CAT

MBA PIONEER 2024

QUANTITATIVE APTITUDE

DPP: 03

Sequence & Series Part III

Q1 The average of a non-decreasing sequence of N numbers $r_1 + r_2 + r_3 + \ldots\ldots + r_n$ is 200. If r_1 is replaced by $5r_1$, the new average becomes 300. Then the number of values that N can take is?

(A) 6 (B) 7
(C) 8 (D) 9

Q2 There is a sequence of numbers $a_1, a_2, a_3, \ldots\ldots\ldots$ such that $a_{n+1} = a_n ? + n - 1$ for all $n \geq 1$, if $a_1 = -5$, find the value of a_{150}

Q3 Consider a sequence of real numbers y_1, y_2, y_3 ,... such that y_1=3 and such that for all positive integers n,$y_{n+1} = \frac{2y_n}{y_n+1}$. What is the approximate value of y_4?

(A) 1.09 (B) 2.08
(C) 3.12 (D) 4.16

Q4 $x_1, x_2, x_{3,} x_n$ are a sequence of real numbers such that $x_1 - x_2 + x_3 - x_4 + \ldots (-1)^{n+1} x_n = n^2 + 2n$ for all natural numbers n. Evaluate the sum of $x_{60} + x_{70}$?

(A) -121 (B) -161
(C) -262 (D) -242

Q5 We have a series of real numbers such that , $x_0 = 1, x_1 = 2$ and $x_{n+2} = \frac{(1+x_{n+1})}{x_n}$ where n is a whole number, the find the value of $2x_{2000} + 3x_{3000}$?

Q6 $b_1, b_2 \ldots\ldots\ldots b_n$ be integers such that $b_1 - b_2 + b_3 - b_4 + \ldots\ldots\ldots\ldots + (-1)^{n-1} b_n = n$, for all the values of $n \geq 1$, then find the value of $b_{200} + b_{201} + \ldots\ldots \ldots\ldots\ldots b_{5004}$

(A) 0 (B) 1
(C) -1 (D) 2

Q7 In a magical town if the population is 'n' at the beginning of year then the population at the start of next year becomes 3+2n.If the population of 2001 is 1000 then find the population at the beginning of 2016

(A) $1003^{15} + 6$ (B) $997^{15} - 3$
(C) $(997)2^{14} + 3$ (D) $(1003)2^{15} - 3$

Q8 $x_1, x_2, \ldots x_n$ are real numbers such that $x_1 + x_2 + x_3 + \ldots\ldots + x_n = 6(3^{n-1} + 1)$. then find the value of x_9

(A) 26244 (B) 25244
(C) 24244 (D) 27244

Q9 $x_1, x_2, \ldots x_n$ are real numbers such that $x_1 + x_2 + x_3 + \ldots\ldots + x_n = 2n^2 + 9n + 13$ for $n \geq 2$.
If the value of $x_n = 103$ then find the value of n

(A) 18 (B) 20
(C) 24 (D) 28

Q10 If $a_1 = \frac{1}{2\times6}, a_2 = \frac{1}{6\times10}, a_3 = \frac{1}{10\times14} \ldots\ldots$ then find the value of $a_1 + a_2 + a_3 + \ldots\ldots\ldots + a_{100}$ is

(A) $\frac{25}{201}$ (B) $\frac{25}{251}$
(C) $\frac{50}{201}$ (D) $\frac{50}{251}$

Q11 Consider a sequence of real numbers where the nth term is denoted by $A_n = \frac{n}{n+2}$ $here\ n\ takes\ the\ values\ 1, 2, 3, .\ ...., then\ find\ the\ value\ of\ t_7 \times t_8 \times t_9 \times .... t_{57}$

(A) $\frac{7\times4}{29\times59}$
(B) $\frac{9\times4}{27\times59}$
(C) $\frac{5\times9}{29\times59}$
(D) $\frac{11\times4}{29\times59}$

Q12 If S_k = k^3 + k^2 + k+ 1 , here S_k is the sum of the first k terms of a series and t_k denotes the k^{th} term of the series, if $t_k = 291\ then\ find\ the\ value\ of\ k$

