GATE Previous Year Questions (PYQs)

on

Sequence, Series, Modular Arithmetic, Logarithms

orientation session

Those who have
Enrolled and not joined
Private Telegram groups
please mail us to get added

Mail Id: contact@goclasses.in

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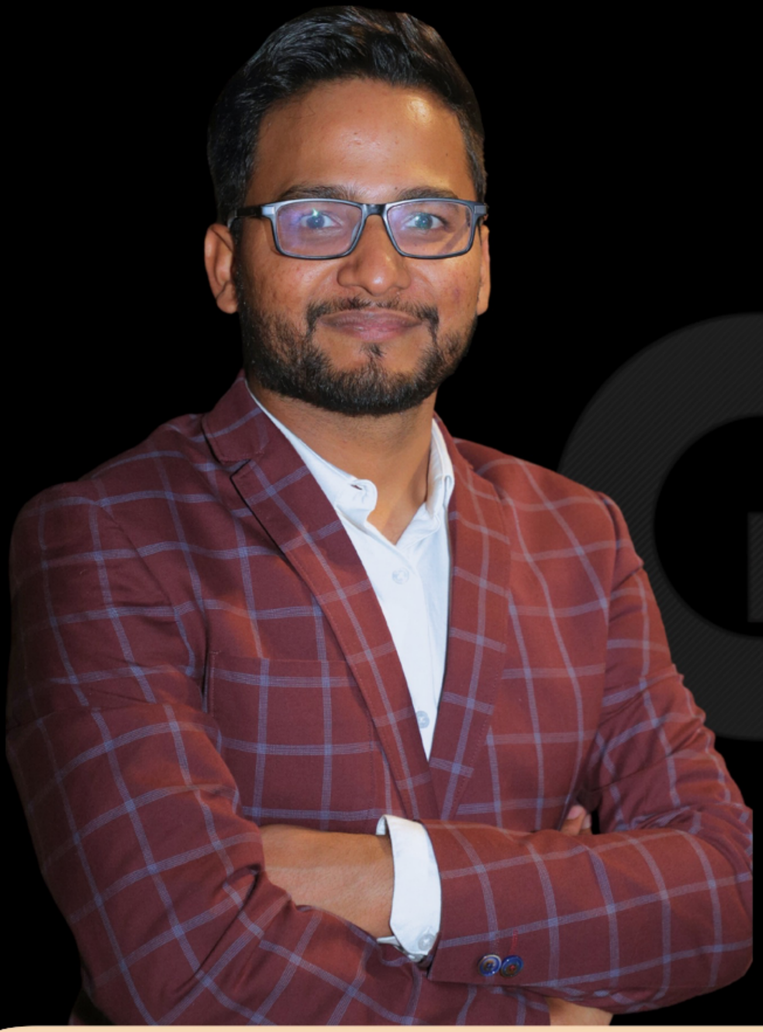
Public Telegram Groups:

1. https://t.me/GATECSE_Goclasses
2. https://t.me/gateoverflow_cse
3. https://t.me/goclasses_cse



Sachin Mittal

Co-founder and Instructor at GO Classes
MTech IISc Bangalore (2017-19)
GATE CSE AIR 33
Ex-Amazon Applied Scientist

→ Machine learning heavy

GATE CSE 2014 Set 3 | Question: GA-4

asked in Quantitative Aptitude Sep 28, 2014 • edited Jun 8, 2018 by Milicevic3306

12

Which number does not belong in the series below?

$$2, 5, 10, 17, 26, 37, 50, 64$$

A. 17
B. 37
C. 64
D. 26

https://gateoverflow.in/2027/gate-cse-2014-set-3-question-ga-4

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2, 5, 10, 17, 26, 37, 50, 64

A. 17
B. 37
C. 64
D. 26

3

5

7

+3 +7 +11 +15

2, 5, 10, 17, 26, 37, 50, 64

+5 +9 +13

it is 65

https://gateoverflow.in/2027/gate-cse-2014-set-3-question-ga-4

GATE CSE 2014 Set 3 | Question: GA-4

asked in **Quantitative Aptitude** Sep 28, 2014 • edited Jun 8, 2018 by **Milicevic3306**

12

Which number does not belong in the series below?

$2, 5, 10, 17, 26, 37, 50, 64$

A. 17
B. 37
C. 64
D. 26

1^2+1 2^2+1 3^2+1 4^2+1 5^2+1 8^2+1 $= 65$

i^2+1

https://gateoverflow.in/2027/gate-cse-2014-set-3-question-ga-4

16

If $a_1, a_2, a_3 \ldots a_n$ is the series and $i = 1$ to n, then the series is defined as $a_i = i^2 + 1$.
i.e the i^{th} term is 1 plus the square of i.
Series will be as follows : $1^2 + 1, 2^2 + 1, 3^2 + 1, 4^2 + 1 \ldots n^2 + 1$

$$2, 5, 10, 17, 26, 37, 50, 65$$

Best answer

Hence 64 does not belong to the series.

Correct Answer: C

answered Oct 12, 2014 • edited Jun 18, 2021 by **Lakshman Bhaiya**

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Srinath Jayachandran

GATE2013 EE: GA-10

asked in Quantitative Aptitude Feb 16, 2016 • recategorized May 7, 2016 by Desert_Warrior

3,995 views

8

Find the sum to $'n'$ terms of the series $10 + 84 + 734 + \dots$

A. $\frac{9(9^n+1)}{10} + 1$
B. $\frac{9(9^n-1)}{8} + 1$
C. $\frac{9(9^n-1)}{8} + n$
D. $\frac{9(9^n-1)}{8} + n^2$

gate2013-ee quantitative-aptitude number-series

https://gateoverflow.in/40297/gate2013-ee-ga-10

GATE2013 EE: GA-10

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D. $\frac{9(9^n-1)}{8} + n^2$

