





Number System - Part I

Complete Course on General Aptitude - GATE & ESE, 2024 & 2025



PREVIEW

HINDI GA,GS AND MATHEMATICS

**Complete Course on General Aptitude
- GATE & ESE, 2024 & 2025**

Saurabh Thakur

Starts on May 7, 2:15 PM

May 7 - Aug 13 • 15 weeks

UNACADEMY
PLUS CLASS



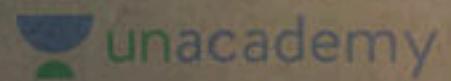
**COMPLETE COURSE ON
GENERAL APTITUDE FOR
GATE 2024/25**

BRANCH : CS & IT

USE CODE : ST26

DATE : 7TH MAY

SAURABH SIR

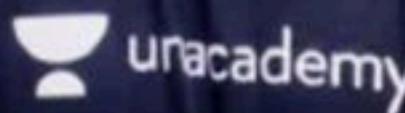


32M+ WATCH MINUTE
12+ YEARS TEACHING EXPERIENCE

SUBSCRIPTION

CODE:ST26

SAURABH THAKUR
IIM ROHTAK



A photograph of an open book lying flat. The left page is dark and textured, while the right page features a vibrant, detailed illustration of a lush green landscape with rolling hills and a small white bird flying in the sky. The book is resting on a light-colored wooden surface.

01

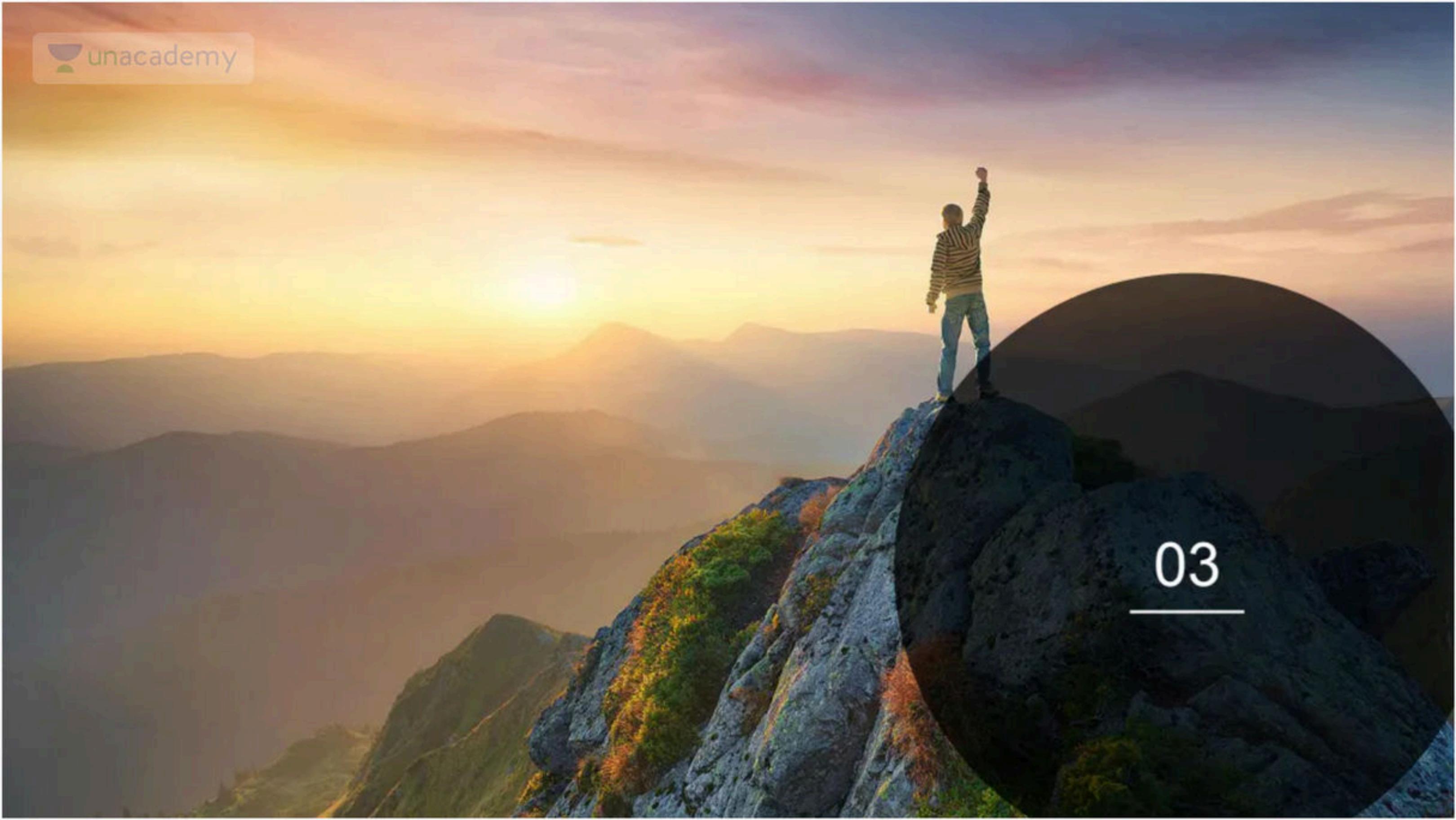


100!, 150!, 250!

