Previous Year Questions 2024

Q1: The ratio of the 10th term to its 30th term of an A.P. is 1 : 3 and the sum of its first six terms is 42. FInd the first term and the common difference of A.P. (CBSE 2024)

Ans:

Let the AP be a, a + d, a + 2d,............

$\frac{T_{10}}{T_{30}} = \frac{1}{3}$

$\Rightarrow \frac{a+9d}{a+29d} = \frac{1}{3}$

$\Rightarrow$ 3a + 27d= a + 29d

$\Rightarrow$ 2a − 2d = 0

$\Rightarrow$ 2a + 2d

$\therefore$ a = d ...(i)

Now, $S_6 = 42$

$\frac{6}{2}[2a+(6-1)d] = 42$

$\Rightarrow$ 3[2a + 5d] = 42

$\Rightarrow$ 2a + 5d =14

$\Rightarrow$ 2a + 5a = 14 [From eqn (i)]

$\Rightarrow$ 7a = 14

$\Rightarrow$ a = 14/7

$\therefore$ a = 2

So First term = 2

Common difference = 2.

Q2: If the sum of first 7 terms of an A.P. is 49 and that of first 17 terms is 289, find the sum of its first 20 terms. (CBSE 2024)

Ans:

$S_7 = 49$

$\Rightarrow \frac{7}{2}[2a+(7-1)d] = 49$

$\Rightarrow 2a + 6d = \frac{49\times2}{7}$

$\Rightarrow$ 2a + 6d = 14

$\Rightarrow$ a + 3d = 7 ...(i)

$S_{17} = 289$

$\Rightarrow \frac{17}{2}[2a+16d] = 289$

$\Rightarrow 2a + 16d = \frac{289\times2}{17}$

$\Rightarrow$ 2(a + 8d) = 34

$\Rightarrow$ a + 8d = 17 ...(ii)

From eqn (i) and (ii).

$-5d = -10$

$\therefore\ d = 2$

Put the value of d in eqn.(i),

$\therefore a + 3 \times 2 = 7$

$\Rightarrow\ a + 6 = 7$

$\Rightarrow\ a = 7 - 6$

$\Rightarrow\ a = 1$

$\therefore\ S_{20} = \frac{20}{3}[2\times1 + (20-1)\times2]$

$= 10\,[2 \times 19 \times 2]$

$= 10\,[2 + 38]$

$= 40 \times 10$

$= 400$

Previous Year Questions 2023

Q1: If a, b, form an A.P. with common difference *d.* then the value of a- 2b-c is equal to (2023)

(a) 2a + 4d

(b) 0

(c) -2a- 4d

(d) -2a - 3d

Ans: (c)

Sol: We have, a, b, c are in A.P.

$b = a + d$, and $c = a + 2d$

Now, $a - 2b - c = a - 2(a + d) - (a + 2d)$

$= a - 2a - 2d - a - 2d$

$= -2a - 4d$

Q2: If k + 2, 4k - 6. and 3k - 2 are three consecutive terms of an A.P. then the value of k is (2023)

(a) 3

(b) -3

(c) 4

(d) -4

Ans: (a)

Sol: Since, k + 2, 4k - 6 and 3k - 2 are three consecutive terms of A.P.

$a_2 - a_1 = a_3 - a_2$

$\Rightarrow (4k - 6) - (k + 2) = (3k - 2) - (4k - 6)$

$\Rightarrow 4k - 6 - k - 2 = 3k - 2 - 4k + 6$

$\Rightarrow 3k - 8 = -k + 4$

Q3: How many terms are there in A.P. whose first and fifth term are -14 and 2, respectively and the last term is 62. (CBSE 2023)

Ans: We have

First term, $a_1 = -14$

Fifth term, $a_5 = 2$

Last term, $a_n = 62$

Let *d* be the common difference and n be the number of terms.

$\because a_5 = 2$

$\Rightarrow -14 + (5-1)d = 2$

$\Rightarrow 4d = 16$

$\Rightarrow d = 4$

Now, $a_n = 62$

$\Rightarrow -14 + (n-1)4 = 62$

$\Rightarrow 4n - 4 = 76$

$\Rightarrow 4n = 80$

$\Rightarrow n = 20$

There are 20 terms in A.P.

Q4: Which term of the A.P. : 65, 61, 57, 53, ____ is the first negative term ? (CBSE 2023)

Ans: Given, A.P. is 65, 61, 57, 53,.....