(A) 12 (B) 9
(C) 10 (D) 8

Q13 Find the sum of the series .5 + .55 + .555+.5555 +........ to n terms

(A) $\frac{25}{81} \times \left[9n - 1 + \frac{1}{10^{2n}}\right]$
(B) $\frac{5}{81} \times \left[9n - 1 + \frac{1}{10^{2n}}\right]$
(C) $\frac{25}{81} \times \left[9n - 1 + \frac{1}{10^{n}}\right]$
(D) $\frac{5}{81} \times \left[9n - 1 + \frac{1}{10^{n}}\right]$

Q14 For a series of natural numbers the sum of the first n terms is given by $n + 2n^2$ (where n is also a natural number). If the nth term of series is divisible by 7 find the smallest value that is possible for n?

(A) 3 (B) 2
(C) 5 (D) 4

Q15 Given a series of real numbers $a_1, a_2, a_3........$ where each term a_{n+1} is obtained by adding n–1 to the previous term a_n for all n≥1, find the value of a_{50} if a_1 starts as -1.

(A) 1120 (B) 1103
(C) 1398 (D) 1175

Q16 If the sum of the series (2n+1)+(2n+3)+(2n+5)+…+(2n+51)=5512, what is the value of the sum 1+2+3+…+n?

Q17 If x1+x2+x3+…+xn=$3\left(2^{n+1}\right.$–2), then what is the value of x15?

(A) 98204 (B) 98304
(C) 98404 (D) 98504

Q18 Find sum of 2 ^{2} + 2 * 3^2 + 3 * 4^2 + 4 * 5^2.....14 * 15^2?

Q19 A man chose to distribute his collection of toys to a group of children using the following method. He offers half of his entire supply of toys, along with an additional one, to the first child. Then, he gives half of the remaining toys, along with one extra, to the second child, and he continues this pattern. He completes the process after catering to 5 children. If he emptied his entire supply, what was the initial count of toys he possessed?

Q20 If S$_n$ = 3n^2 + 2n + 1 , where S$_n$ denotes the sum of the first n terms of a series and t$_m$=35 , then m is equal to?

Q21 Evaluate the sum of the following sequence

$$\frac{1}{2^2-1} + \frac{1}{4^2-1} + \frac{1}{6^2-1} + \ldots\ldots\ldots + \frac{1}{20^2-1}$$

(A) $\frac{15}{21}$ (B) $\frac{13}{21}$
(C) $\frac{11}{21}$ (D) $\frac{10}{21}$

Q22 Consider the infinite sum S = 2 + 5a + 9a^2 + 14a^3 + 20a^4 + ..., where |a| < 1. Determine the value of S.

(A) $\frac{2-a}{(1-a)^3}$ (B) $\frac{a^2}{(1-a)^3}$
(C) $\frac{a^2-2a}{(1-a)^3}$ (D) $\frac{a^3}{(1-a)^3}$

Q23

The infinite sum of the series $1+\frac{4}{7}+\frac{9}{7^2}+\frac{16}{7^3}+\ldots\ldots.\infty$ evaluates to what value

(A) 49/27 (B) 47/27

(C) 43/27 (D) 41/27

Q24 How many terms are common between the two sequences: 17, 21, 25, ..., 417 and 16, 21, 26, ..., 466?

Q25 A team of 630 participants is organizing themselves for a competition's group photo. Every row accommodates three fewer participants than the row right before it. Identify the count of rows that cannot be organized in this manner.

(A) 3 (B) 4

(C) 5 (D) 6

Q26 The average of a non-decreasing sequence of N numbers $r_1+r_2+r_3+\ldots\ldots+r_n$ is 200. If r_1 is replaced by $5r_1$, the new average becomes 400. Then the number of values that N can take is?

Q27 If $S_n = 3n^2 + 2n + 1$, where S_n denotes the sum of the first n terms of a series and t_m=59 ,then find S_{m+1}

Q28 A man made a choice to distribute his collection of toys among a group of youngsters following a certain procedure. To the first child, he offers half of his total toy stash plus one additional toy. Then, he hands over half of the remaining toys along with an extra one to the second child, continuing in this manner. He repeats this process until he has provided for 7 children. If he eventually depletes his entire toy supply, what was the original count of toys he possessed?