05



$2^{23}, 2^{51}, 3^{59}, 4^{99}, 3^{171}, 7^{208}$



03



12^{71} , 16^{51} , 21^{99} , 39^{235} , 17^{999} , 37^{897} , 127^{200899}



04



$$13^{666} \times 44^{777} \times 616^{333} \times 777^{444}, 8898^{222} \times 999^{555},$$



05



$$1^2 + 2^2 + 3^2 + \dots + 99^2 + 100^2$$

06



$$1^1 + 2^2 + 3^3 + \dots + 9^9 + 10^{10}$$



07



The numeral in the units position of

$$211^{870} + 146^{127} + 3^{424} \text{ is.....}$$

[GATE 2016 : IISc Bangalore (EE Set - 2)]

08





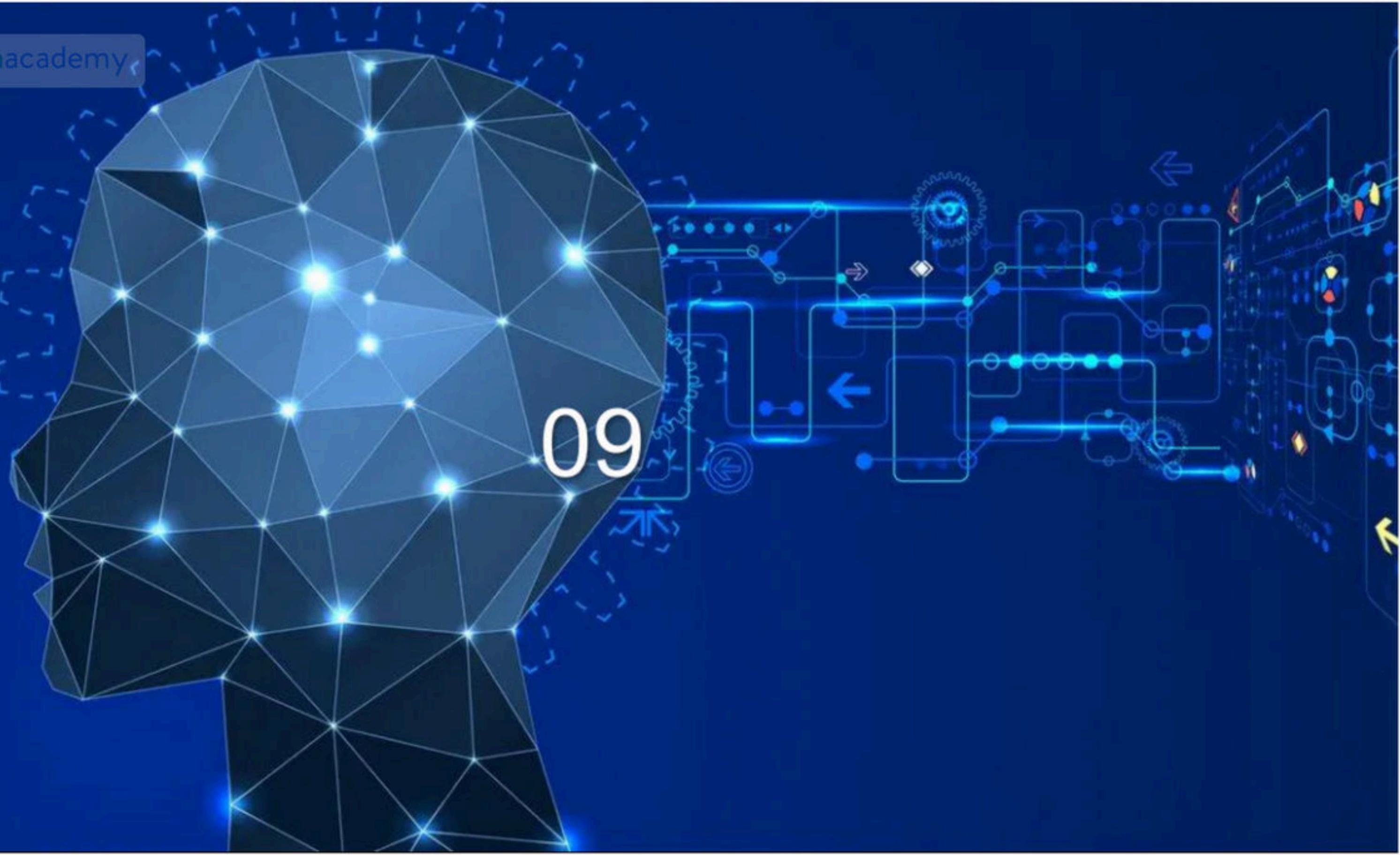
The last digit of

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

- (A) 2
- (B) 4
- (C) 6
- (D) 8

[GATE 2017 : IIT Roorkee (CH, CE, Set - 1)]

