[n-1, \left(\frac{1}{2}\right)] \times \left(\frac{1}{2}\right) > 0.9$$

$$\Rightarrow \frac{n-1}{2} > 0.9 \Rightarrow n-1 > 3.6 \Rightarrow n = 5$$

3. There is 200m long tunnel, one train enters at a speed of 200mph while other train enters the tunnel in opposite direction at a speed of 1000mph. A bee travels at a speed of 1500mph enters the tunnel goes to and fro until reaches a train. What is the distance covered by the bee when two trains collide?

A. 260m
B. 350m

C. 250m
D. 173m

Answer:

Time taken by the trains to collide
 $= \frac{200}{200+1000} = \frac{1}{6} \text{ hrs}$

For this length of time, the bee keeps flying from one train to other.

$$\therefore \text{distance covered} = 1500 \times \frac{1}{6} = \boxed{250\text{m}}$$

4. Find the product of all factors of 5^{12} .

A. 12
B. 512

C. 14
D. 20

Answer:

Total factors of $5^{12} = (12+1) = 13$

So, there can be 6 proper pairs of factors & one middle term, viz 5^6 . product of all factors of 5^{12} would be $5^6 \times 5^6 = 5^{12}$

This is because
of number of pairs of factors

This term is the middle
term of all factors.

5. Find the unit digit of $34^{26} \cdot 23$ is

A. 6
B. 7

C. 8
D. 9

Answer:

Unit digit
of $34^{26} \cdot 23$
 $\rightarrow 4^{26} \cdot 23$
 $\rightarrow 4^{26} \cdot 23$

Power of 4 is even number

Power of 4	Unit digits
4^1	$\rightarrow 4$
4^2	$\rightarrow 6$
4^3	$\rightarrow 4$
4^4	$\rightarrow 6$

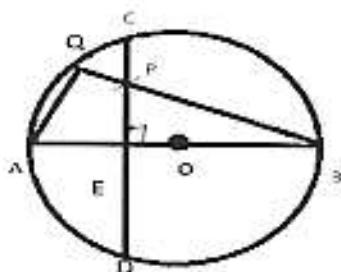
Even power of 4 results in 6 at unit's place

So answer is 6.

6. In a circle O, AB and CD are two chords such that $AB > CD$ and AB is perpendicular bisector of CD at E. P is a point on CD and when BP is extended it meets the circle at Q. For any point P, the triangle BPE is similar to triangle option

A. AEC
B. QDP

C. QAB
D. ABC



Answer: By the condition of the question, AB is the diameter of circle.

$$\angle \triangle BPE, \angle E = 90^\circ$$

If we go by options we find that in $\triangle BAE$,

$$\angle Q = 90^\circ \text{ [as angle in semicircle is a right angle]} \\ = \angle ABQ = \angle EBP.$$

$$\text{Hence } \triangle BPE \cong \triangle BAQ.$$

7. The number 84210p31q is divisible by 88. What is the value of p+q?

A. 11

B. 12

C. 17

D. 90

Answer: 88 \rightarrow 1128

For 8 last 3 digits must be divisible by 8.

So, only option for q=2.

$$\text{For 11, } (2+3+0+2+8) - (1+p+1+4) = 0/11K$$

$$\Rightarrow 15 - p - 6 = 0/11K$$

$$\Rightarrow p = 9$$

$$\text{So } p+q = 9+2 = 11$$

8. When the numbers are written in base b, we have $15 \times 25 = 414$. Then the value of b is.

A. 5

B. 2

C. None of these

D. Data inadequate

Answer:

$$(15)_b \times (25)_b = (414)_b \Rightarrow (b+5)(2b+5)$$

$$= 4b^2 + b + 4$$

$$\Rightarrow 2b^2 + 15b + 25 = 4b^2 + b + 4$$

$$\Rightarrow 2b^2 - 14b - 21 = 0$$

b will be fractional. Hence wrong data

9. Set A {1, 3, 10, 17, 19}, B {9, 12, 15, 18, 21} and set C {4, 7, 10, 13, 16, 19} probability of a num from A + a num from B > a num from C. (not sure about numbers)