(A) 254 (B) 127

(C) 62 (D) 174

Q29 If the sum of the series (2n+1)+(2n+3)+(2n+5)+…+(2n+69)=4725, what is the value of the sum 1+2+3+…+n?

Q30 Given a series of real numbers $a_1, a_2, a_3 \ldots.$ where each term a_{n+1} is obtained by adding n–1 to the previous term a_n for all n≥1, find the value of a_{150} if the series starts with -1

(A) 11025 (B) 10925

(C) 11175 (D) 12025

Answer Key

Q1	(B)
Q2	11021
Q3	(A)
Q4	(C)
Q5	5
Q6	(C)
Q7	(D)
Q8	(A)
Q9	(C)
Q10	(A)
Q11	(A)
Q12	(C)
Q13	(D)
Q14	(B)
Q15	(D)
Q16	4371
Q17	(B)
Q18	13160
Q19	62
Q20	6
Q21	(D)
Q22	(A)
Q23	(A)
Q24	20
Q25	(D)
Q26	3
Q27	386
Q28	(A)
Q29	1275
Q30	(A)

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

$r_1 + r_2 + r_3 + \ldots\ldots + r_n = 200N$

$5r_1 + r_2 + r_3 + \ldots\ldots + r_n = 300N$

on subtracting

$4r_1 = 100N$

$r_1 = 25N$

$As\ the\ given\ sequence\ of\ numbers\ is\ non - decrea\sin g\ sequence,$

$N\ can\ take\ values\ from\ 2\ to\ 8.\ N\ is\ not\ equal\ to\ 1,$

$if\ N = 1,\ then\ average\ of\ N\ numbers\ is\ 200\ wouldn't\ satisfy.\ Therefore,\ N\ can\ take\ values\ from\ 2\ to\ 8$

Video Solution:

Q2 Text Solution:

it is given that

$a_{n+1} = a_n + n - 1$ and $a_1 = -5$

$a_1 = -5$

$a_2 = a1 + 0$

$a_3 = a_2 + 1$

.

.

.

$a_{150} = a_{149} + 148$

$adding\ lhs\ and\ rhs\ separately\ of\ all\ the\ equations$

$a_1 + a_2 + \ldots\ldots\ldots\ldots\ldots\ldots a_{150} = a_1 + a_2 + \ldots\ldots\ldots\ldots\ldots\ldots + a_{149} + (-5 + 0 + 1 + 2 + \ldots\ldots\ldots\ldots + 148)$

$a_{150} = (1 + 2 + \ldots\ldots + 148) - 5$

$= 11021$

Video Solution:

Q3 Text Solution:

$given\ y_{n+1} = \frac{2y_n}{y_n+1}$

$y_{1=3}$

$substituting\ in\ the\ function\ we\ get$

$y_2 = {}^{6}/_{4=1.5}$

$y_3 = {}^{3}/_{2.5=1.2}$

$y_4 = {}^{2.4}/_{2.2=1.09}$

Video Solution:

Q4 Text Solution:

$as\ given\ from\ the\ general\ expression$

$x_1 = 1 + 2 = 3$

$x_1 - x_2 = 8$

$x_2 = -5$

$x_1 - x_2 + x_3 = 15$

$x_3 = 7$

$we\ can\ generalize\ the\ expression\ for\ x_n$

$= (-1)^{n+1}\left(2n + 1\right)$

$therefore\ x_{60} = -121$

$X_{70} = -141$

$answer = -262$

Video Solution:

Q5 Text Solution:

$x_0 = 1$
$x_1 = 2$
$x_2 = \frac{(1+x_1)}{x_0} = \frac{(1+2)}{1} = 3$
$x_3 = \frac{(1+x_2)}{x_1} = \frac{(1+3)}{2} = 2$
$x_4 = \frac{(1+x_3)}{x_2} = \frac{(1+2)}{3} = 1$
$x_5 = \frac{(1+x_4)}{x_3} = \frac{(1+1)}{2} = 1$
$x_6 = \frac{(1+x_5)}{x_4} = \frac{(1+1)}{1} = 2$

The series repeats itself after each 5 terms, as 2000 are 3000 both are multiples of 5, their value will be 1 each

answer= $2 \times 1 + 3 \times 1 = 5$

.