09





$21^{23}, 31^{53}, 51^{93}$



10



$3^{53}, 7^{53}, 9^{93}$

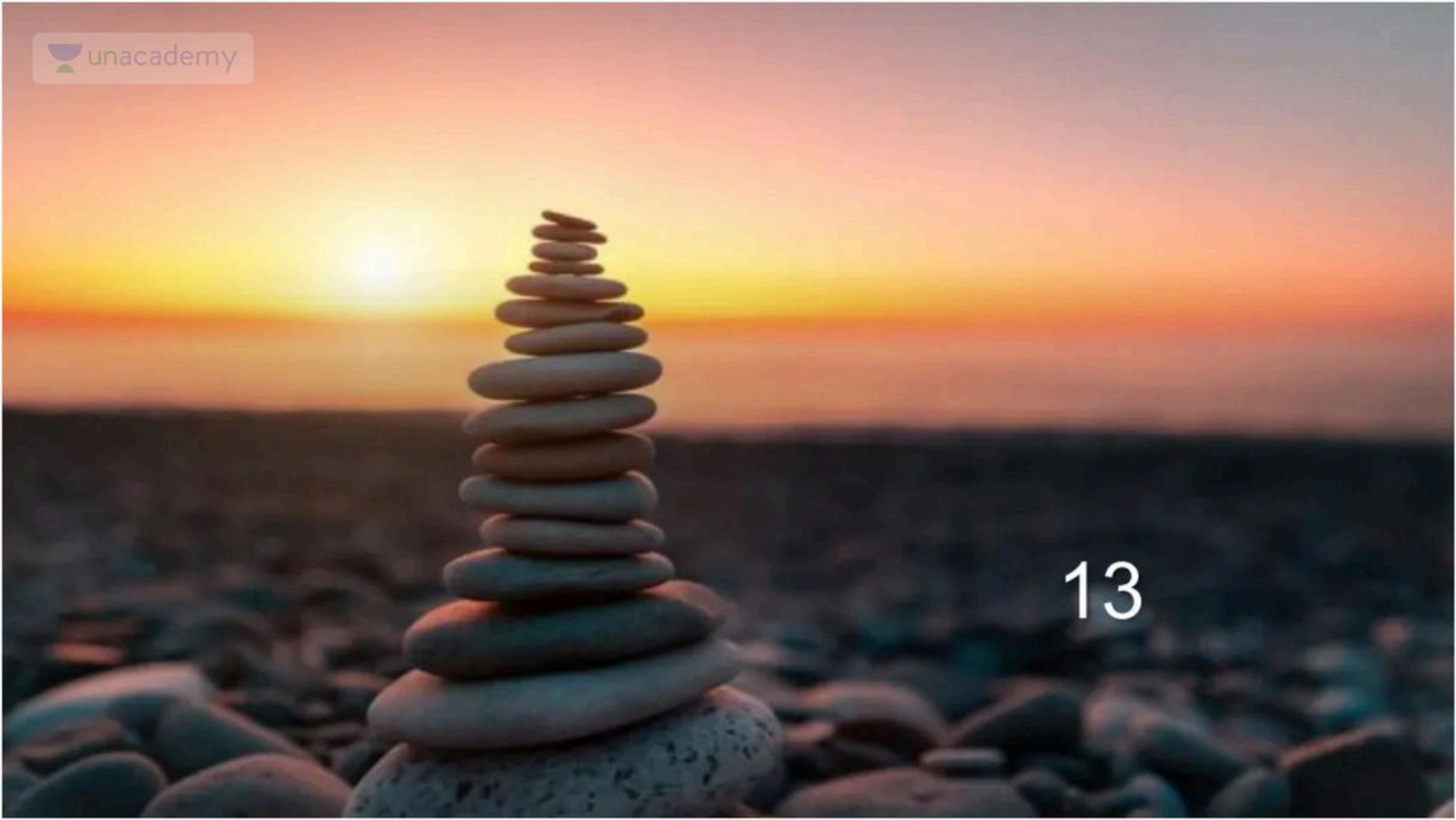
11



$2^{53}, 4^{83}, 8^{93}$



$$\begin{array}{r} (123 \ 1234) \\ \hline 15 \end{array}$$

A photograph of a tall, perfectly balanced stack of smooth, grey stones, likely zen stones, set against a vibrant sunset or sunrise sky. The stones are arranged in a spiral pattern, creating a sense of depth and balance. In the foreground, there are more stones scattered across a dark, textured surface.

13



$$(1218 \times 1220 \times 1222 \times 1224) \div 9$$



14



$$(1719 \times 1721 \times 1723 \times 1725 \times 1727) \div 18$$



The remainder when S is divided by 20 ,

$$\text{where } S = 1! + 2! + 3! + 4! + 5! + 6! + \dots + 19! + 20!$$

16





The rightmost non-zero digit of the number 30^{2720} .





$$7^{77} \div 4$$



18



$$11^{88} \div 7$$





$$5^{123} \div 7$$

$$7^{84} \div 342$$

A photograph of a two-lane road stretching into the distance under a dark, star-filled sky. The road is marked with white dashed lines. In the background, there's a small blue and white triangular road sign. The foreground is dark, while the sky above is filled with numerous stars and some faint clouds.

21



Find : Number of factors, Sum of factors and Product of factors of the following :

12, 24, 288.

How many factors of 12 are divisible by : 2, 3 , 4, 6 , 12.

How many factors of 24 are divisible by : 2, 3 , 4, 6 , 8.



24



Find the smallest number y such that : $y \times 162$ is a perfect cube.

- (A) 24
- (B) 27
- (C) 32
- (D) 36

[GATE 2017 : IIT Roorkee (EE, CS, Set - 1)]

If all the natural numbers starting from 1 are written side by side
then find the :

25th, 50th, 100th, digit of the sequence.



26



In the above question find the remainder when the sequences are divided by : 2, 4, 8, 16 , 5 , 25 , 125 , 3 , 9



If the number $715 \blacksquare 423$ is divisible by 3 (\blacksquare denotes the missing digit in the thousandths place), then the smallest whole number in the place of \blacksquare is _____.

- A. 0
- B. 2
- C. 5
- D. 6

[GATE 2018 : IIT Guwahati (EC Set – 1)]



28



How many numbers less than 21 are co-primes to 21?

- (A) 24
- (B) 96
- (C) 11
- (D) 12



If a and b are integers and $a - b$ is even, which of the following must always be even?

- (A) ab
- (B) $a^2 + b^2 + 1$
- (C) $a^2 + b + 1$
- (D) $ab - b$

[GATE 2017 : IIT Roorkee (ME Set – 2)]



30



Given that a and b are integers and $a + a^2 b^3$ is odd then, which one of the following statements is correct?

- (A) a and b are both odd
- (B) a and b are both even
- (C) a is even and b is odd
- (D) a is odd and b is even

[GATE 2018 : IIT Guwahati (ME Set – 1)]

31



If $x = -0.5$, then which of the following has the smallest value?

(A) $2^{1/x}$

(B) $\frac{1}{x}$

(C) $\frac{1}{x^2}$

(D) $2x$

32





The sum of the digits of a two-digit number is 12. If the new number formed by reversing the digits is greater than the original number by 54, find the original number.