A. 120/50
B. 133/140

C. 133/150
D. None of these

Answer:

$$\text{Sample space} = 5 \times 5 \times 6 = 150$$

Going case by case

From C if 4 is selected, we have $5 \times 5 = 25$ favourable pairs

From C if 7 is selected, we have $5 \times 5 = 25$

From C if 10 is selected, we have $5 \times 5 - 1 = 24$

From C if 13 is selected, we have $5 \times 5 - 3 = 22$

From C if 16 is selected, we have $5 \times 5 - 5 = 20$

From C if 19 is selected, we have $5 \times 5 - 8 = 17$

$$\text{Total favourable pairs} = 133$$

$$\text{Probability} = 133/150$$

10. The 288th term in the series a, b, b, c, c, c, d, d, d, d, d, e, e, e, e, e is

A. X
B. Y

C. Z
D. None of these

Answer:

a → once

b → twice

c → thrice

d → four times

e → 26 times

Hence we can say

$1 + 2 + 3 + \dots + 26$ will be the total terms in the series.

$$\frac{n(n+1)}{2} > 288$$

$$n(n+1) > 576 \quad \text{--- (A)}$$

for $n=22$ the value will be

$$22(23) = 506$$

$$n=23 \text{ value} = 23(24) = 552$$

$$n=24 \text{ value} = 24(25) = 600$$

Hence 24th alphabet in the series will be 288th

term which is X.

(OR) ALTERNATE

$$\begin{array}{rcl} \frac{22(23)}{2} = 253 & \downarrow & 23^{\text{rd}} \text{ will be there} \\ \frac{23(24)}{2} = 276 & \downarrow & \\ \frac{24(25)}{2} = 300 & \downarrow & 24^{\text{th}} \text{ will be there} \end{array}$$

11. Find the last three digits of 2988^{687} .

- ☐ A. 592
☐ B. 288

- ☐ C. 187
☐ D. None of these

Answer:

For last 3 digits we have to find,

$$\begin{aligned} \text{Rem} \left[\frac{2988^{687}}{100} \right] &= \text{Rem} \left(\frac{3000 - 12}{1000} \right)^{687} \\ &= \frac{\text{Rem}(-12)^{687}}{1000} = 592. \end{aligned}$$

12. What is the value of $(222224 \times 444445 + 222221 + 666668) / (222222)^2$?

- ☐ A. 444447
☐ B. 444448

- ☐ C. 444446
☐ D. 444443

Answer:

$$\text{Let } x = 222222$$

$$\Rightarrow 2x = 444444 \quad 3x = 666666$$

$$\text{So } \frac{(x+2)(2x+1)(x-1) + (3x+2)}{x^2}$$

$$= 2x + 3$$

$$= 444447$$

13. To complete a task two men work on first day and three men work on second day and so on, till it gets completed. If the same work can be completed by 9 men for 15 days, in how many days will the work be completed in earlier case?

A. 15
B. 16

C. 17
 D. 18

Answer:

Let a man completes 1 unit per day.

$$\text{So, } 2 \times 1 + 3 \times 1 + 4 \times 1 + \dots \text{ } n \text{ days} = 9 \times 15$$

$$\Rightarrow 2 + 3 + 4 + \dots n = 135$$

$$\Rightarrow \frac{n(n+1)}{2} - 1 = 135$$

$$\Rightarrow \boxed{n = 16}$$

14. What is the probability that a 9 digit number formed using 1, 2, 3, 4, 5, 6, 7, 8, 9 is divisible by 36 (without repetition)?

A. 7/36
 B. 2/66

C. 4/25
 D. 5/2

Answer:

Sample space = 9!

For divisibility by 36, the number must be divisible by 9 & 4.

9 → Every 9 digit number made up of given digits will be divisible by 9 as their sum is 45 which is divisible by 9.

4 → Last 2 digits must be divisible by 4. So, options are 12, 16, 24, 28, 32, 36, 48, 52, 56, 72, 76, 84, 92, 96.

For every such option, remaining digits can be arranged in 7! ways.

$$\text{So, probability} = \frac{14 \times 7!}{9!} = \frac{14}{9 \times 8} = \boxed{7/36}$$

15. What annual installment will discharge a debt of Rs. 1092 in 3 years of 12% SI?

A. 255

B. 966

C. 455

D. 255

Answer:

$$\frac{A}{\left(1 + \frac{12}{100}\right)} + \frac{A}{\left(1 + \frac{12}{100}\right)^2} + \frac{A}{\left(1 + \frac{12}{100}\right)^3} = 1092$$

$$A(1.12)^2 + A(1.12) + A = 1092(1.12)^3$$

$$A = \frac{1092(1.12)^3}{(1.12)^2 + (1.12) + 1}$$

$$\boxed{A \approx 455}$$

16. The present worth of Rs. 1404 due in two equal half yearly installments at 8% per annum simple is:

A. Rs. 1325

B. Rs. 1300

C. Rs. 1350

D. Rs. 1500

Answer:

$$A(1.04) + A(1.04)^2 = 1404$$

$$\Rightarrow \boxed{A = 1350}$$

17. In an air force of a country, there are $(3x^2 - 5x - 2)$ fighter planes and $(x^2 - x - 2)$ cargo planes. Both types of planes are put in different group in such a way that every group consists of equal number of planes. An official is appointed to take care of each and every group. Find out the least number of officials to be appointed so that there is at least one official for every group.