Video Solution:

Q6 Text Solution:

$b1 = 1$
$b_1 - b_2 = 2$
$b2 = -1$
$b_1 - b_2 + b_3 = 3$
$b_3 = 1$
$b_4 = -1$
$every\ even\ index\ number = -1$
$every\ odd\ index\ number\ = 1$
$the\ given\ series\ starts\ with\ an\ even$
$number\ and\ ends\ with\ a\ even\ number$
$thus\ it\ contains\ an\ extra\ even\ number$
$while\ other\ odd\ and\ even\ numbers$
$cancels\ out$
$answer = -1$

Video Solution:

Q7 Text Solution:

The population of town

1st year = p

2nd year = 3+2p

3rd year = 2(3+2p)+3 = 2*2p+2*3+3 =4p+3(1+2)

4th year = 2(2*2p+2*3+3)+3 = 8p+3(1+2+4)

nth year = $2^{n-1}\left(p+3\right) - 3$

answer will be option d

Video Solution:

Q8 Text Solution:

$answer = sum\ \ upto\ x_9 - sum\ upto\ x_8$

$6(3^8 + 1 - 3^7 - 1)$

$6 \times 3^7 \times 2$

$x_9 = 26244$

Video Solution:

Q9 Text Solution:

$x_n = S_n - S_{n-1}$ $\qquad$ $where\ Sn = x_1$
$+ x_2 + \ldots. + x_n$

$x_n = \left(2n^2 + 9n + 13\right)$

$- \left(2(n-1)^2 + 9\left(n-1\right) + 13\right)$

$= 4n + 7$

$4n + 7 = 103$

$n = 24$

Video Solution:

Q10 Text Solution:

$a_n = \frac{1}{(4n-2)\times(4n+2)}$

$a_1 = \frac{1}{2\times6} = \frac{1}{4}\left(\frac{1}{2} - \frac{1}{6}\right)$

$a_2 = \frac{1}{6\times10} = \frac{1}{4}\left(\frac{1}{6} - \frac{1}{10}\right)$

$a_{100} = \frac{1}{398\times402} = \frac{1}{4}\left(\frac{1}{398} - \frac{1}{402}\right)$

$a_1 + a_2 + a_3 + \ldots\ldots.. + a_{100} = \frac{1}{4}\left(\frac{1}{2} - \frac{1}{6}\right)$

$+ \frac{1}{4}\left(\frac{1}{6} - \frac{1}{10}\right) + \ldots\ldots.. + \frac{1}{4}\left(\frac{1}{398} - \frac{1}{402}\right)$

$= \frac{1}{4}\left(\frac{1}{2} - \frac{1}{402}\right) = \frac{25}{201}$

Video Solution:

Q11 Text Solution:

$t_7 = \frac{7}{9}$

$t_8 = \frac{8}{10}$

$t_9 = \frac{9}{11}$

$t_{56} = \frac{56}{58}$

$t_{57} = \frac{57}{59}$

$t_7 \times t_8 \times t_9 \times \ldots\ldots\ldots \times t_{56} \times t_{57} = \frac{7}{9} \times \frac{8}{10}$
$\times \frac{9}{11} \times \ldots\ldots \times \frac{56}{58} \times \frac{57}{59}$
$= \frac{7\times8}{58\times59} = \frac{7\times4}{29\times59}$

Video Solution:

Q12 Text Solution:

$S_k - S_{k-1} = t_k$

We know that S_k = k^3 + k^2 + k + 1

k^3 + k^2 + k + 1 - [(k-1)^3 + (k-1)^2 + (k-1) + 1] = 291

k^3+ k^2 + k + 1 - [k^3 - 3k^2 + 3k - 1 + k^2 - 2k + 1 + k - 1 + 1] = 291

1 + 3k^2 + 3k + 1 -2k - 1 = 291

-3k^2 + k + 290 = 0

3k^2 - k - 290 = 0

Solving above equation we get k = 10,
k cannot be negative as it is an index of the sequence.
Hence k= 10

Video Solution:

Q13 Text Solution:

$.5+.55+.555+.5555+........n\ terms$

$= 5 \times \left(.1+.11+.111+......nterms\right)$

$= \frac{5}{9} \times \left(.9+.99+.999+......nterms\right)$

$= \frac{5}{9} \times \left[\left(1-0.1\right)+\left(1-0.01\right)\right.$

$\left.+\left(1-0.001\right)+.......to\ n\ terms\right]$

$= \frac{5}{9} \times \left[\left(1+1+1.....to\ n\ terms\right)\right.$

$\left.-\left(0.1+0.01+0.001...to\ n\ terms\right)\right]$

$= \frac{5}{9} \times \left[n - \frac{\frac{1}{10}\times\left(1-\frac{1}{10^n}\right)}{1-\frac{1}{10}}\right]$

$= \frac{5}{81} \times \left[9n - \left(1-\frac{1}{10^n}\right)\right]$

$= \frac{5}{81} \times \left[9n - 1 + \frac{1}{10^n}\right]$

Video Solution:

Q14 Text Solution:

Let S_n stand for the sum of the first n terms of the series.

Given, $S_n = \left(n+2n^2\right)$

Let Tn stand for the nth term of the same. $Tn = Sn - \left(S_{n-1}\right)$

$Tn = \left(n+2n^2\right) - \left(n-1+2(n-1)^2\right)$

$Tn = \left(n+2n^2\right)$

$-\left(n-1+2\left(n^2+1-2n\right)\right)$

$Tn = \left(n+2n^2\right) - \left(n-1+2n^2+2\right.$

$\left.-4n\right)$

$Tn = 4n-1$

The smallest value of n for which $4n-1$ is a multiple of 7 is . $n = 2$

Video Solution:

Q15 Text Solution:

Starting with a1=–1,

we see that a2=a1+(1–1)=–1

a3=a2+(2–1)=–1

a3=a1+(1-1)+(2-1)

similarly

a50=a1+(1–1)+(2–1)+(3–1)+...+(49–1)

=a1+(1+2+3+......49)-49

=1175

Video Solution:

Q16 Text Solution:

$Given\ series\ =\ (2n+1)\ +\ (2n+3)\ +$
$(2n+5)\ +\ \ldots\ +\ (2n+51)\ = 5512$
$Isolate\ 2n\ terms\ on\ one\ side$
$(2n\ +\ 2n + \ldots.\ +\ 2n)\ +$
$(1\ +3\ +\ 5 + \ldots.\ +\ 51)\ = 5512$
$Odd\ numbers\ from\ 1\ to\ 51\ are\ added\ in$
$the\ above\ series.$
$Number\ of\ terms\ from\ 1\ to\ 51\ =\ 26$
$terms$
$Therefore,\ the\ number\ of\ 2n\ terms\ =$
26
$For\ computing\ the\ value\ of$
$(1\ +3\ +\ 5 + \ldots.\ +\ 51),$
$We\ know\ 1\ =\ 1^2,\ 1\ +3\ =\ 2^2,\ 1\ +3$
$+5\ =\ 3^2\ and\ so\ on\ \ or\ we\ can\ use\ the$
$sum\ of\ n\ terms\ of\ AP\ formula$
$= \frac{26}{2}\,[1+51] = 26 \times 26$
$So,\ (1\ +3\ +\ 5 + \ldots.\ +\ 51)\ =\ 26^2$
$So,\ 2n\ x\ 26\ +\ 26^2\ =\ 5512$
$2n\ x\ 26\ =\ 5512\ -\ 26^2$
$2n\ x\ 26 = 4836$
$2n = 186$
$n = 93$
$Value\ of\ 1+2+3+\ldots+93\ =\ \frac{93\times94}{2}$
$= 4371$

Video Solution:

Q17 Text Solution:

$Let\ n\ =\ 1,\ x1\ =\ 3(2^{1+1}\ -2)\ =$
$3(4-2)\ =\ 6\ =\ 3\ x\ 2^1$
$x2\ =\ 3(2^{2+1}\ -2)\ =\ 3(8-2)\ =\ 18,$
$a2\ =\ 18\ -\ 6\ =\ 12\ =\ 3\ x\ 2^2$
$x3\ =\ 3(2^{3+1}\ -2)\ =\ 3(14)\ =\ 42\ a3\ =$
$42\ -\ 12\ -\ 6\ =\ 42-18\ = 24\ =\ 3\ x$
2^3
$So,\ x15\ =\ 3\ x\ 2^{15}\ =\ 3\ x\ 32768$
$x15\ =\ 98304$