- (A) 39
- (B) 57
- (C) 66
- (D) 93

33



A number is as much greater than 75 as it is smaller than 117.
The number is:

- (A) 91
- (B) 93
- (C) 89
- (D) 96

[GATE 2013 : IIT Bombay (CE)]

34





A number consists of two digits, the sum of digits is 9. If 45 is subtracted from the number, its digits are interchanged. What is the number?

- (A) 63
- (B) 72
- (C) 81
- (D) 90

SUCCESS

35



The sum of eight consecutive odd numbers is 656. The average of four consecutive even numbers is 87. What is the sum of the smallest odd number and second largest even number?

[GATE 2014 : IIT Kharagpur (EC Set – 2, ME Set - 2)]



36



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?

[GATE 2014 : IIT Kharagpur (EC Set - 4, ME Set - 4)]



Direction (37 – 40) : Given, $m = 1! + 2! + 3! + 4!$
+..... + 99! + 100!

A photograph of an open book resting on top of a stack of books. The stack includes a blue book with 'MALIK' on its spine and a green book. A large, semi-transparent white number '37' is overlaid on the right side of the blue book's spine.

37



Given, $m = 1! + 2! + 3! + 4! + \dots + 99! + 100!$

Find the unit digit of “m”



38



Given, $m = 1! + 2! + 3! + 4! + \dots + 99! + 100!$

Find the last two digits of 'm'



39



Given, $m = 1! + 2! + 3! + 4! + \dots + 99! + 100!$

Find the remainder, when 'm' is divided by 168.

40



Given, $m = 1! + 2! + 3! + 4! + \dots + 99! + 100!$

If N is a natural number such that $10^{12} < N < 10^{13}$ and the sum of the digits of n is 2 , then the number of values n take is :

41

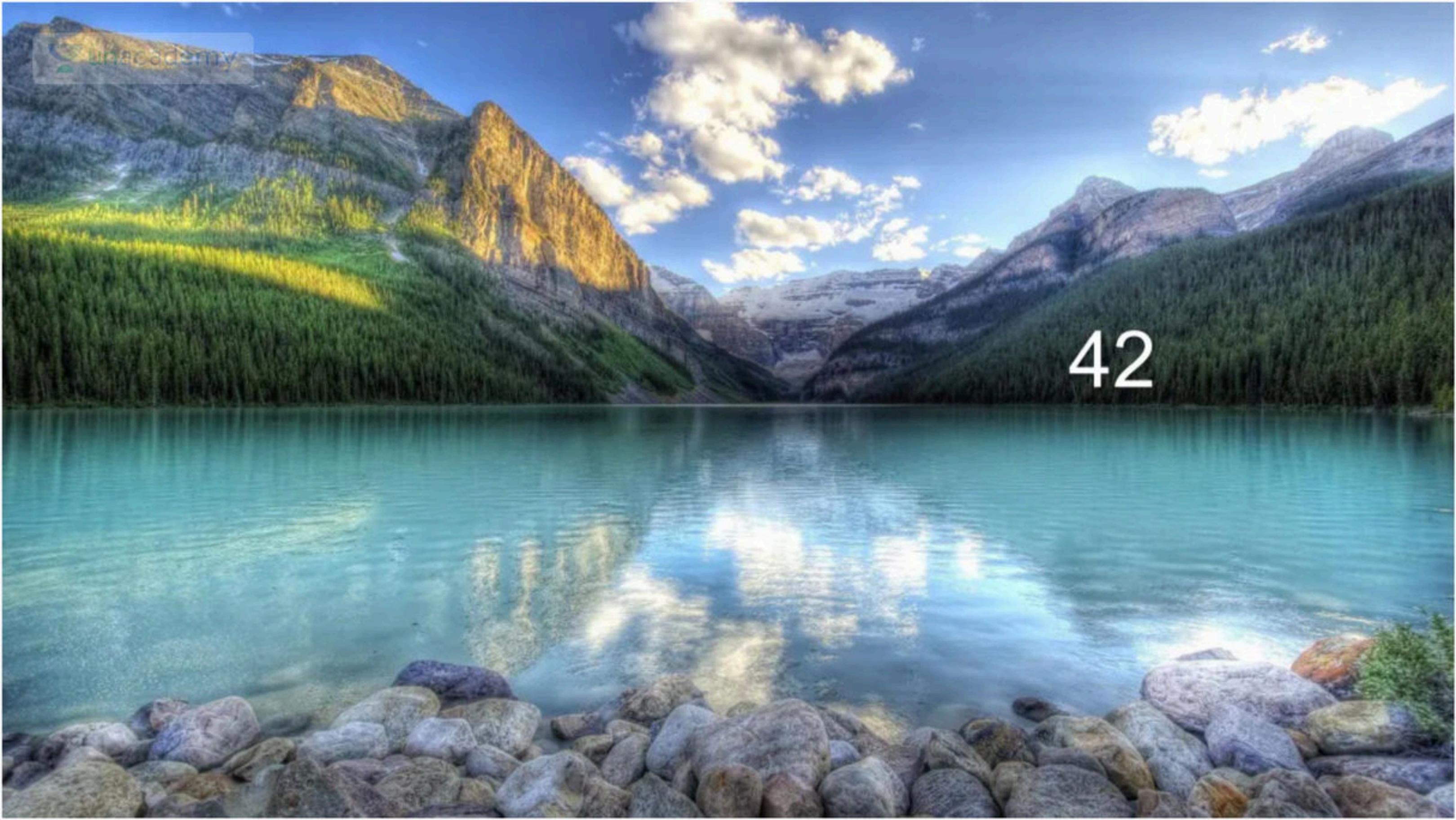




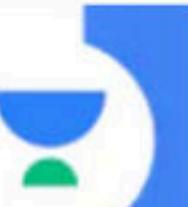
Which among $2^{1/2}$, $3^{1/3}$, $4^{1/4}$, $6^{1/6}$ and $12^{1/12}$ is the largest ?