$9+1$ $\quad$ 9^2+3 $\quad$ 9^3+5

gate2013-ee quantitative-aptitude number-series

https://gateoverflow.in/40297/gate2013-ee-ga-10

GATE2013 EE: GA-10

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D. $\frac{9(9^n-1)}{8} + n^2$

in exam: put $n=2$

while preparing: always go for proper method and also see using option elemination

gate2013-ee quantitative-aptitude number-series

https://gateoverflow.in/40297/gate2013-ee-ga-10

GATE2013 EE: GA-10

Proper method

8

Find the sum to $'n'$ terms of the series $10 + 84 + 734 + \dots$

A. $\frac{9(9^n+1)}{10} + 1$

B. $\frac{9(9^n-1)}{8} + 1$

C. $\frac{9(9^n-1)}{8} + n$

D. $\frac{9(9^n-1)}{8} + n^2$

$$(9^1+1) + (9^2+3) + (9^3+5)$$

$$\frac{n}{2}\left(2a+(n-1)d\right)$$

$$9^1 + 9^2 + 9^3 + \dots = \frac{a(r^n-1)}{r-1} = \frac{9(9^n-1)}{9-1}$$

$$1 + 3 + 5 + \dots = \frac{n}{2}\left(2\cdot 1 + 2(n-1)\right) = \frac{n}{2}\cdot \cancel{2}+2n-\cancel{2}$$

$$= n^2$$

GATE2013 EE: GA-10

$$\frac{9(9^2-1)}{8}+4 \qquad 90+4 = 94$$

8

Find the sum to $'n'$ terms of the series $10+84+734+\dots$

A. $\frac{9(9^n+1)}{10}+1$

B. $\frac{9(9^n-1)}{8}+1$

C. $\frac{9(9^n-1)}{8}+n$

D. $\frac{9(9^n-1)}{8}+n^2$

$n=2$ ↓ put Substitute

$\underbrace{10}_{9^1+1} + \underbrace{84}_{9^2+3} + \underbrace{734}_{9^3+5}$

gate2013-ee quantitative-aptitude number-series

https://gateoverflow.in/40297/gate2013-ee-ga-10

$$10+84+734+\ldots=(9^1+1)+(9^2+3)+(9^3+5)+\ldots$$

Such a series is called AGP (Arithmetic Geometric Progression). For solving such progressions, we need to find

$$\sum(GP+AP)=\frac{a(r^n-1)}{r-1}+\frac{n(2a+(n-1)d)}{2}$$

This can be broken down into two parts: the geometric progression (GP) and the arithmetic progression (AP). The sum of a geometric progression is given by $\frac{a(r^n-1)}{r-1}$, and the sum of an arithmetic progression is given by $\frac{n(2a+(n-1)d)}{2}$.

$$\begin{aligned}&=\frac{9(9^n-1)}{8}+\frac{n(2+2n-2)}{2}\\&=\frac{9(9^n-1)}{8}+n^2\end{aligned}$$

Thus, the final expression simplifies to $\frac{9(9^n-1)}{8}+n^2$. So, the answer is (D).

GATE2018 EC: GA-4

4

What is the value of $1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \frac{1}{256} + \ldots\ldots?$

A. 2
B. $\frac{7}{4}$
C. $\frac{3}{2}$
D. $\frac{4}{3}$

gate2018-ec general-aptitude quantitative-aptitude number-series

https://gateoverflow.in/205208/gate2018-ec-ga-4

GATE2018 EC: GA-4

asked in Quantitative Aptitude Feb 21, 2018 • edited Jun 2, 2019 by Lakshman Bhaiya

1,118 views

4

What is the value of $1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \frac{1}{256} + \ldots\ldots?$

$\times 1/4 \quad \times 1/4 \quad \times 1/4 \quad \times 1/4$

A. 2

B. $\frac{7}{4}$

C. $\frac{3}{2}$

D. $\frac{4}{3}$

gate2018-ec general-aptitude quantitative-aptitude number-series

GP

Decreasing GP

$$\frac{a}{1-r}$$

$$\frac{1}{1-1/4} = \frac{1}{3/4} = 4/3$$

https://gateoverflow.in/205208/gate2018-ec-ga-4

7

Best answer

It is an infinite G.P. with first term $a = 1$ and common ratio $r = \frac{1}{4}$.

Sum of infinite G.P with $|r| < 1$ is

$$S_\infty = \frac{a}{1-r}$$

$$S_\infty = \frac{1}{1-\frac{1}{4}}$$

$$S_\infty = \frac{4}{3}$$

Hence option d) is correct

answered Feb 21, 2018 • edited Jun 22, 2019 by **Lakshman Bhaiya**

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Ashwani Kumar 2

GATE CSE 2011 | Question: 57

asked in **Quantitative Aptitude** Sep 29, 2014 • edited Jul 30, 2015 5,077 views

20

If $\log(P) = (1/2)\log(Q) = (1/3)\log(R)$, then which of the following options is **TRUE**?

A. $P^2 = Q^3R^2$
B. $Q^2 = PR$
C. $Q^2 = R^3P$
D. $R = P^2Q^2$

gatecse-2011 quantitative-aptitude normal numerical-computation logarithms

https://gateoverflow.in/2166/gate-cse-2011-question-57

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GATE CSE 2011 | Question: 57

asked in **Quantitative Aptitude** Sep 29, 2014 • edited Jul 30, 2015

5,077 views

20

If $\log(P) = (1/2)\log(Q) = (1/3)\log(R)$, then which of the following options is **TRUE**?

A. $P^2 = Q^3R^2$
B. $Q^2 = PR$
C. $Q^2 = R^3P$
D. $R = P^2Q^2$

gatecse-2011 quantitative-aptitude normal numerical-computation logarithms

$$\log P = \frac{1}{2}\log Q = \frac{1}{3}\log R = K$$

whenever multiple equal signs are there assume to be "K".

https://gateoverflow.in/2166/gate-cse-2011-question-57

GATE CSE 2011 | Question: 57

asked in **Quantitative Aptitude** Sep 29, 2014 • edited Jul 30, 2015 5,077 views

20

If $\log(\mathrm{P}) = (1/2)\log(\mathrm{Q}) = (1/3)\log(\mathrm{R})$, then which of the following options is **TRUE**?