Video Solution:

Q18 Text Solution:

The series is in the form $n(n + 1)^2 = n^3 + 2n^2 + n$

Then $\Sigma\ n^3\ +\ 2n^2\ +\ n\ =\ \left[\frac{n(n+1)}{2}\right]^2 +\ 2\ \left[\frac{n\ (n\ +\ 1)2n+1)}{6}\right] + \frac{n(n+1)}{2}$

substituting n=14

we get $\left[\frac{14\times15}{2}\right]^2 + 2\left[\frac{14\times15\times29}{6}\right] + \frac{14\times15}{2}$

= 13160

Video Solution:

Q19 Text Solution:

5th kid has 2 toys

after 5th toy his stock exhausts.

So only if the 5th kid has 2 toys, he can give away half of it and 1 extra

Then for 4th kid, he would have given 4 (Since we are moving in reversing order)

3rd = 8 and 2nd = 16 and 1st kid = 32

Total = 32 + 16 + 8 + 4 + 2 = 62

Video Solution:

Q20 Text Solution:

$t_{m=}s_m - s_{m-1}$

$t_m = 3m^2 + 2m + 1$

$-\left[3(m-1)^2 + 2\left(m-1\right) + 1\right]$

$= 6m - 1$

$6m - 1 = 35$

$m = 6$

Video Solution:

Q21 Text Solution:

$\frac{1}{1\times3}+\frac{1}{3\times5}+....\frac{1}{19\times21}$

$=\frac{1}{2}\left[\left(\frac{1}{1}-\frac{1}{3}\right)+\left(\frac{1}{3}-\frac{1}{5}\right)+\left(\frac{1}{5}-\frac{1}{7}\right)+....+\left(\frac{1}{19}-\frac{1}{21}\right)\right]$

$=\frac{1}{2}\left(1-\frac{1}{21}\right)=\frac{10}{21}$

Video Solution:

Q22 Text Solution:

This question can be solved easily by exploring the options

$first\ option\ is$

$\left(2-a\right)(1-a)^{-3} = \left(2-a\right)\left(1+3a+6a^2\right.$

$\left.+10a^3+.......\right)$

$= 2 + 5a + 9a^2 + 14a^3 + ...$

$from\ the\ expansion\ of\ (1-a)^{-3} = 1$

$+ 3a + 6a^2 + 10a^3 + ...$

Video Solution:

Q23 Text Solution:

$S_n = 1 + \frac{4}{7} + \frac{9}{7^2} + \frac{16}{7^3} + ...\infty$

$-\left(1\right)$

$\frac{S_n}{7} = \frac{1}{7} + \frac{4}{7^2} + \frac{9}{7^3} + \frac{16}{7^4} + ...\infty$

$-\left(2\right)$

$\left(1\right) - \left(2\right) = S_n - \frac{S_n}{7} = 1 + \frac{3}{7} + \frac{5}{7^2}$

$+ \frac{7}{7^3} + ...\infty \qquad -\left(3\right)$

$\frac{6S_n}{49} = \frac{1}{7} + \frac{3}{7^2} + \frac{5}{7^3} + ...\infty$

$-\left(4\right)$

$\left(3\right) - \left(4\right)$

$\frac{36S_n}{49} = 1 + \frac{2}{7} + \frac{2}{7^2} + ...$

$\frac{36S_n}{49} = 1 + \frac{2}{7}\left[\frac{1}{1-\frac{1}{7}}\right] = S_n = \frac{49}{27}$

Video Solution:

Q24 Text Solution:

First sequence: 17, 21, 25, ..., 417 (terms of the form 4p + 13) Second sequence: 16, 21, 26, ..., 466 (terms of the form 5q + 11)

To find the common terms between the sequences, we consider the equation 4p = 5q - 2.

Since the left-hand side (LHS) of the equation, 4p, is always even, q must also be even.

We can rewrite the equation as 2p = 5r - 1, where q = 2r.

Notably, the LHS is even, so r should be odd. Let r = 2m + 1 for some integer m.

Hence, p = 5m + 2.