- (A) $2^{1/2}$
- (C) $4^{1/4}$

- (B) $3^{1/3}$
- (D) $6^{1/6}$

A wide-angle photograph of a mountainous landscape. In the foreground, a clear, turquoise-colored lake reflects the surrounding environment. The lake's edge is bordered by a rocky shoreline. In the background, several rugged mountains rise against a bright blue sky dotted with wispy white clouds. The sunlight illuminates the peaks, casting long shadows and highlighting the textures of the rock faces and the dense green forests at their bases.

42



If $\frac{a}{b} = \frac{1}{3}$, $\frac{b}{c} = 2$, $\frac{c}{d} = \frac{1}{2}$, $\frac{d}{e} = 3$ and $\frac{e}{f} = \frac{1}{4}$, then what is the value of $\frac{abc}{def}$?

- (A) $\frac{3}{8}$
- (B) $\frac{27}{8}$
- (C) $\frac{3}{4}$
- (D) $\frac{27}{4}$

(2006)



S is a 6 digit number beginning with 1 . If the digit 1 is moved from the leftmost place to the rightmost place the number obtained is three times of S . Then the sum of the digits of S is-



If $N = 15 \times 30 \times 45 \times 60 \times \dots \times 1500$, what will be the number of zeroes at the end of N?

- (A) 63
- (B) 55
- (C) 97
- (D) 124

[GATE 2016 : IISc Bangalore (CE Set – 2)]

90 min



* NUMBERS.  

Prime + 10 \Rightarrow 

 15 X



Let x , y and z be distinct integers, that are odd and positive. Which one of the following statements cannot be true?

- (A) xyz^2 is odd
- (B) $(x-y)^2z$ is even
- (C) $(x+y-z)(x+y)$ is even
- (D) $(x-y)(y+z)(x+y-z)$ is odd
- (E) None of these



Find the odd one from the following group:

W,E,K,O I,Q,W,A

F, N,T,X N,V,B,D

(A) W,E,K,O

(B) I,Q,W,A

(C) F, N,T,X

(D) N,V,B,D

[GATE 2014 : IIT Kharagpur (EC Set-1, ME Set-1)]



Find the odd one in the following group

Q,W,Z,B B,H,K,M

W,C,G,J M,S,V,X

- (A) Q, W, Z, B (B) B, H, K, M
(C) W, C, G, J (D) M, S, V, X

[GATE 2014 : IIT Kharagpur
(EC Set-2, ME Set-2)]



If ROAD is written as URDG, then SWAN should be written as:

- (A) VXDQ (B) VZDQ
(C) VZDP (D) UXDQ

[GATE 2015 : IIT Kanpur (CE Set - 1, CSE Set - 3)]



Pick the odd one out in the following : 13, 23, **33**, 43, 53

- (A) 23
- (B) 33
- (C) 43
- (D) 53

$$\begin{array}{c} \text{33} \\ \swarrow \quad \searrow \\ 1 \times 33 \\ \hline 3 \times 11 \end{array}$$

[GATE 2016 : IISc Bangalore (EE Set - 2)]

$$\kappa$$

$$\kappa^2 \pm \frac{1\sqrt{2}\sqrt{3}}{2}$$

$$\kappa^3 \pm \frac{1\sqrt{2}\sqrt{3}}{2}$$

$$[QD14] - JJJ \cdot K \boxed{P} =$$



$$\begin{array}{l} 1^2 + 1 \\ \rightarrow 2^2 + 1 \\ \rightarrow 3^2 + 1 \\ \rightarrow 4^2 + 1 \\ \rightarrow 5^2 + 1 \end{array}$$

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

$$5^2 + 1$$

$$7^2 + 1$$



$$n^2$$

[GATE 2014 : IIT Kharagpur (EE Set - 3, CSE Set - 3)]



A-Z





The number that least fits this set: (324, 441, 97 and 64) is _____.

- (A) 324 (B) 441
(C) 97 (D) 64

[GATE 2016 : IISc Bangalore (IN)]



$\angle 90^\circ$

+3

+1

Find the missing group of letters in the following series :

BC, FGH, LMNO, TUVWX.

(A) UVWXY

(B) TUVWX

(C) STUVW

(D) RSTUV

23, 678, 12131415
+3

TUVWX
[20212223.4]
+5

[GATE 2018 : IIT Guwahati (ME Set - 2)]

1 [2615]



Fill in the missing number in the series :

2 3 6 15 _____ 157.5 630.

[GATE 2014 : IIT Kharagpur (EC Set - 2, ME Set - 2)]



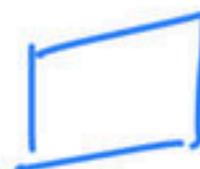
Find the missing sequence in the letter series below:

A, CD, GHI, ?, UVWXYZ

~~(A) LMN~~
~~(B) MNO~~

~~(C) MNOP~~
~~(D) NOPQ~~

$\frac{20+12}{40}$
9:02
40



13 19 / 5 11 1

[GATE 2015 : IIT Kanpur (EC Set - 3, ME Set - 2)]

Find the next term in the sequence: 7G, 11K, 13M, _____.

- (A) 15Q
(B) 17Q
(C) 15P
(D) 17P.

~~15~~ Prime No.
~~17~~
17Q

[GATE 2014 : IIT Kharagpur (EC Set - 3, ME Set - 3)]



Find the next term in the sequence: 13M, 17Q, 19S,
_____.