A. $\mathrm{P}^2 = \mathrm{Q}^3\mathrm{R}^2$
B. $\mathrm{Q}^2 = \mathrm{PR}$
C. $\mathrm{Q}^2 = \mathrm{R}^3\mathrm{P}$
D. $\mathrm{R} = \mathrm{P}^2\mathrm{Q}^2$

$$\log P = \frac{1}{2}\log Q = \frac{1}{3}\log R = K$$

$$\log_e P = K \Rightarrow P = e^K$$

$$\frac{1}{2}\log_e Q = K \Rightarrow \underline{Q} = e^{2K}$$

$$\frac{1}{3}\log_e R = K \Rightarrow R = e^{3K}$$

$$\underline{R = PQ}$$

$$\underline{\underline{Q^2 = PR}}$$

$$\log_a x = 5$$

$$x = a^5$$

GATE2012 AR: GA-6

asked in Quantitative Aptitude Feb 16, 2016 • edited Dec 6, 2017 by pavan singh

2,029 views

8

A value of x that satisfies the equation $\log x + \log(x – 7) = \log(x + 11) + \log 2$ is

A. 1
B. 2
C. 7
D. 11

gate2012-ar quantitative-aptitude numerical-computation logarithms

https://gateoverflow.in/40227/gate2012-ar-ga-6

GATE2012 AR: GA-6

asked in Quantitative Aptitude Feb 16, 2016 • edited Dec 6, 2017 by pavan singh

2,029 views

8

A value of x that satisfies the equation $\log x + \log(x – 7) = \log(x + 11) + \log 2$ is

A. 1
B. 2
C. 7
D. 11

$\log(x(x-7)) = \log(2(x+11))$

gate2012-ar | quantitative-aptitude | numerical-computation | logarithms

$x(x-7) = 2(x+11)$

$x^2 - 7x - 2x - 22 = 0$

https://gateoverflow.in/40227/gate2012-ar-ga-6

$x^2 - 9x - 22 = 0$

$$x^2 - 9x - 22 = 0$$

$$x^2 - 11x + 2x - 22 = 0$$

$$x(x-11) + 2(x-11) = 0$$

$$(x+2)(x-11) = 0 \Rightarrow$$

$$\underline{\underline{x = -2}} \text{ or } \underline{11}$$

12

Best answer

$\log m + \log n = \log mn$

So, $\log x + \log(x-7) = \log(x+11) + \log 2$

$\Rightarrow \log x(x-7) = \log 2(x+11)$

$\Rightarrow x(x-7) = 2(x+11)$

$\Rightarrow x^2 - 9x - 22 = 0$

$\Rightarrow (x-11)(x+2) = 0$

$\therefore x = 11$

$\because x \neq -2$, log is undefined for negative number.

Correct Answer: D

answered Feb 29, 2016 • edited Apr 27, 2019 by Naveen Kumar 3

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Praveen Saini

GATE CSE 2023 | GA Question: 3

asked in Quantitative Aptitude Feb 15, 2023 • edited Mar 19, 2023 by Lakshman Bhaiya

8,516 views

6

A series of natural numbers $F_1, F_2, F_3, F_4, F_5, F_6, F_7, \ldots$ obeys $F_{n+1} = F_n + F_{n-1}$ for all integers $n \geq 2$.

If $F_6 = 37$, and $F_7 = 60$, then what is F_1?

A. 4
B. 5
C. 8
D. 9

gatecse-2023 quantitative-aptitude sequence-series 1-mark

					37	60
1	2	3	4	5	6	7

$f_5 + f_6 = f_7$

$f_5 = f_7 - f_6 = 60 - 37$
$= 23$

https://gateoverflow.in/399253/gate-cse-2023-ga-question-3

GATE CSE 2023 | GA Question: 3

asked in Quantitative Aptitude Feb 15, 2023 • edited Mar 19, 2023 by Lakshman Bhaiya

8,516 views

6

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If $F_6 = 37$, and $F_7 = 60$, then what is F_1?

A. 4
B. 5
C. 8
D. 9

gatecse-2023 quantitative-aptitude sequence-series 1-mark

4	5	9	14	23	37	60
1	2	3	4	5	6	7

$f_5 + f_6 = f_7$

$f_5 = f_7 - f_6 = 60 - 37 = 23$

https://gateoverflow.in/399253/gate-cse-2023-ga-question-3

GATE CSE 2023 | GA Question: 3

asked in **Quantitative Aptitude** Feb 15, 2023 • edited Mar 19, 2023 by **Lakshman Bhaiya** 8,516 views

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If $F_6 = 37$, and $F_7 = 60$, then what is F_1?

A. 4
B. 5
C. 8
D. 9

gatecse-2023 quantitative-aptitude sequence-series 1-mark

5	8	13	21	34	55	89
1	2	3	4	5	6	7

https://gateoverflow.in/399253/gate-cse-2023-ga-question-3

9

it is given that $f_{n+1} = f_n + f_{n-1}$

if we put $n = 6, 5, 4, 3, 2$ we get our value.

put $n = 6 \rightarrow f_7 = f_6 + f_5 \implies f_5 = 60 - 37 = 23$

put $n = 5 \rightarrow f_6 = f_5 + f_4 \implies f_4 = 37 - 23 = 14$

put $n = 4 \rightarrow f_5 = f_4 + f_3 \implies f_3 = 23 - 14 = 9$

put $n = 3 \rightarrow f_4 = f_3 + f_2 \implies f_2 = 14 - 9 = 5$

put $n = 2 \rightarrow f_3 = f_2 + f_1 \implies f_1 = 9 - 5 = 4$

So we get $f_1 = 4$ option (B) is correct.

answered Feb 6, 2023

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Hira Thakur

GATE2014 EC-4: GA-5

asked in **Quantitative Aptitude** Mar 17, 2016 — 1,595 views

5

In a sequence of 12 consecutive odd numbers, the sum of the first 5 numbers is 425. What is the sum of the last 5 numbers in the sequence?