A. $4x+2$
B. $4x+3$

C. $4x+4$
D. None of these

Answer:

$$\begin{aligned} \text{Fighter planes} &= 3x^2 - 5x - 2 = 3x^2 - 6x + x - 2 \\ &= 3x(x-2) - (x-2) \\ &= (3x+1)(x-2) \end{aligned}$$

$$\text{Cargo planes} = x^2 - x - 2 = (x+1)(x-2)$$

One official for each group, so we have to find

Number of groups \geq least no. of groups. For that, the no. of players in each group must be highest. i.e. See the HCF of above factors is $(x-2)$. So fighter players in groups of $(x-2)$ players & $(3x+1)$ groups. Similarly cargo planes $(x-2)$ planes in $(x+1)$ groups.
 Total no. of groups $= (3x+1) + (x+1) = 4x+2$.

18. $9+99+999+9999+\dots$ up to 23 terms, find the last 3 digits of the sum.

A. 009

B. 508

C. 085

D. 850

Answer: For last three digits, we have to find remainder of the number when divided by 1000. The remainder in the above expressions are -

$$9 + 99 + (999 + 9999 + 9999) \rightarrow 21 \text{ terms} \\ = 108 + 23 \times 999 \\ = 23085$$

\therefore Last 3 digits are 085.

19. A sum of money is sufficient to pay A's wages for 24 days and B's wages for 40 days. The same money is sufficient to pay the wages of both for:

A. 15 days

B. 25 days

C. 35 days

D. 12 days

Answer:

$$\text{LCM of } (24, 40) = 120$$

$$\text{Let A's 24 day's wage} = \text{B's 40 days wage} = 120$$

$$\Rightarrow \text{A's daily wage} = 120/24 = 5/-$$

$$\text{B's daily wage} = 120/40 = 3/-$$

$$\text{A's \& B's daily wage} = 5 + 3 = 8/- \text{ per day}$$

$$\text{So, } \frac{120}{8} = 15 \text{ days, amount will last.}$$

20. 12 persons seated in circular table. 2 women and 10 men, probability of seating 3 men between 2 women?

A. 2/11

B. 3/42

C. 2/10

D. None of these

Answer: Sample Space = $(12-1)! = 11!$

3 men & 2 women can be treated as one group, so half-group & remaining 7 persons circular arrangement is $7!$.
Two women can interchange their places in $2!$ ways.
Those 3 men can be selected & arranged in ${}^{10}C_3 \times 3!$ ways

$$\text{So, probability} = \frac{7! \times 2! \times {}^{10}C_3 \times 3!}{11!} = 2/11$$

21. Successive discounts of 20%, 10% and 5% amount to single discount of:

A. 68.40%

B. 31.60%

C. 32.60%

D. 34%

Answer:

$$0.3 \times 0.9 \times 0.95 = 0.684$$

This is equal to

$$1 - 0.684 = 31.60\% \text{ discount}$$

22. The latest registration no. issued by the Delhi Motor Vehicle registration authority is DL-5S-2234. If all the numbers and alphabets before this have been used up, then find how many vehicles have a registration number starting with DL-5.

A. 182213

B. 182214

C. 182216

D. 182218

Answer:

For every alphabet after DL-5, there would be 9999 vehicles.
So up to R, there are 18 alphabets. So, total vehicles = 9999×18

Now in DL-5S series, there are 2234 vehicles.

So total no. of vehicles starting with DL-5S

$$= 9999 \times 18 + 2234 = 182216$$

23. A and B run 1 km race. If A gives B start of 50 m, A win by 14 secs, if B gives a start by 22 secs, B win by 20m. Find the time taken to complete the race?