- (A) 21W
- (B) 21V
- (C) 23W
- (D) 23V

[GATE 2014 : IIT Kharagpur
(EC Set - 4, ME Set - 4)]



What is the next number in the series :

12 35 81 173 357 _____

[GATE 2014 : IIT Kharagpur
(EC Set - 1, ME Set - 1)]



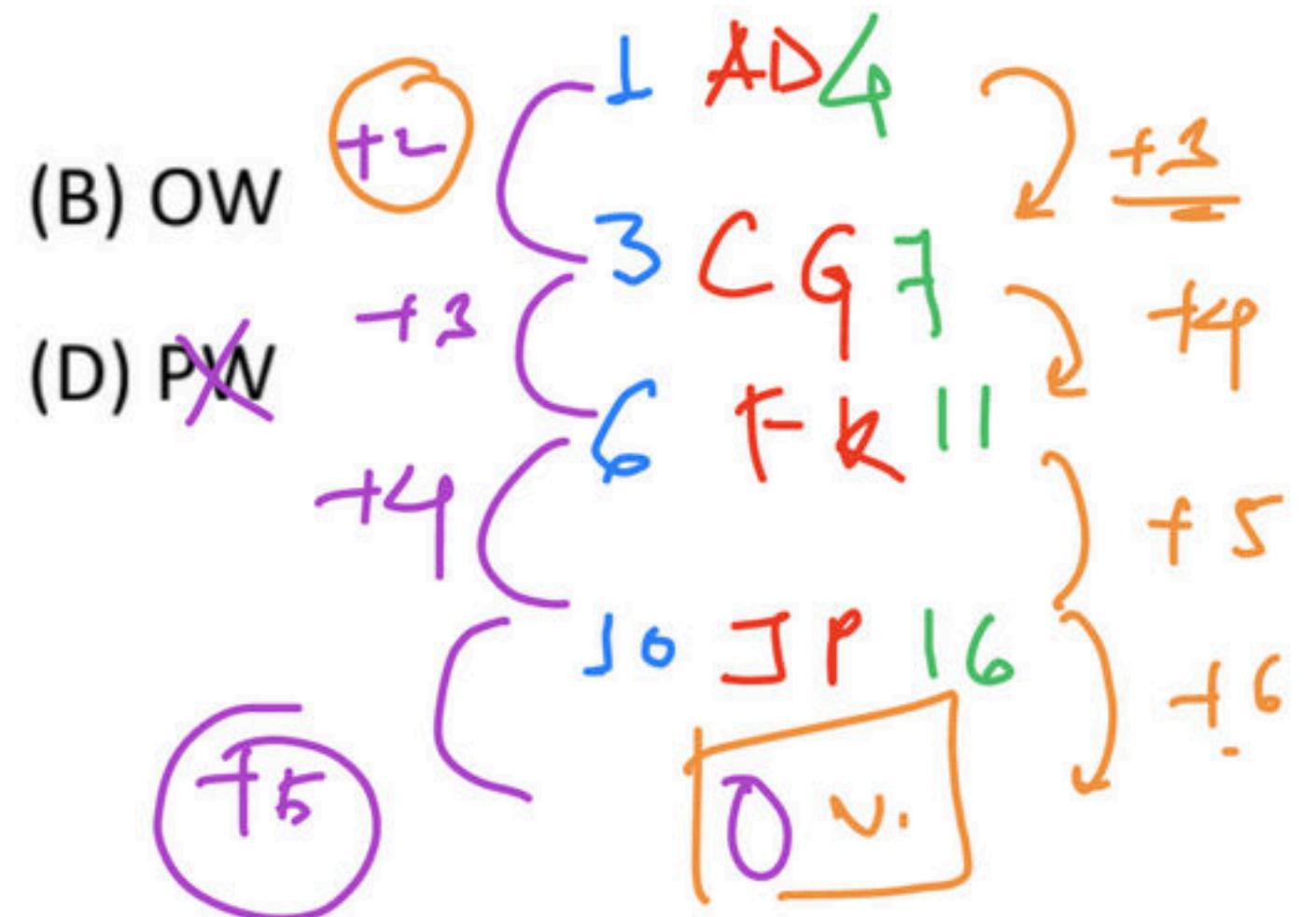
The next term in the series 81, 54,
36, 24 ... is _____

[GATE 2014 : IIT Kharagpur
(EC Set - 3, ME Set - 3)]



Given the sequence of terms, AD CG FK JP, the next term is

- (A) OV
- (C) PW



[GATE 2012 : IIT Delhi (ME, CE, CSE)]

$$\begin{array}{r} \cancel{2} \cancel{3} \\ \hline \boxed{5} \end{array}$$

$$N = \underline{\quad}$$

$$\frac{DS}{3}$$

$$\checkmark + \cancel{1} \cancel{2} \checkmark$$

$$\begin{array}{r} \cancel{1} \cancel{2} \cancel{3} \cancel{4} \cancel{5} \\ \hline 3 \end{array} \Rightarrow \boxed{0}$$

$$\cancel{9} \cancel{8} \cancel{7} \cancel{5} \cancel{4} \cancel{2} \cancel{3} \cancel{1}$$