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makhdoom ghaya

https://gateoverflow.in/41467/gate2014-ec-4-ga-5

GATE2014 EC-4: GA-5

asked in **Quantitative Aptitude** Mar 17, 2016 · 1,595 views

5

In a sequence of 12 consecutive odd numbers, the sum of the first 5 numbers is 425. What is the sum of the last 5 numbers in the sequence?

gate2014-ec-4 · quantitative-aptitude · sequence-series · normal · numerical-answers

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makhdoom ghaya

$a, \quad a+2, \quad a+4, \quad a+6, \quad a+8, \quad a+10, \quad a+12 \quad \ldots \quad a+22$

odd

$$a + (a+2) + (a+4) + (a+6) + (a+8) = 425$$

$$\Rightarrow \quad 5a + 20 = 425$$

$$\Rightarrow \quad 5a = 405$$

$$\Rightarrow \quad a = \underline{\underline{81}}$$

81, 83, 85, 87, 89, 91, 93, 95,

97, 99, 101, 103

$\Rightarrow$ $95 + 97 + 99 + 101 + 103$

$= 495$

$a, \quad a+2, + \cdots\cdots \quad a+22$

$$S_5 = \frac{5}{2}\left(2a + (5-1)2\right) \qquad \frac{n}{2}\left(2a + (n-1)d\right)$$

$$= \frac{5}{2}\left(2a+8\right) = 5(a+4) = 425 \Rightarrow a = 81$$

$S_{12} - S_7$ ← this is summation of last 5 numbers

$a + a+d + \dots \quad l$

$S_n = \frac{n}{2}(a+l)$

$\underline{a+14} \quad a+16 \quad a+18 \quad a+20 \quad a+22$

$\frac{5}{2}(a+14 + a+22) \Rightarrow \frac{5}{2}(2a+36)$

$= 5(a+18)$

$= 5(81+18) = 99 \times 5$

$= \underline{495}$

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7

Best answer

Let a be the first odd number.
So the terms of sequence will be
$a, a+2, a+4, a+6, \ldots, a+20, a+22$

Sum of first 5 terms $= a+a+2+a+4+a+6+a+8 = 5a+20 = 425$
We get, $5a = 405$
$\implies a = 81$

Sum of last 5 terms $= a+22+a+20+a+18+a+16+a+14$
$= 5a+90$

Now, we have $a = 81$. Substituting it we get,
Answer as $5 \times 81 + 90 = 405 + 90 = 495$

Answer: 495

answered Mar 17, 2016 • edited Jun 9, 2018 by **Arjun**

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abhilashpanicker29

GATE CSE 2005 | Question: 44

Optional

59

What is the minimum number of ordered pairs of non-negative numbers that should be chosen to ensure that there are two pairs (a, b) and (c, d) in the chosen set such that, $a \equiv c \mod 3$ and $b \equiv d \mod 5$

A. 4
B. 6
C. 16
D. 24

mod 3 =

gatecse-2005 set-theory&algebra normal pigeonhole-principle

https://gateoverflow.in/1170/gate-cse-2005-question-44

GATE CSE 2005 | Question: 44

Optional

asked in Combinatory Sep 21, 2014 • edited Nov 23, 2017 by pavan singh 13,061 views

59

What is the minimum number of ordered pairs of non-negative numbers that should be chosen to ensure that there are two pairs (a, b) and (c, d) in the chosen set such that, $a \equiv c \mod 3$ and $b \equiv d \mod 5$

A. 4
B. 6
C. 16
D. 24

gatecse-2005 set-theory&algebra normal pigeonhole-principle

mod 3 = 0, 1, 2

mod 5 = 0, 1, 2, 3, 4

(,)

mod3 mod5

5-6 hours

30-40

example

Pigeon hole principle

https://gateoverflow.in/1170/gate-cse-2005-question-44

3 possibilties

5 possibilties

(,)

mod 3 mod 5

(,)

mod 3 mod 5

15 pairs

15 possiblities

(0, 0)	(0, 1)	(0, 2)	(0, 3)	(0, 4)
(1, 0)	(1, 1)	(1, 2)	(1, 3)	(1, 4)
(2, 0)	(2, 1)	(2, 2)	(2, 3)	(2, 4)

(,)

(2, 0)

0, 1, 2

0, 1, 2, 3

5 pairs

(0,0) (0,1) (1,2)

(1,0) (1,1) (2,2)

(0,0) (0,1)

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in GATE DA

we will teach required DM

GATE CSE 2008 | Question: 24

asked in **Combinatory** Sep 12, 2014 • edited Apr 24, 2021 by **Lakshman Bhaiya** 4,211 views

17

Let $P = \sum\limits_{\substack{i \text{ odd}}}^{1 \le i \le 2k} i$ and $Q = \sum\limits_{\substack{i \text{ even}}}^{1 \le i \le 2k} i$, where k is a positive integer. Then

A. $P = Q - k$
B. $P = Q + k$
C. $P = Q$
D. $P = Q + 2k$

https://gateoverflow.in/422/gate-cse-2008-question-24

GATE CSE 2008 | Question: 24

asked in Combinatory Sep 12, 2014 • edited Apr 24, 2021 by Lakshman Bhaiya

4,211 views

17

Let $P = \sum\limits_{\substack{i \text{ odd}}}^{1 \leq i \leq 2k} i$ and $Q = \sum\limits_{\substack{i \text{ even}}}^{1 \leq i \leq 2k} i$, where k is a positive integer. Then

A. $P = Q - k$
B. $P = Q + k$
C. $P = Q$
D. $P = Q + 2k$

odd $\rightarrow$ $P = 1 + 3 + 5 + 7 + \cdots 2k-1$

+1 +1 +1 +1

even $\rightarrow$ $Q = 2 + 4 + 6 + \cdots \cdots 2k$

$P + k = Q \Rightarrow P = Q - k$

https://gateoverflow.in/422/gate-cse-2008-question-24

GATE CSE 2008 | Question: 24

asked in Combinatory Sep 12, 2014 • edited Apr 24, 2021 by Lakshman Bhaiya

4,211 views

17

Let $P = \sum_{i \text{ odd}}^{1 \leq i \leq 2k} i$ and $Q = \sum_{i \text{ even}}^{1 \leq i \leq 2k} i$, where k is a positive integer. Then