- A. 100
B. 120

- C. 145
D. 200

Answer: A gives B a start of 50m means, A runs 1000m & B runs only 950. By the time A reaches the target, B has to take 22 secs to reach the target.

$$a/b = \frac{1000}{950-146} = \frac{980}{1000-226}$$

$$50,000 - 1100b = 46550 - 686b$$

Solving we get $b = 25/3$

Now Assume A's speed = x

$$\frac{1000}{950-14(25/3)} = x/25/3$$

$$x = 10$$

$$\text{So } x \text{ takes } 1000/10 = 100 \text{ sec}$$

24. 2 person A & B are rolling a dice on the condition that the person who gets 3 will win the game. If A starts the game, then find the probabilities of A & B respectively to win the game?

- A. 2/11
B. 10/11

- C. 5/11
D. 20/11

Answer:

Let A = Probability that A gets a 3 = $1/6$

\bar{A} = Probability that A doesn't get a 3 = $5/6$

B = Probability that B gets a 3 = $1/6$

\bar{B} = Probability that B doesn't get a 3 = $5/6$

\therefore Probability of A winning the game

$= A + \bar{A} \cdot \bar{B} \cdot A + \bar{A} \cdot \bar{B} \cdot \bar{A} \cdot B + \dots$ till ∞ terms

$$= \frac{1}{6} + \left(\frac{5}{6}\right)^2 + \frac{1}{6} + \left(\frac{5}{6}\right)^4 + \frac{1}{6} + \dots$$

$$= \frac{6}{11}$$

\therefore Probability of B, winning the game

$$= 1 - \frac{6}{11} = \frac{5}{11}$$

25. What will the value of n to make the value of $2^{74} + 2^{2058} + 2^{2n}$ to be perfect square?

- A. 2010
B. 2012

- C. 2020
D. 2100

Answer: $(2^{37})^2 + 2 \cdot 2^{37} \cdot 2^{2020} + (2^n)^2$

If $n = 2020$, we have $(2^{37})^2 + 2 \cdot 2^{37} \cdot 2^{2020} + (2^{2020})^2$

$$= (2^{37} + 2^{2020})^2$$

So $n = 2020$

26. In the sample subtraction problem below, single digits are replaced by letter. Find the values of $3 \cdot A + 7 \cdot B + 4 \cdot C + D$?

$$\begin{array}{r} A5C1 \\ -3B79 \\ \hline 397D \end{array}$$

- A. 95

- B. 96

- C. 97

- D. 98

Answer:

$$\begin{array}{r} A5C1 \\ -3B79 \\ \hline 397D \end{array}$$

* $11 - 9 = D \Rightarrow D = 2$

* $C - 1 + 10 - 7 = 7 \Rightarrow C = 5$

* $5 - 1 + 10 - B = 9 \Rightarrow B = 5$

* $A - 1 - 3 = 3 \Rightarrow A = 7$

$$\begin{aligned} & 3A + 7B + 4C + D \\ &= 3 \times 7 + 7 \times 5 + 4 \times 5 + 2 \\ &= 21 + 35 + 20 = \boxed{76} \end{aligned}$$

27. There are two pipes A and B. If A filled 10 liters in hour, B can fill 20 liters in same time. Likewise B can fill 10, 20, 40, 80, 160. If B filled in $(1/16)$ th of A tank in 3 hours, how much time will it take to fill completely?

A. 7 hrs
B. 8 hrs

C. 4 hrs
D. 1 hrs

Answer:

$$B \rightarrow \frac{1}{20} \text{ in } 3 \text{ hours}$$

$$\text{Time } \frac{1}{4} + 3 = 7 \text{ hours}$$

28. Find the sum of number between 200 and 300, which is multiple of 3.

A. 8217
B. 2847

C. 1185
D. 3674

Answer:

$$201 + 204 + \dots + 297$$

$$T_n = a + (n-1)d$$

$$297 = 201 + (n-1)3 \Rightarrow n = 33$$

$$S_n = \frac{n}{2} (a + l) = \frac{33}{2} (201 + 297) = \boxed{8217}$$

29. The remainder when 2^{232} is divided by 43 is:

A. 41
B. 42

C. 43
D. 44

Answer:

$$2^{232} = (2^7)^{33} \times 2 = (128)^{33} \times 2$$

$$= (129-1)^{33} \times 2 = (43 \times 3 - 1)^{33} \times 2$$

when it is divided by 43, Remainder $= (-1)^{33} \times 2 = -2$

$$\boxed{\text{Remainder} = -2 + 43 = 41}$$

30. How many 2's are there between 223 to 2222?

A. 583

B. 598

C. 532

D. 478

Answer:

Between 223 — 229 → 91 2's

Between 300 — 999 → $20 \times 7 = 40$ 2'sBetween 1000 — 1999 → $20 \times 10 = 300$ 2's
+ 100×1 Between 2000 — 2222 → $6 + 46 = 52$ 2's583 2's

31. 14 men and 9 women complete a dam in 15 days. 9 men and 4 women do the same in 40 days. Determine the time for 10 men and 10 women to complete the same work.

A. 31

B. 32

C. None of these

D. Insufficient data

Answer:

14m & 9w → 15 days

⇒ $14 \times 15m$ & $9 \times 15w$ → 1 day

Also 9m & 4w → 40 days

⇒ $9 \times 40m$ & 4×40 → 1 day⇒ $14 \times 15m + 9 \times 15w = 9 \times 40m + 4 \times 40w$ ⇒ $210m + 135w = 360m + 160w$ ⇒ $150m + 25w = 0$ ⇒ $w = -6m$ (wrong data)

32. The ratio of apples : oranges : pears = 7:11:9. Timmy ate 21 fruits as a result the ratio of apples : oranges : pears became 2:3:3. How many fruits were left?

A. 167

B. 168

C. 165

D. 156

Answer:

Total fruits = $7x + 11x + 9x = 27x$ Remainly fruits = $2y + 3y + 3y = 8y$ $27x - 21 = 8y$ One solution of the equation is $x = 7, y = 21$ So final number of fruits could be $8y = 8 \times 21 = 168$.

33. The cost of diamond varies directly as the square of its weight. Once, the diamond broke into four pieces with weights in the ratio 1:2:3:4. When the pieces were sold, the merchant got 70000 less. Find the original price of the diamond/

A. 1,00,000
B. 12,00,000

C. 11,1125
D. None of these

Answer:

Let original weight = 10kg.

$$V \propto w^2$$

$$\Rightarrow V = Kw^2$$

where K is a constant

$$\text{So, value} = V = K \times 10^2 = 100K$$

$$\text{final value} = K(1)^2 + K(2)^2 + K(3)^2 + K(4)^2 = 30K$$

$$\text{Reduction in value} = 100K - 30K = 70K = 70000 \Rightarrow K = 1000$$

$$\text{So original price} = 100K = 100 \times 1000 = \boxed{1,00,000}.$$

34. For a real number x, $\text{int}(x)$ denotes the integral part of x that is $\text{int}(x)$ is the largest integer less than or equal to x. The value of $\text{int}(1/2) + \text{int}(1/2 + 1/100) + \text{int}(1/2 + 2/100) + \dots + \text{int}(1/2 + 99/100)$ is

A. 50
B. 49

C. 51
D. 48

Answer:

$$x = \text{int}(1/2) + \text{int}(1/2 + 1/100) + \text{int}(1/2 + 2/100) + \dots + \text{int}(1/2 + 99/100)$$

$$x = [\text{int}(1/2) + \text{int}(1/2 + 1/100) + \dots + \text{int}(1/2 + 49/100)] +$$

$$[\text{int}(1/2 + 50/100) + \text{int}(1/2 + 51/100) + \dots + \text{int}(1/2 + 99/100)]$$

$$[\text{int}(1/2) + \text{int}(1/2 + 1/100) + \dots + \text{int}(1/2 + 49/100)] = 0 \text{ as, all}$$

terms less than 1.

$$\text{So } x = [\text{int}(1/2 + 50/100) + \text{int}(1/2 + 51/100) + \dots + \text{int}(1/2 + 99/100)]$$

$$= 1 + 1 + 1 + \dots \text{ 50 times (from 50 to 99 = 50 times)}$$

$$\boxed{= 50}$$

35. A merchant buys 20Kg of wheat at Rs 30 per kg and 40kg wheat at Rs 25 Per kg. he mixed them and sell the one third of the mixture at 26 per Kg. The price at which the merchant should sell the remaining mixture so that he may earn a profit of 25% on his whole outlay is

- A. Rs 30
B. Rs 36

- C. Rs 40
D. Rs 37

Answer:

$$\text{Total CP} = 20 \times 30 + 40 \times 25 = 1600$$

$$\text{SP} = 125/100 \times 1600 = 2000 \text{ (25\% profit)}$$

$$\text{SP for 20kg mix} = 26 \times 20 = 520$$

$$\begin{aligned} \text{Remaining total SP should be} \\ = 2000 - 520 = 1480 \end{aligned}$$

$$\boxed{\text{The SP for 40kg} = 1480/40 = 37}$$