3

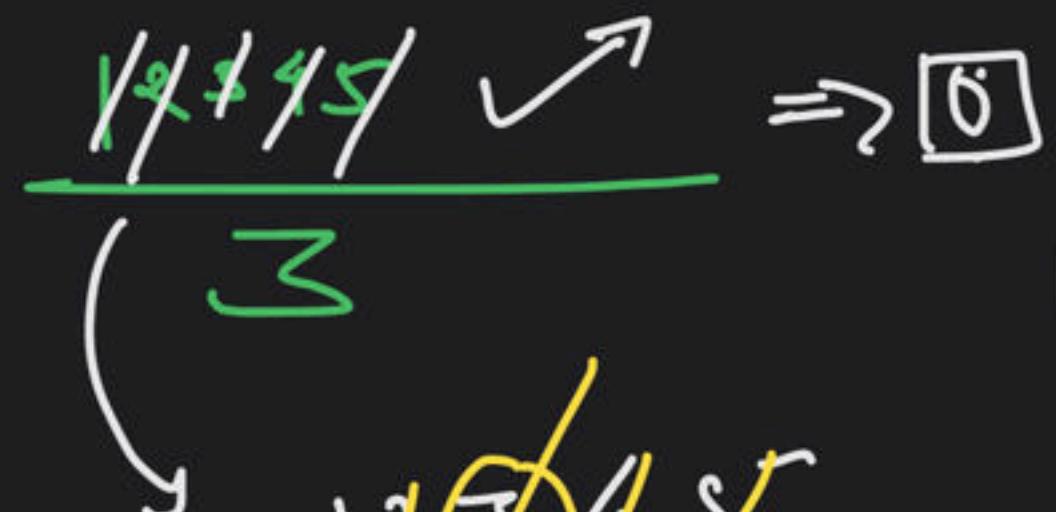
$$\textcircled{4} \cancel{7} \checkmark$$



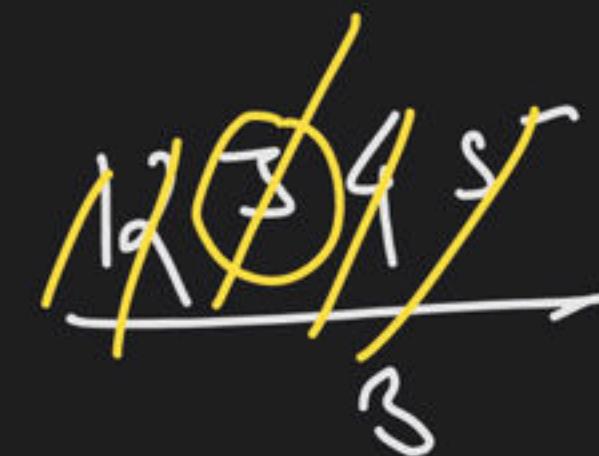
$N =$ —



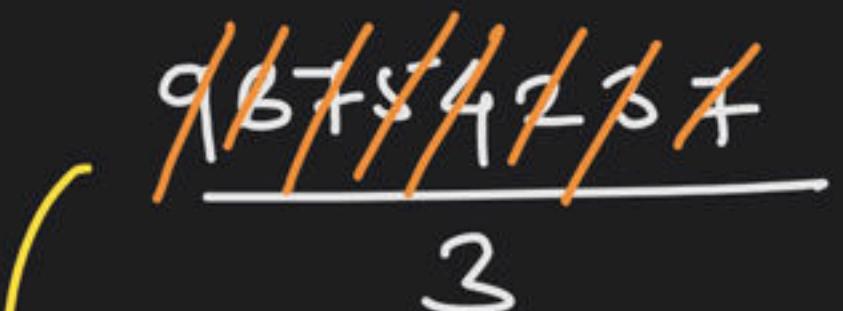
+/
3✓



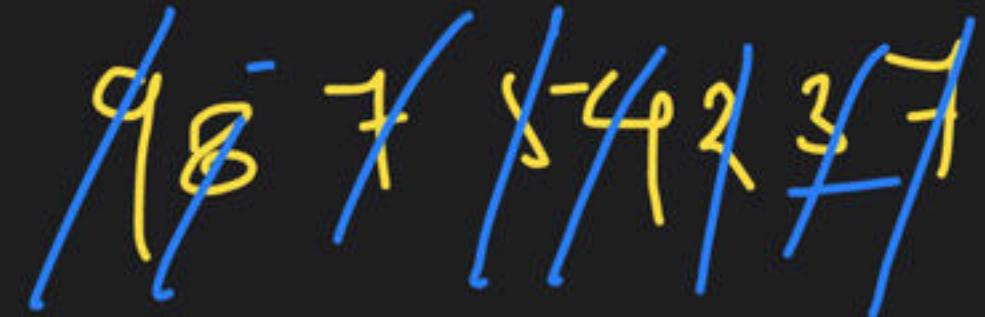
A green checkmark is positioned above a yellow square box containing the number 0. Below the box is a green horizontal line with the number 3 written below it.



A yellow circle surrounds the number 3, which is inside a yellow box. Below the box is a yellow horizontal line with the number 3 written below it.



A yellow circle surrounds the number 3, which is inside a yellow box. Below the box is a yellow horizontal line with the number 3 written below it.



A blue circle surrounds the number 3, which is inside a blue box. Below the box is a blue horizontal line with the number 3 written below it.

$$\begin{array}{r} 967 \\ + 1234 \\ \hline 1091 \end{array}$$

The diagram shows a subtraction problem with a blue horizontal line separating the minuend (1091) from the difference (2). Above the minuend, the digits 9, 6, 7, and 1 are crossed out with yellow diagonal lines. The digits 1, 2, 3, and 4 above the blue line are also crossed out with yellow diagonal lines. The digit 0 in the tens column is circled in yellow. A vertical white arrow points down to the tens column of the minuend. To the right of the blue line, there is a yellow circle containing the number 2, followed by a checkmark (✓).





If ROAD is written as URDG, then SWAN should be written as:

- (A) VXDQ (B) VZDQ
- (C) VZDP (D) UXDQ

[GATE 2015 : IIT Kanpur
(CE Set - 1, CSE Set - 3)]



In a certain code, AMCF is written as EQGJ and NKUF is written as ROYJ. How will DHLP be written in that code?

- (A) RSTN (B) TLPH
- (C) HLPT (D) XSVR

[GATE 2018 : IIT Guwahati (EE Set – 1)]



The missing number m the given sequence 343, 1331,
_____, 4913 is

- (A) 4096 (B) 2744
- (C) 2197 (D) 3375

[GATE 2019 : IIT Madras (EE)]



If the number $715 \blacksquare 423$ is divisible by 3 (\blacksquare denotes the missing digit in the thousandths place), then the smallest whole number in the place of \blacksquare is _____.