Here, first term a = 65 and common difference, *d* = -4

Let the n^{th} term is negative.

Last term, $a_n = a + (n - 1) = 65 + (n - 1)(-4)$

$= 65 - 4n + 4$

$= 69 - 4n$, which will be negative when n = 18

So, 18^{th} term is the first negative term.

Q5: Assertion: a, b, c are in AP if and only if 2b = a + c

Reason: The sum of first n odd natural numbers is n^2. (CBSE 2023)

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true.

Ans: (b)

Sol: Since, a, b ,c are in A.P. then b - a = c -b

$\Rightarrow$ 2b = a + c

First n odd natural number be 1, 3, 5 ..... (2n - 1).

which form an A.P. with a = 1 and d = 2

Sum of first n odd natural number = n/2[2a + (n -1)d]

$= n/2\,[2 + (n - 1)2] = n^2$

Hence, assertion and reason are true but reason is not the correct explanation of assertion.

Q6: The sum of first 15 terms of an A.P. is 750 and its first term is 15. Find its 20^{th} term. (2023)

Ans: Here, a = 15 and $S_{15} = 750$

$\because S_n = n/2[2a + (n -1)d]$

$\therefore S_{15} = 15/2\,[2 \times 15 + (15 -1)d] = 750$

$\Rightarrow$ 15(15 + 7d) = 750

$\Rightarrow$ 15 + 7d = 50

$\Rightarrow$ 7d = 35

$\Rightarrow$ d = 5

Now, 20^{th} term = a + (n - 1)d

= 15 + (20 - 1) 5

= 15 + 95

= 110

Q7: Rohan repays his total loan of Rs. 1,18,000 by paying every month starting with the first instalment of Rs. 1,000. If he increase the instalment by Rs. 100 every month. what amount will be paid by him in the 30^{th} instalment? What amount of loan has he paid after 30^{th} instalment? (2023)

Ans: Total amount of loan Rohan takes = Rs. 1,18,000

First instalment paid by Rohan = Rs. 1000

Second instalment paid by Rohan = 1000 + 100 = Rs. 1100

Third instalment paid by Rohan = 1100 + 100 = Rs. 1200 and so on.

Let its 30^{th} instalment be n.

Thus, we have 1000,1100,1200, which forms an A.P. with first term (a) = 1000

and common difference (d) = 1100 - 1000 = 100

n^{th} term of an A.P. $a_n = a + (n - 1)d$

For 30^{th} instalment, $a_{30} = a + (30 - 1)d$

= 1000 + (29) 100 = 1000 + 2900 = 3900

So Rs. 3900 will be paid by Rohan in the 30^{th} instalment.

Now, we have a = 1000, last term (l)= 3900

Sum of 30 instalment, S_{30} = 30/2[a + 1]

⇒ S_{30} = 15(1000 + 3900) = Rs. 73500

Total amount he still have to pay after the 30th instalment = (Amount of loan) - (Sum of 30 instalments)

= Rs. 1,18,000 - Rs. 73,500 = Rs. 44,500

Hence, Rs. 44,500 still have to pay after the 30^{th} instalment.

Q8: The ratio of the 11th term to the 18th term of an AP is 2:3. Find the ratio of the 5th term to the 21st term and also the ratio of the sum of the first five terms to the sum of the first 21 terms. (2023)

Ans: Let a and d be the first term and common difference of an AP.

Given that, $a_{11} : a_{18} = 2 : 3$

$$\Rightarrow \quad \frac{a+10d}{a+17d} = \frac{2}{3}$$

⇒ 3a + 30d = 2a + 34d

⇒ a = 4d ...(i)

Now, a_5 = a + 4d = 4d + 4d = 8d [from Eq.(i)]

And a_{21} = a + 20d = 4d + 20d = 24d [from Eq. (i)]

$a_5 : a_{21}$ = 8d : 24d = 1 : 3

Now, sum of the first five terms, S_5 = 5/2 [2a + (5−1)d]

= 5/2 [2(4d) + 4d] [from Eq.(i)]

= 5/2 (8d + 4d) = 5/2 × 12d = 30d

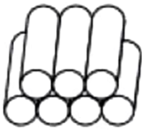
And, sum of the first 21 terms, S_{21} = 21/2 [2a + (21−1)d]

= 21/2 [2(4d) + 20d]= 21/2 × 28 d = 294 d from Eq..(i)]

So, ratio of the sum of the first five terms to the sum of the first 21 terms is,

$S_5 : S_{21}$ = 30d : 294d = 5 : 49

Q9: 250 logs are stacked in the following manner: 22 logs in the bottom row, 21 in the next row, 20 in the row next to it and so on (as shown by an example). In how many rows, are the 250 logs placed and how many logs are there in the top row?