A. $P = Q - k$
B. $P = Q + k$
C. $P = Q$
D. $P = Q + 2k$

k terms

$P = \overbrace{1 + 3 + 5 + 7 + \cdots 2k-1}$

$Q = 2 + 4 + 6 + 8 + \cdots 2k$

$\boxed{P + k = Q}$ $\Rightarrow P = Q - k$

https://gateoverflow.in/422/gate-cse-2008-question-24

GATE CSE 2008 | Question: 24

asked in Combinatory Sep 12, 2014 • edited Apr 24, 2021 by Lakshman Bhaiya

4,211 views

17

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A. $P = Q - k$
B. $P = Q + k$
C. $P = Q$
D. $P = Q + 2k$

k terms

$P = \underbrace{1 + 3 + 5 + 7 + \cdots 2K-1}$

$Q = 2 + 4 + 6 + 8 + \cdots 2K$

$\boxed{P + K = Q}$ $\Rightarrow P = Q - 1$

$K = 1$ substitute

$P = 1$ $Q = 2$

only A satisfy

total 2K number

6

odd

1, 3, 5

even

2, 4, 6

total 2K number

odd

K

even

K

33

$$
\begin{aligned}
\mathbf{P} &= 1+3+5+7+\ldots+(2k-1)\\
&= (2-1)+(4-1)+(6-1)+(8-1)+\ldots+(2k-1)\\
&= (2+4+6+8+\ldots+2k)+(-1-1-1-1-1\ldots k \text{ times})\\
&= \mathbf{Q}+(-k) = \mathbf{Q\text{-}k}
\end{aligned}
$$

Correct Answer: A

Best answer

answered Jan 17, 2017 • edited Apr 23, 2019 by **Naveen Kumar 3**

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Pranabesh Ghosh 1

GATE CSE 2015 Set 1 | Question: 26

asked in **Combinatory** Feb 13, 2015 • edited Apr 25, 2021 by **Lakshman Bhaiya** 7,912 views

43

$$\sum_{x=1}^{99} \frac{1}{x(x+1)} = \_\_\_\_\_\_.$$

$$\frac{(x+1)-x}{x(x+1)} = \frac{x+1}{x(x+1)} - \frac{x}{x(x+1)}$$

gatecse-2015-set1 combinatory normal numerical-answers summation

$$1 = (x+1) - x$$

$$= \frac{1}{x} - \frac{1}{x+1}$$

https://gateoverflow.in/8248/gate-cse-2015-set-1-question-26

GATE CSE 2015 Set 1 | Question: 26

asked in Combinatory Feb 13, 2015 • edited Apr 25, 2021 by Lakshman Bhaiya

43

$\sum_{x=1}^{99} \frac{1}{x(x+1)} =$ ______.

gatecse-2015-set1 combinatory normal numerical-answers summatio

$$\frac{(x+1) - x}{x(x+1)} = \frac{\cancel{x+1}}{x(\cancel{x+1})} - \frac{\cancel{x}}{\cancel{x}(x+1)}$$

$$= \frac{1}{x} - \frac{1}{x+1}$$

$$1 = (x+1) - x$$

https://gateoverflow.in/8248/gate-cse-2015-set-1-question-26

GO CLASSES

GATE CSE 2015 Set 1 | Question: 26

asked in Combinatory Feb 13, 2015 • edited Apr 25, 2021 by Lakshman Bhaiya

7,912 views

43

$$\sum_{x=1}^{99} \frac{1}{x(x+1)} = \_\_\_\_\_\_.$$

gatecse-2015-set1 combinatory

$$\sum_{x=1}^{99} \left(\frac{1}{x} - \frac{1}{x+1} \right)$$

$$= \left(\frac{1}{1} - \cancel{\frac{1}{2}} \right) + \left(\cancel{\frac{1}{2}} - \cancel{\frac{1}{3}} \right) + \left(\cancel{\frac{1}{3}} - \frac{1}{4} \right)$$

$$\ldots + \left(\frac{1}{98} - \cancel{\frac{1}{99}} \right) + \left(\cancel{\frac{1}{99}} - \frac{1}{100} \right)$$

$$= 1 - \frac{1}{100}$$

$$\frac{1}{1.2}+\frac{1}{2.3}+\cdots+\frac{1}{99.100}$$
$$=1-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+\frac{1}{3}-\frac{1}{4}+\cdots+\frac{1}{99}-\frac{1}{100}$$
$$=1-\frac{1}{100}=0.99$$

GATE2017 CE-1: GA-8

asked in Quantitative Aptitude Mar 26, 2018 • recategorized May 31, 2019 by Pooja Khatri

2,944 views

4

The last digit of $(2171)^7 + (2172)^9 + (2173)^{11} + (2174)^{13}$ is

A. 2
B. 4
C. 6
D. 8

gate2017-ce-1 modular-arithmetic quantitative-aptitude numerical-computation

https://gateoverflow.in/313482/gate2017-ce-1-ga-8

GATE2017 CE-1: GA-8

4

The last digit of $(2171)^7 + (2172)^9 + (2173)^{11} + (2174)^{13}$ is mod 10

A. 2
B. 4
C. 6
D. 8

gate2017-ce-1 modular-arithmetic quantitative-aptitude numerical-computation

$2^4 \cdot 2^5 = 6 \cdot 2 = \underline{\underline{12}} \Rightarrow 2$

$1^7 + 2^9 + 3^{11} + 4^{13}$ mod 10

$1 + 2$

$2^1 = 2$

$2^2 = 4$

$2^3 = 8$

$2^4 = 16 = 6$

$2^5 = 32 = 2$

https://gateoverflow.in/313482/gate2017-ce-1-ga-8

GATE2017 CE-1: GA-8

asked in Quantitative Aptitude Mar 26, 2018 • recategorized May 31, 2019 by Pooja Khatri

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4

The last digit of $(2171)^7 + (2172)^9 + (2173)^{11} + (2174)^{13}$ is mod 10

A. 2
B. 4
C. 6
D. 8

gate2017-ce-1 modular-arithmetic quantitative-aptitude numerical-computation

$2^4 \cdot 2^5 = 6 \cdot 2 = \underline{\underline{12}} \Rightarrow 2$

$1^7 + 2^9 + 3^{11} + 4^{13}$ mod 10

$3^5 \cdot 3^5 \cdot 3$

$(4^3)^4 \cdot 4$

$\underline{1 + 2 + 7 + 4}$

$\Downarrow$

14 mod 10

$= 4$

$3^1 = 3$

$3^2 = 9$

$3^3 = 27 \Rightarrow 7$

$3^4 = 81 \Rightarrow 1$

$3^5 = 243 \Rightarrow 3$

$4^1 = 4$ $\quad 4^3 \Rightarrow 4$

$4^2 = 16$ $\quad 4^4 \Rightarrow 6$

$\Rightarrow 2$

372

last digit $\Rightarrow$ take mod 10

$\boxed{372 \bmod 10 \Rightarrow 2}$

$$(2171)^7 + (2172)^9 + (2173)^{11} + (2174)^{13}$$

We want to find last digit, so we can focus only last digit.

$$\implies (1)^7 + (2)^9 + (3)^{11} + (4)^{13}$$

$$\implies 1 + (2^4)^2 \cdot 2^1 + (3^4)^2 \cdot 3^3 + (4)^{odd}$$

$$\implies 1 + (6)^2 \cdot 2^1 + (1)^2 \cdot 3^3 + 4$$

$$\implies 1 + 6 \cdot 2 + 7 + 4$$

$$\implies 1 + 2 + 7 + 4$$

$$\implies 14$$

So, last digit is 4

The answer (B) is the correct choice

GATE2010 TF: GA-7

asked in Quantitative Aptitude May 14, 2019 • retagged May 14, 2019 by Lakshman Bhaiya

1,072 views

4

Consider the series $\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{8}+\frac{1}{9}-\frac{1}{16}+\frac{1}{32}+\frac{1}{27}-\frac{1}{64}+\ldots$. The sum of the infinite series above is:

A. ∞
B. $\frac{5}{6}$
C. $\frac{1}{2}$
D. 0

general-aptitude quantitative-aptitude gate2010-tf number-series

$$\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{8}+\frac{1}{9}-\frac{1}{16}+\frac{1}{32}+\frac{1}{27}-\frac{1}{64}+\ldots$$

$\cancel{1}/3 +$ $\quad \frac{1}{3} \times \frac{\cancel{3}}{2}$

$= \cancel{1}/3 + 1/2$

Summation of two GPs

$$\frac{1/2}{1+1/2} + \frac{1/3}{1-1/3}$$

https://gateoverflow.in/312026/gate2010-tf-ga-7

We can observe that there is sum of two series.

$$\left(\frac{(1)}{2}+\frac{(-1)}{2^2}+\frac{(1)}{2^3}+\frac{(-1)}{2^4}+\frac{(1)}{2^5}+\frac{(-1)}{2^6}+\frac{(1)}{2^7}+\ldots\right)$$
$$+\left(\frac{1}{3^1}+\frac{1}{3^2}+\frac{1}{3^3}+\frac{1}{3^4}+\frac{1}{3^5}+\ldots\right)$$

Both parts are in G.P.

First series with $a=\frac{1}{2}$ and $r=\frac{(-1)}{2} \implies$ infinite sum $=\frac{a}{1-r}=\frac{\frac{1}{2}}{1-\frac{(-1)}{2}}=\frac{1}{3}$

Second series with $a=\frac{1}{3}$ and $r=\frac{(1)}{3} \implies$ infinite sum $=\frac{a}{1-r}=\frac{\frac{1}{3}}{1-\frac{1}{3}}=\frac{1}{2}$

Final Sum $=\frac{1}{3}+\frac{1}{2}=\frac{5}{6}$.

$$\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{8}+\frac{1}{9}-\frac{1}{16}+\frac{1}{32}+\frac{1}{27}-\frac{1}{64}+\ldots.$$

Summation of 2 GPs

Answer: 5/6

Given series:

$$\frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{8} + \frac{1}{9} - \frac{1}{16} + \frac{1}{32} + \frac{1}{27} - \frac{1}{64} + \dots$$

We observe that this series can be decomposed into two separate geometric series:

1. Series with terms $\frac{1}{2}, -\frac{1}{4}, \frac{1}{8}, -\frac{1}{16}, \dots$

   This forms a geometric series with first term $a = \frac{1}{2}$ and common ratio $r = -\frac{1}{2}$.

   The sum of an infinite geometric series is given by the formula $\frac{a}{1-r}$.

   So, the sum of this series is:

   $$S_1 = \frac{\frac{1}{2}}{1-\left(-\frac{1}{2}\right)} = \frac{\frac{1}{2}}{\frac{3}{2}} = \frac{1}{3}$$

1. Series with terms $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}, \dots$

   This forms a geometric series with first term $a = \frac{1}{3}$ and common ratio $r = \frac{1}{3}$.

   Using the same formula, the sum of this series is:

   $$S_2 = \frac{\frac{1}{3}}{1-\frac{1}{3}} = \frac{\frac{1}{3}}{\frac{2}{3}} = \frac{1}{2}$$

   Therefore, the sum of the given series is the sum of these two geometric series:

   $$\text{Sum} = S_1 + S_2 = \frac{1}{3} + \frac{1}{2} = \frac{5}{6}$$

GATE2013 EE: GA-10

asked in Quantitative Aptitude Feb 16, 2016 • recategorized May 7, 2016 by Desert_Warrior 3,997 views

8

Find the sum to $'n'$ terms of the series $10 + 84 + 734 + \ldots$

A. $\frac{9(9^n+1)}{10} + 1$
B. $\frac{9(9^n-1)}{8} + 1$
C. $\frac{9(9^n-1)}{8} + n$
D. $\frac{9(9^n-1)}{8} + n^2$

gate2013-ee quantitative-aptitude number-series

https://gateoverflow.in/40297/gate2013-ee-ga-10

$$10 + 84 + 734 + \ldots = (9^1 + 1) + (9^2 + 3) + (9^3 + 5) + \ldots$$

Such a series is called AGP (Arithmetic Geometric Progression). For solving such progressions, we need to find

$$\sum(GP + AP) = \frac{a(r^n-1)}{r-1} + \frac{n(2a+(n-1)d)}{2}$$

This can be broken down into two parts: the geometric progression (GP) and the arithmetic progression (AP). The sum of a geometric progression is given by $\frac{a(r^n-1)}{r-1}$, and the sum of an arithmetic progression is given by $\frac{n(2a+(n-1)d)}{2}$.

$$\begin{aligned} &= \frac{9(9^n-1)}{8} + \frac{n(2+2n-2)}{2} \\ &= \frac{9(9^n-1)}{8} + n^2 \end{aligned}$$

Thus, the final expression simplifies to $\frac{9(9^n-1)}{8} + n^2$. So, the answer is (D).