- A. 0
- B. 2
- C. 5
- D. 6

A handwritten diagram showing the number 7152423. The digits 7, 1, 5, 2, and 3 are circled in blue. A red horizontal line is drawn under the digits 1, 5, and 2. A red arrow points from the circled 3 down to the red line, indicating that the sum of the digits 1+5+2+3=9 is being checked for divisibility by 3.

[GATE 2018 : IIT Guwahati (EC Set – 1)]



Euphony.



Find the odd one in the following group of words.

mock, deride, praise, jeer

- (A) Mock
- (B) Deride
- (C) Praise
- (D) Jeer

[GATE 2016 : IISc Bangalore (EE Set - 1, CSE Set - 2)]



Choose the most appropriate word from the options given below to complete the following sentence:

His rather casual remarks on politics _____ his lack of seriousness about the subject.

- | | |
|--------------|----------------|
| (A) Masked | (B) Belied |
| (C) Betrayed | (D) Suppressed |

[GATE 2010 : IIT Guwahati (CSE, EE, ME, CE, EC, IN)]



Debauch

Choose the appropriate word/phrase, out of the four options given below, to complete the following sentence:

Frogs _____.

- (A) Croak
- (B) Roar
- (C) Hiss
- (D) Patter

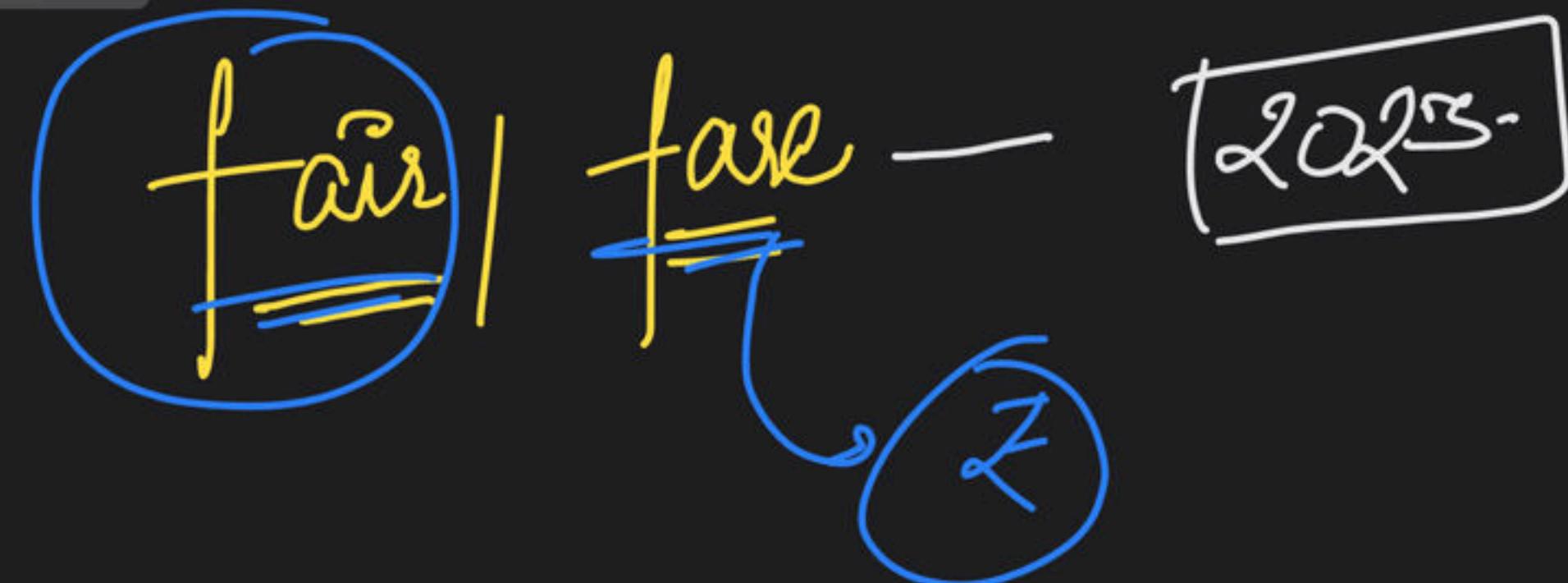
[GATE 2015 : IIT Kanpur (EC Set - 1)]

6M

The driver applied the _____ as soon as she approached the hotel where she wanted to take a_____?

- (A) Brake, Break
- (B) Break, Break
- (C) Brake, Brake
- (D) Break, Brake

[GATE 2018 : IIT Guwahati (CE Set – 1)]





"By giving him **the last** _____ of the **cake**, you will **ensure** lasting
_____ in our house today."

The words that best fill the blanks in the above sentence are

- (A) Peas, Piece
- (B) Piece, Peace
- (C) Peace , Pieces
- (D) Peace, Peas

[GATE 2018 : IIT Guwahati (EC Set – 1)]



“His face _____ with joy when the solution of the puzzle was
_____ to him.”

The words that best fill the blanks in the above sentence are

- (A) Shone, shown
- (B) Shone, shone
- (C) Shown, shone
- (D) Shown, shown

[GATE 2018 : IIT Guwahati (CE Set – 2)]



Statement: You can always give me a ring whenever you need.

Which one of the following is the best inference from the above statement?

- Because I have a nice caller tune. C 1D.
- Because I have a better telephone facility.
- Because a friend in need is a friend indeed.
- Because you need not pay towards the telephone bills when you give me a ring.



Choose the most appropriate phrase from the options given below to complete the following sentence.

India is a post-colonial country because

- it was a former British colony
- Indian Information Technology professionals have colonized the world
- India does not follow any colonial practices
- India has helped other countries gain freedom

IIT, Kharagpur GATE 2014