(Example)

Ans: Let there be n rows to pile of 250 logs

Here, the bottom row has 22 logs and in next row, 1 log reduces

It means, we get an AP 22, 21, 20, 19, ... n with first term or a = 22 and d = -1

Now, we know that total logs are 250 or we can say that,

$S_n = 250$

Since sum of n terms of an A.P. $S_n = n/2\,(2a + (n-1)\,d)$

$= 250$ Therefore, $n/2\,(2 \times 22 + (n-1) \times (-1))$

or $500 = n\,(44 - (n-1))$

$500 = n\,(45 - n)$

$n^2 - 45n + 500 = 0$

By solving this, we get $(n-20)(n-25) = 0$

Since, there are 22 logs in first row and in next row, 1 log reduces, then we can not have more than 22 terms

$\therefore n \neq 25$

and $n = 20$

Means, 20^{th} row is the top row of the pile

Now let's find out number of logs in 20^{th} row

We know that value of nth term of an A.P. = $a + (n-1)\,d$

$N_{20} = [22 + (20-1)(-1)]$

$= (22-19) = 3$

Therefore, there are 3 logs in the top row.

Q10: The next term of the A.P. : √7 , √28, √63 is:

(a) √70

(b) √80

(c) √97

(d) √112 (CBSE 2023)

Ans: (d)

To find the next term of the arithmetic progression (A.P.) √7, √28, √63, let's first determine the common difference.

We need the approximate values for calculation:

$\sqrt{7} \approx 2.6458$

$\sqrt{28} \approx 5.2915$

$\sqrt{63} \approx 7.9373$

So:

$d = \sqrt{28} - \sqrt{7} \approx 5.2915 - 2.6458 = 2.6457$

Similarly, checking the difference between √63 and √28:

$d = \sqrt{63} - \sqrt{28} \approx 7.9373 - 5.2915 = 2.6458$

The common difference dd is approximately 2.6458, so the sequence is indeed an A.P.

The next term after √63 is:

Next term = $\sqrt{63} + d \approx 7.9373 + 2.6458 = 10.5831$

Now, approximate this result as the square root of the next perfect square:

Previous Year Questions 2022

Q1: Find a and b so that the numbers a, 7, b, 23 are in A.P. (2022)

Ans: Since a, 7, b, 23 are in A.P.

∴ Common difference is same.

∴ 7 - a = b -7 = 23 - b

Taking second and third terms, we get

b - 7 = 23 - b

⇒ 2b = 30

⇒ b = 15

Taking first and second terms, we get

⇒ 7 - a = b - 7

⇒ 7 - a = 15 - 7

⇒ 7 - a = 8

⇒ a = -1

Hence, a = -1, b = 15.

Q2: Find the number of terms of the A.P. : 293, 235, 227,......, 53 (2022)

Ans: Given, 293, 285, 277..... 53 be an A.P.

a = 293, d = 285 - 293 = -8

We know. $a_n = a + (n - 1)d$

⇒ 53 = 293 = (n - 1)(-8)

⇒ 53 - 293 = (n - 1) (-8)

⇒ -240 = (n - 1) (-8)

⇒ 30 = n - 1

⇒ n = 31

Q3: Determine the A.P. whose third term is 5 and seventh term is 9. (2022)

Ans: Let the first term and common difference of an A.P. be a and *d*, respectively.

Given $a_3 = 5$ and $a_7 = 9$

a + (3 - 1) d = 5 and a + (7 - 1)d = 9

a + 2d = 5 --------------(i)

and a + 6d = 9--------------(ii)

On subtracting (i) from (ii), we get

⇒ 4d = 4

⇒ d = 1

From (i), a + 2(1) = 5 ⇒ a + 2 = 5 ⇒ a = 3

Previous Year Questions 2020

Q1: If -5/7, a, 2 are consecutive terms in an Arithmetic Progression, then the value of a' is (2020)

(a) 9/7

(b) 9/14

(c) 19/7

(d) 19/14

Ans: (b)

Sol: Given, -5/7, a, 2 are in A.P. therefore common difference is same.