The common terms can be expressed as 4p + 13 = 20m + 21.

Thus, the common terms are all numbers of the form 20m + 21, which include 21, 41, 61, ..., 401. There are a total of 20 such terms.

Video Solution:

Q25 Text Solution:

Let x be in the front row.

So no. of children in next rows will be x-3,x-6,x-9,x-12,x-15,x-18,x-21….

Here the best approach would be to substitute options to the equation.

Suppose there are 6 rows, then the sum is equal to x + x-3 + x-6 + x-9 + x-12 + x-15 = 6x – 45

This sum is equal to 630.

=> 6x – 45 = 630 => 6x = 675 so x= 112.5

Here, x is not an integer.

Hence, there cannot be 6 rows.

Video Solution:

Q26 Text Solution:

$r_1 + r_2 + r_3 + \ldots\ldots + r_n = 200N$

$5r_1 + r_2 + r_3 + \ldots\ldots + r_n = 400N$

$on\ subtracting$

$4r_1 = 200N$

$r_1 = 50N$

$As\ the\ given\ sequence\ of\ numbers\ is\ non$
$-\ decrea\sin g\ sequence,$

$N\ can\ take\ values\ from\ 2\ to\ 4.\ N\ is\ not\ equal\ to\ 1,$
$if\ N\ =\ 1,\ then\ average\ of\ N\ numbers\ is\ 200\ wouldn't\ satisfy.\ Therefore,\ N\ can\ take\ values\ from\ 2\ to\ 4$

Video Solution:

Q27 Text Solution:

$t_{m=} s_m - s_{m-1}$

$t_m = 3m^2 + 2m + 1$
$- \left[3(m-1)^2 + 2\left(m-1\right) + 1\right]$
$= 6m\ -\ 1$

$6m\ -\ 1 = 59$

$m = 10$

$s_{11} = 3 \times 11^2 + 2 \times 11 + 1$
$= 386$

Video Solution:

Q28 Text Solution:

7th kid has 2 toys

after 7th toy his stock exhausts.

So only if the 7th kid has 2 toys, he can give away half of it and 1 extra

Then for 6th kid, (2+1) × 2 = 6 (Since we are moving in reversing order)

5th = 14 and 4th = 30 and 3rd = 62 2nd=126 1st=254

Video Solution:

Q29 Text Solution:

$Given\ series = (2n+1) + (2n+3) + (2n+5) + \ldots + (2n+69) = 4725$

$Isolate\ 2n\ terms\ on\ one\ side$

$(2n + 2n + \ldots. + 2n) + (1 + 3 + 5 + \ldots. + 69) = 4725$

$Odd\ numbers\ from\ 1\ to\ 69\ are\ added\ in\ the\ above\ series.$

$Number\ of\ terms\ from\ 1\ to\ 51 = 35\ terms$

$Therefore,\ the\ number\ of\ 2n\ terms = 35$

$For\ computing\ the\ value\ of\ (1 + 3 + 5 + \ldots. + 69),$

$We\ know\ 1 = 1^2,\ 1 + 3 = 2^2,\ 1 + 3 + 5 = 3^2\ and\ so\ on$

$So,\ (1 + 3 + 5 + \ldots. + 51) = 35^2$

$So,$

$2n \times 35 + 35^2 = 4725$

$2n \times 35 = 4725 - 35^2$

$n = 50$

$Value\ of\ 1 + 2 + 3 + \ldots + 50 = \frac{50 \times 51}{2} = 1275$

Video Solution:

Q30 Text Solution:

$Starting\ with\ a_1 = -1,$

$we\ see\ that\ a_2 = a_1 + (1 - 1) = -1$

$a_3 = a_2 + (2 - 1) = 0$

$a_3 = a_1 + (1 - 1) + (2 - 1)$

$a_{4=} a_3 + (3 - 1) = a_1 + (1 - 1) + (2 - 1)$

$+ (3 - 1)$

$similarly\ \ a_{150} = a_1 + (1 - 1) + (2 - 1)$

$+ (3 - 1) + \ldots + (149 - 1)$

$= a1 + (1 + 2 + 3 + \ldots\ldots 149) - 149$

$= -1 + \frac{149 \times 150}{2} - 149$

$= 11025$

Video Solution: