Maths Questions for TISSNET

Instructions
For the following questions answer them individually

Question 1

How many pairs of positive integers m, n satisfy 1/m + 4/n = 1/12 , where n is an odd integer less than 60?

A 6

B 4

C 7

D 5

E 3

Answer: E

Explanation:
1/m + 4/n = 1/12
So, 1/m = 1/12 - 4/n
So, m = 12n/(n-48)
Since m is positive, n should be greater than 48
Also, since n is an odd number, it can take only 49, 51, 53, 55, 57 and 59
If n = 49, 51, 57 then m is an integer, else it is not an integer
So, there are 3 pairs of values for which the equation is satisfied

Question 2

Let T be the set of integers {3,11,19,27,...451,459,467} and S be a subset of T such that the sum of no two elements of S is 470. The maximum possible number of elements in S is

A 32

B 28

C 29

D 30

Answer: D

Explanation:
No. of terms in series T , 3+(n-1)*8 = 467 i.e. n=59.

Now S will have atleast have of 59 terms i.e 29 .

Also the sum of 29th term and 30th term is less than 470.

Hence, maximum possible elements in S is 30.

Question 3

Suppose n is an integer such that the sum of digits on n is 2, and $10^{10} < n < 10^{11}$. The number of different values of n is

A 11

B 10

C 9

D 8

Answer: A

Explanation:
The sum of digits should be 2. The possibilities are 1000000001,1000000010,10000000100,..these 10 cases . Also additional 1 case where 20000000000. Hence option A .

XAT Previous Papers

Question 4

If a/b = 1/3, b/c = 2, c/d = 1/2 , d/e = 3 and e/f = 1/4, then what is the value of abc/def ?

A 3/8

B 27/8

C 3/4

D 27/4

E 1/4

Answer: A

Explanation:
a/d = a/b * b/c * c/d = 1/3 * 2 * 1/2 = 1/3

Similarly, b/e and c/f are 3 and 3/8 respectively.

b/e = b/c*c/d*d/e = 3

c/f = c/d*d/e*e/f = 3/8

=> Value of abc/def = 1/3 * 3 * 3/8 = 3/8

Question 5

What are the values of x and y that satisfy both the equations?

$2^{0.7x} * 3^{-1.25y} = 8\sqrt{6}/27$

$4^{0.3x} * 9^{0.2y} = 8 * 81^{1/5}$

A x = 2, y = 5

B x = 2.5, y = 6

C x =3, y = 5

D x = 3,y = 4

E x = 5,y = 2

Answer: E

Explanation:
$2^{0.7x} * 3^{-1.25y} = 8\sqrt{6}/27$ => $2^{0.7x} * 3^{-1.25y} = 2^{3.5} * 3^{-2.5}$

=> 0.7x = 3.5 => x = 5

=> -1.25y = -2.5 => y = 2

$4^{0.3x} * 9^{0.2y} = 8 * 81^{1/5}$ => $2^{0.6x} * 3^{0.4y} = 2^3 * 3^{0.8}$

=> 0.6x = 3 => x = 5

=> 0.4y = 0.8 => y = 2

=> (5,2) is the solution.

Question 6

If R = $(30^{65} - 29^{65})/(30^{64} + 29^{64})$ **,then**

A $0 < R \leq 0.1$

B $0.1 < R \leq 0.5$

C $0.5 < R \leq 1.0$

D $R > 1.0$

Answer: D

Explanation:

$\frac{(30^{65}-29^{65})}{(30^{64}+29^{64})} = ((30-29) * \frac{(30^{64}+30^{63}*29+....+29^{64})}{(30^{64}+29^{64})}$, which is greater than 1 . Hence option D.

Question 7

If x = $(16^3 + 17^3 + 18^3 + 19^3)$**, then x divided by 70 leaves a remainder of**

A 0

B 1

C 69

D 35

Answer: A

Explanation:

We know that x = $16^3 + 17^3 + 18^3 + 19^3 = (16^3 + 19^3) + (17^3 + 18^3)$

= $(16 + 19)(16^2 - 16 * 19 + 19^2) + (17 + 18)(17^2 - 17 * 18 + 18^2)$ = 35 × odd + 35 × odd = 35 × even = 35 × (2k)

=> x = 70k

=> Remainder when divided by 70 is 0.

Question 8

Let $n! = 1 * 2 * 3 * ... * n$ **for integer** $n \geq 1$.

If $p = 1! + (2 * 2!) + (3 * 3!) + ... + (10 * 10!)$**, then** $p + 2$ **when divided by 11! leaves a remainder of**

A 10

B 0

C 7

D 1

Answer: D

Explanation:

According to given condiiton we have p = (1 × 1!) + (2 × 2!) + (3 × 3!) + (4 × 4!) + ... + (10 × 10!) . So n × n! = [(n + 1) - 1] × n! = (n + 1)! - n!. So equation becomes p = 2! - 1! + 3! - 2! + 4! - 3! + 5! - 4! +... + 11! - 10!. So p = 11! - 1! = 11! - 1. p + 2 = 11! + 1 .So when it is divided by 11! gives a remainder of 1. Hence, option 4.

Question 9

Let $x = \sqrt{4+\sqrt{4-\sqrt{4+\sqrt{4-}}}}\ to\ infinity$ **. Then x equals**

A 3

B $(\sqrt{13}-1)/2$

C $(\sqrt{13}+1)/2$

D $\sqrt{13}$

Answer: C

Explanation:

$x = \sqrt{4+\sqrt{4-\sqrt{4+\sqrt{4-}}}}\ to\ infinity$

=> $x = \sqrt{4+\sqrt{4-x}}$

=> $x^2 = 4+\sqrt{4-x}$

=>$x^4 + 16 - 8x^2 = 4 - x$

=> $x^4 - 8x^2 + x + 12 = 0$

On substituting options, we can see that option C satisfies the equation.

Question 10

Let N = 1421 * 1423 * 1425. What is the remainder when N is divided by 12?

A 0

B 9

C 3

D 6

Answer: C

Explanation:

The numbers 1421, 1423 and 1425 when divided by 12 give remainder 5, 7 and 9 respectively.

5*7*9 mod 12 = 11 * 9 mod 12 = 99 mod 12 = 3