$\therefore a_2 - a_1 = a_3 - a_2$

$$a-\left(\frac{-5}{7}\right)=2-a \Rightarrow a+\frac{5}{7}=2-a \Rightarrow 2a=\frac{9}{7} \Rightarrow a=\frac{9}{14}$$

Q2: Which of the following is not an A.P? (2020)

(a) -1.2, 0.8.2.8, ...

(b) 3, 3+√2, 3+2√2,3 + 3√2,...

(c) 4/3, 7/3, 9/3, 12/3, ...

(d) -1/5, -2/5, -3/5,..

Ans: (c)

Sol: In option (c), We have

$$a_2 - a_1 = \frac{7}{3} - \frac{4}{3} = \frac{3}{3} = 1; a_3 - a_2 = \frac{9}{3} - \frac{7}{3} = \frac{2}{3}$$

As $a_2 - a_1 \neq a_3 - a_2$ the given list of numbers does not form an A.P.

Q3: The value of x for which 2x, (x + 10) and (3x + 2) are the three consecutive terms of an A.P, is (2020)

(a) 6

(b) -6

(c) 18

(d) -18

Ans: (a)

Sol: Given, 2x, (x + 10) and (3x + 2) are in A.P.

(x + 10) - 2x = (3x + 2) -(x + 10)

$\Rightarrow$ -x + 10= 2x - 8

$\Rightarrow$ - 3x = -18

$\Rightarrow$ x = 6

Q4: Show that $(a - b)^2$, $(a^2 + b^2)$ and $(a + b)^2$ are in A.P. (2020)

Ans: Let $a_1 = (a - b)^2$, $a_2 = (a^2 + b^2)$ and $a_3 = (a + b)^2$
Now. $a_2 - a_1 = (a^2 + b^2) - (a - b)^2$
$= a^2 + b^2 - (a^2 + b^2 - 2ab)$
$= a^2 + b^2 - a^2 - b^2 + 2ab = 2ab$
Again $a_3 - a_2 = (a + b)^2 - (a^2 + b^2)$
$= a^2 + b^2 + 2ab - a^2 - b^2 = 2ab$
$\therefore a_2 - a_1 = a_3 - a_2$
So, $(a - b)^2$, $(a^2 + b^2)$ and $(a + b)^2$ are in A.P.

Q5: The sum of four consecutive numbers in A.P. is 32 and the ratio of the product of the first and last terms to the product of two middle terms is 7 : 15. Find the numbers. (2020)

Ans: Let the four consecutive numbers be $(a - 3d)$, $(a - d)$, $(a + d)$, $(a + 3d)$.

Sum of four numbers = 32 (Given)
$\Rightarrow (a - 3d) + (a - d) + (a + d) + (a + 3d) = 32$
$\Rightarrow 4a = 32 \Rightarrow a = 8$

Also, $\frac{(a-3d)(a+3d)}{(a-d)(a+d)} = \frac{7}{15}$

$\Rightarrow \frac{a^2-9d^2}{a^2-d^2} = \frac{7}{15} \Rightarrow 15a^2 - 135d^2 = 7a^2 - 7d^2$

$\Rightarrow 8a^2 = 128d^2 \Rightarrow d^2 = \frac{8a^2}{128} = \frac{8\times64}{128} = 4 \quad \therefore d = \pm 2$

If d = 2. then the numbers are (8 - 6), (8 - 2), (8 + 2) and (8 + 6) i.e., 2,6, 10, 14 .
If d = -2. then the numbers are (8 + 6), (8 + 2), (8 - 2). (8 - 6) i.e.,14 ,10 ,6 ,2 .
Hence, the numbers are 2, 6, 10, 14 or 14, 10, 6, 2.

Q6: Find the sum of the first 100 natural numbers. (CBSE 2020)

Ans: First 100 natural numbers are 1 , 2 , 3 ...... 100 which form an A.P. with a = 1, d = 1.
Sum of n terms $= S_n = n/2\,[2a + (n - 1)d]$

$= 100/2\,[2 \times 1 + (100 - 1) \times 1] = 50\,[2 + 99] = 50 \times 101 = 5050$

Q7: Find the sum of first 16 terms of an Arithmetic Progression whose 4^{th} and 9^{th} terms are - 15 and - 30 respectively. (2020)

Ans: Given, a_4 = -15 and a_9 = -30

a + 3d = - 15 (i)

a + 8d = -30 (ii)