GATE2018 CE-1: GA-9

2

Consider a sequence of numbers $a_1, a_2, a_3, \ldots, a_n$ where $a_n = \frac{1}{n} - \frac{1}{n+2}$, for each integer $n > 0$. Whart is the sum of the first 50 terms?

A. $\left(1 + \frac{1}{2}\right) - \frac{1}{50}$
B. $\left(1 + \frac{1}{2}\right) + \frac{1}{50}$
C. $\left(1 + \frac{1}{2}\right) - \left(\frac{1}{51} + \frac{1}{52}\right)$
D. $1 - \left(\frac{1}{51} + \frac{1}{52}\right)$

$$a_n = \frac{1}{n} - \frac{1}{n+2}$$

https://gateoverflow.in/313256/gate2018-ce-1-ga-9

GATE2018 CE-1: GA-9

Consider a sequence of numbers $a_1, a_2, a_3, \ldots, a_n$ where $a_n = \frac{1}{n} - \frac{1}{n+2}$, for each integer $n > 0$. Whart is the sum of the first 50 terms?

A. $\left(1 + \frac{1}{2}\right) - \frac{1}{50}$
B. $\left(1 + \frac{1}{2}\right) + \frac{1}{50}$
C. $\left(1 + \frac{1}{2}\right) - \left(\frac{1}{51} + \frac{1}{52}\right)$
D. $1 - \left(\frac{1}{51} + \frac{1}{52}\right)$

$$a_n = \frac{1}{n} - \frac{1}{n+2}$$

$$= \left(\frac{1}{1} - \cancel{\frac{1}{3}}\right) + \left(\frac{1}{2} - \cancel{\frac{1}{4}}\right) + \left(\cancel{\frac{1}{3}} - \cancel{\frac{1}{5}}\right) + \cdots$$

$$\left(\frac{1}{48} - \cancel{\frac{1}{50}}\right) + \left(\cancel{\frac{1}{49}} - \frac{1}{51}\right) + \left(\cancel{\frac{1}{50}} - \frac{1}{52}\right)$$

$$\left(1 + 1/2\right) - 1/51 - 1/52$$

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The sequence a_n is given by:

$a_n = \frac{1}{n} - \frac{1}{n+2}$

So, let's find the sum of the first 50 terms:

Saurav Sahoo to Everyone 9:17 PM

K

1 , 1/2 from first and from last
1/51,1/52 wont be cancel out

$$\sum_{n=1}^{50} a_n = a_1 + a_2 + a_3 + \cdots + a_{50}$$
$$= \left(\frac{1}{1} - \frac{1}{1+2}\right) + \left(\frac{1}{2} - \frac{1}{2+2}\right) + \left(\frac{1}{3} - \frac{1}{3+2}\right) + \cdots + \left(\frac{1}{50} - \frac{1}{50+2}\right)$$
$$= \left(1 - \frac{1}{3}\right) + \left(\frac{1}{2} - \frac{1}{4}\right) + \left(\frac{1}{3} - \frac{1}{5}\right) + \cdots + \left(\frac{1}{50} - \frac{1}{52}\right)$$
$$= \left(1 + \frac{1}{2}\right) - \left(\frac{1}{51} + \frac{1}{52}\right)$$

So, the correct answer is $\boxed{(\text{c})\ \left(1 + \frac{1}{2}\right) - \left(\frac{1}{51} + \frac{1}{52}\right)}$.

GATE CSE 2024 | Set 1 | GA: 5

1

For positive non-zero real variables p and q, if

$$\log\left(p^2+q^2\right)=\log p+\log q+2\log 3,$$

then, the value of $\frac{p^4+q^4}{p^2q^2}$ is

A. 79
B. 81
C. 9
D. 83

log( ) = log( )

https://gateoverflow.in/422782/gate-cse-2024-set-1-ga-5

GATE CSE 2024 | Set 1 | GA: 5

asked in Quantitative Aptitude Feb 16 • edited Feb 21 by makhdoom ghaya

2,395 views

1

For positive non-zero real variables p and q, if

$$\log\left(p^2+q^2\right)=\log p+\log q+2\log 3,$$

then, the value of $\frac{p^4+q^4}{p^2q^2}$ is

A. 79
B. 81
C. 9
D. 83

$$\log(p^2+q^2) = \log(9pq)$$

$$p^2+q^2 = 9pq$$

$$(p^2+q^2)^2 = 81p^2q^2$$

$$\Rightarrow p^4+q^4+2p^2q^2 = 81p^2q^2$$

$$\frac{p^4+q^4}{p^2q^2}+2 = 81$$

https://gateoverflow.in/422782/gate-cse-2024-set-1-ga-5

Given that, $\log(p^2 + q^2) = \log p + \log q + 2 \log 3$

We can rewrite it without assuming any specific logarithm base:

$$\log(p^2 + q^2) = \log(p \cdot q) + \log(3^2)$$
$$\log(p^2 + q^2) = \log(9 \cdot pq)$$

$p^2 + q^2 = 9pq$

We can take a square on both sides:

$(p^2 + q^2)^2 = (9pq)^2$

$p^4 + q^4 + 2p^2q^2 = 81p^2q^2$

$p^4 + q^4 = 81p^2q^2 - 2p^2q^2$

$p^4 + q^4 = 79p^2q^2$

$\frac{p^4+q^4}{p^2q^2} = 79$

Correct Answer: A

saikiran31415 commented Feb 17

Given for positive real numbers p and q the given equation holds " $\log(p^2 + q^2) = \log p + \log q + 2\log 3$" holds then can't we say p^2+q^2 are also positive real numbers then the condition " $\log(p^4 + q^4) =$ $\log p^2 + \log q^2 + 2\log 3$" also holds then we can get different answer.

$$x = \frac{p^4+q^4}{p^2q^2}$$

$$\Rightarrow \log x = \log(p^4+q^4) - \log(pq)^2$$

$$= \log p^2 + \log q^2 + 2\log 3 - \log p^2q^2 \quad \left[\because \log(p^2+q^2) = \log p + \log q + 2\log 3\right]$$

$$= \cancel{\log p^2q^2} + 2\log 3 - \cancel{\log p^2q^2}$$

$$= 2\log 3$$

$$= \log 3^2$$

$$\Rightarrow \log x = \log 9$$

$$\therefore x = 9$$

1

$p \Rightarrow p^2$

$q \Rightarrow q^2$

$$\log(p^2+q^2) = \log p + \log q + 2\log 3$$

$$\log(p^4+q^4) = \log p^2 + \log q^2 + \log 9$$

GO

$\log(p^2 + q^2) = \log p + \log q + 2\log 3$

dell to Everyone 9:22 PM

by this concept if x+y=7 then substituting like this we get x^2 +y^2=7. not possible. wrong method

👍 5

Diksha to Everyone 9:23 PM

equation doesn't support if we square variables

$\boxed{p, q = 2, 3}$

$p \Rightarrow p^2$

$q \Rightarrow q^2$

$\log(p^4 + q^4) = \log p^2 + \log q^2 + \log 9$

$\Rightarrow \log(p^4 + q^4) = \log(9p^2 q^2)$

$\Rightarrow p^4 + q^4 = 9p^2q^2 \Rightarrow \dfrac{p^4 + q^4}{p^2 q^2} = 9$

$x + y = 7$

equation

$x^3 + y^2 = 7$

function

$$\boxed{f(x) = x^2}$$

GO CLASSES

Sachin Mittal 1 commented Feb 20 edited Feb 20 by Sachin Mittal 1

@saikiran31415 @02Prime

This confusion is really interesting and can make anyone wonder what might be wrong with it.

Let's understand this clearly:

Consider a NEW problem, different from the one asked in the question:

Let p and q be such that they satisfy the (some different) equation:

$$\log\left(p^2+q^2\right)=\log(p+2)+\log(q+1)$$

Upon inspection or trial and error, it can be seen that the solution to the equation is $p=3$ and $q=4$.

$$\log\left(3^2+4^2\right)=\log(3+2)+\log(4+1)$$

$$\log\left(5^2\right)=\log(5)+\log(5)$$

Now, does this imply that p^2 and q^2 also satisfy the original equation? That is, are 3^2 and 4^2 solutions to the given equation?

$$\log\left((3^2)^2+(4^2)^2\right)=\log((3^2)+2)+\log((4^2)+1)$$

This does not hold, does it? Hence, the idea of substituting p^2 and q^2 into the equation is invalid.

Key Takeaway: Just because p and q are solutions to an equation doesn't automatically imply that p^2 and q^2 will also satisfy it. If this were the case, p^4 and q^4 would also work, implying an infinite number of solutions for every problem, which clearly isn't the case.

$$\log\left(p^2+q^2\right)=\log(p+2)+\log(q+1)$$

$p=3$

$q=4$

$p=3^2$

$q=4^2$

GATE CSE 2024 | Set 2 | GA Question: 4

4

For positive non-zero real variables x and y, if

$$\ln\left(\frac{x+y}{2}\right) = \frac{1}{2}[\ln(x) + \ln(y)]$$

then, the value of $\frac{x}{y} + \frac{y}{x}$ is

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

$\frac{1}{1} + \frac{1}{1} = 2$

$x = 1$
$y = 1$

satisfy

https://gateoverflow.in/422903/gate-cse-2024-set-2-ga-question-4

GATE CSE 2024 | Set 2 | GA Question: 4

asked in **Quantitative Aptitude** Feb 16 • edited Feb 21 by **makhdoom ghaya** 2,096 views

4

For positive non-zero real variables x and y, if

$$\ln\left(\frac{x+y}{2}\right) = \frac{1}{2}[\ln(x) + \ln(y)]$$

then, the value of $\frac{x}{y} + \frac{y}{x}$ is

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

$\log(\quad) = \log(\quad)$

$(xy)^{1/2}$

$\frac{x+y}{2} = \sqrt{xy}$

https://gateoverflow.in/422903/gate-cse-2024-set-2-ga-question-4

$$\frac{x+y}{2} = \sqrt{xy}$$

$$x+y = 2\sqrt{xy}$$

$$x^2+y^2+2xy = 4xy \Rightarrow \frac{x^2}{xy} + \frac{y^2}{xy} + 2 = 4$$

$$\frac{x}{y} + \frac{y}{x} = 2$$

Given:

$$\ln\left(\frac{x+y}{2}\right) = \frac{1}{2}(\ln(x) + \ln(y))$$

Step 1: Rewrite equation.

$$\ln\left(\frac{x+y}{2}\right) = \frac{1}{2}\ln(xy)$$

Step 2: Apply logarithm property.

$$\ln\left(\frac{x+y}{2}\right) = \ln\left(\sqrt{xy}\right)$$

Step 3: Drop logarithms.

$$\frac{x+y}{2} = \sqrt{xy}$$

Step 4: Square both sides.

$$(x+y)^2 = 4xy$$

$$x^2 + 2xy + y^2 = 4xy$$

$$x^2 + y^2 = 2xy$$

Step 5: Divide both sides by xy.

$$\frac{x^2}{xy} + \frac{y^2}{xy} = 2$$

$$\frac{x}{y} + \frac{y}{x} = 2$$

TIFR CSE 2010 | Part A | Question: 9

asked in Digital Logic Oct 3, 2015 • recategorized Nov 23, 2022 by **Lakshman Bhaiya** 1,303 views

8

A table contains 287 entries. When any one of the entries is requested, it is encoded into a binary string and transmitted. The number of bits required is.

A. 8
B. 9
C. 10
D. Cannot be determined from the given information.
E. None of the above.

tifr2010 digital-logic number-representation

https://gateoverflow.in/18385/tifr-cse-2010-part-a-question-9

GATE2014 EC-1: GA-5

asked in Quantitative Aptitude Mar 18, 2016 • edited Jun 8, 2018 by Milicevic3306

1,407 views

10

What is the next number in the series?

$12 \quad 35 \quad 81 \quad 173 \quad 357$ ______.

gate2014-ec-1 number-series quantitative-aptitude numerical-answers

https://gateoverflow.in/41494/gate2014-ec-1-ga-5

12 35 81 173 357 725

+23 +46 +92 +184 +368

7:30 PM by Deepak sir for GATE CSE

next week schedule in morning