On subtracting (ii)from (i), we have

-5d = 15

⇒ d = - 3

Put d = - 3 in (i), we have

a + 3(-3)= - 15

⇒ a - 9 = - 15

⇒ a = - 6

Now, S_n = n/2 [2a + (n - 1)d]

⇒ S_{16} = 16/2 [2(-6) + (16 - 1) (-3)]

= 8 [2(-6) + (15) (-3)] = 8 [-12 - 45] = -456

Q8: In an A.P. given that the first term (a) = 54. the common difference (d) = -3 and the n^{th} term (a_n) = 0. find n and the sum of first n terms (S_n) of the A.P. (2020)

Ans: Given, d = - 3, a = 54 and a_n= 0

Since a_n = a + (n -1)d

∴ 0 = 54 + (n - 1)(-3)

⇒ 0 = 54 - 3n + 3

⇒ 3n = 57

⇒ n = 19

Now,

S_n = n/2 [2a+(n-1)d]

= 19/2 [2 × 54 +(19 - 1)(-3)]

= 19/2 [108 - 54] = 19/2 × 54 = 513

Q9: Find the Sum (−5) + (−8)+ (−11) + ... + (−230). (2020)

Ans: (−5) + (−8)+ (−11) + ... + (−230) .

Common difference of the A.P. (d) = a_2 - a_1

= -8-(-5)

= -8+5

= -3

So here,

First term (a) = −5

Last term (l) = −230

Common difference (d) = −3

So, here the first step is to find the total number of terms. Let us take the number of terms as n.

Now, as we know,

$a_n = a + (n-1)\, d$

So, for the last term,

$-230 = -5 + (n-1)(-3)$

$-230 = -5-3n + 3$

$-23 + 2 = -3n$

$-228/-3 = n$

$n = 76$

Now, using the formula for the sum of n terms, we get

$S_n = 76/2\,[2(-5) + (76-1)(-3)]$

$= 38\,[-10 + (75)(-3)]$

$= 38\,(-10-225)$

$= 38(-235)$

$= -8930$

Therefore, the sum of the A.P is $S_n = -8930$

Q10: Show that the sum of all terms of an A.P. whose first term is a, the second term is b and the last term is c is equal to $\frac{(a+c)(b+c-2a)}{2(b-a)}$. (CBSE 2020)

Ans: Given: first term $a_1 = a$, second term, $a_2 = b$ and last term, $l = c$.

So, common difference, $d = a_2 - a_1 = b - a$

Let this A.P. contains n terms.

Then, $l = a + (n-1)d$

$\Rightarrow c = a + (n-1)(b-a)$

$\Rightarrow c - a = (n-1)(b-a)$

$\Rightarrow \quad n - 1 = \frac{c-a}{b-a}$

$\Rightarrow \quad n = \frac{c-a}{b-a} + 1$

$= \frac{c-a+b-a}{b-a}$

$\Rightarrow \quad n = \frac{b+c-2a}{b-a}$ ...(i)

Now, sum of n terms of A.P. is given by,

$S_n = \frac{n}{2}[a + l]$

$= \frac{1}{2}\left(\frac{b+c-2a}{b-a}\right)[a+c]$ [Using (i)]

$\Rightarrow \quad S_n = \frac{(a+c)(b+c-2a)}{2(b-a)}$

Hence, proved.

Previous Year Questions 2019

Q1: Write the common difference of A.P. (2019)

√3, √12, √27, √48, ...

Ans: Give A.P. is

√3, √12, √27, √48, ...

or √3, 2√3, 3√3,4√3, ...

∴ d = common difference = 2√3 - √3 = √3

Q2: Which term of the A.P. 10, 7, 4, ...is -41 ? (2019)

Ans: Let n^{th} term of A.P. 10, 7, 4, ...is -41

∴ $a_n = a + (n - 1)d$

⇒ - 41 = 10+(n-1)(-3) [∵ d = 7 - 10 = -3]

⇒ - 41 = 10 - 3n + 3

⇒ -41 = 13 - 3n

⇒ 3n = 54=n= 18

∴ 18^{th} term of given A.P. is - 41

Q3: If in an A.P. a = 15, d = - 3 and a_n = 0, then find the value of n. (2019)

Ans: Given, a = 15, d = - 3 and a_n = 0

∴ $a_n = a + (n - 1)d$

⇒ 15 + (n - 1)(- 3)= 0

⇒ 15 - 3n +3 = 0

⇒ 18 - 3n = 0

⇒ - 3n = -18

⇒ n = 6

Q4: How many two digit numbers are divisible by 3? (2019)

Ans: Two-digit numbers which are divisible by 3 are 12, 15, 13..... 99. which forms an A.P. with first term (a) = 12, common difference (d) = 15 - 12 = 3 and last term (l) or n^{th} term = 99

a + (n - 1)d = 99

⇒ 12 + (n - 1)3 = 99

⇒ 3n = 99 - 9

⇒ n = 90/3

Q5: If the 9^{th} term of an AR is zero, then show that its 29^{th} term is double of its 19^{th} term. (2019, 2 Marks)

Ans: Given, $a_9 = 0$. we have to show that $a_{29} = 2a_{19}$

$a + 8d = 0$

$\Rightarrow a = -8d$

Now, $a_{19} = a + 18d = -8d + 18d = 10d$

$a_{29} = a + 28d = -8d + 28d = 20d = 2(10d) = 2a_{19}$

Hence, $a_{29} = 2a_{19}$

Q6: Which term of the A.P. 3, 15, 27, 39, ... will be 120 more than its 21^{st} term? (CBSE 2019)

Ans: We have, first term, a = 3, common difference, d = 15 - 3 =12

n^{th} term of an A.P. is given by $a_n = a + (n - 1)d$

$\therefore a_{21} = 3 + (20) \times 12$

$= 3 + 240$

$= 243$

Let the r^{th} term of the AP. be 120 more than the 21^{st} term.

$\Rightarrow a + (r - 1) d = 243 + 120$

$\Rightarrow 3 + (r - 1) 12 = 363$

$\Rightarrow (r - 1) 12 = 360 \Rightarrow r - 1 = 30 \Rightarrow r = 31$

Q7: If the 17^{th} term of an A.P. exceeds its 10^{th} term by 7, find the common difference. (2019)

Ans: According to question, $a_{17} - a_{10} = 7$

i.e. $a + 16d - (a + 9d) = 7$

where a = first term d = common difference

$\Rightarrow 7d = 7$

$\therefore d = 1$

Q8: Ramkali would require ₹ 5000 for getting her daughter admitted in a school after a year. She saved ₹ 150 in the first month and increased her monthly saving by ₹ 50 every month. Find, if she will be able to arrange the required money after 12 months. Which value is reflected in her efforts? (CBSE 2019, 15)

Ans: The saving in first month is₹ 150.

The saving in second month is

₹(150 + 50) = ₹ 200

Similarly, saving goes on increasing every month by ₹ 50.

Savings = ₹ 150, ₹ 200, ₹ 250, ₹300,.....

Savings forms an A.P. in which first term (a) = 150 and common difference, (d) = 50

Then, total savings for 12 months

$$S_{12} = \frac{n}{2}[2a + (n-1)d]$$

$$= \frac{12}{2}[2 \times 150 + (12-1)50]$$

$$= 6[300 + 550]$$

$$= 6 \times 850 = ₹\,5100$$

Then, Ramkali would be able to save ₹ 5,100 in 12 months and she needs ₹5,000 to send her daughter to school.

Hence, Ramkali would be able to send her daughter to school.

Values: Putting efforts to send her daughter to school shows her awareness regarding girls education and educating a child.

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Previous Year Questions 2017

Q1: A sum of ₹ 4,250 is to be used to give 10 cash prizes to students of a school for their overall academic performance. If each prize is ₹ 50 less than its preceding prize, find the value of each of the prizes. (CBSE 2017)

Ans: Let the value of first most expensive prize be ₹ a.

Then, according to the given condition, prizes are a, a – 50, a – 100, a – 150 ....

The given series forms an A.P., with a common difference of (– 50).

Here, first term = a

Common difference d = – 50

Number of terms, n = 10 and,

sum of 10 terms, S_{10} = ₹ 4,250

By formula, $S_n = \frac{n}{2}[2a + (n-1)d]$

$$\Rightarrow \quad S_{10} = \frac{10}{2}[2 \times a + (10-1) \times (-50)]$$

$$\Rightarrow \quad 4250 = 5(2a - 450)$$

$$\Rightarrow \quad 850 = 2a - 450$$

$$\Rightarrow \quad a = \frac{1300}{2} = ₹\,650$$

Hence, the value of the prizes are: ₹ 650, ₹ 600, ₹ 550, ₹ 500, ₹ 450, ₹ 400, ₹ 350, ₹ 300, ₹ 250, ₹ 200.