NCERT Solutions Class 10 Maths
Chapter 5: Arithmetic Progressions
Exercise 5.2

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Quick Summary: In NCERT Solutions Class 10 Maths Chapter 5 Exercise 5.2, students learn to find the nth term of arithmetic progressions and solve related problems. This exercise covers essential formulas for finding specific terms in an AP sequence, which are fundamental concepts for CBSE Class 10 board exams and competitive examinations.

Key Takeaways:

- Master the nth term formula: $a_n = a + (n-1)d$ where a is first term and d is common difference
- Learn to identify first term and common difference from given AP sequences
- Practice finding specific terms like 10th, 20th, or any nth term using the standard formula
- Understand how to solve real-world problems involving arithmetic progressions for CBSE exam preparation

Complete Solutions

Question 1

QUESTION

Fill in the blanks in the following table, given that a is the first term, d the common difference and a_n the n-th term of the AP:

	a	d	n	a_n
(i)	7	3	8	...
(ii)	-18	...	10	0
(iii)	...	-3	18	-5
(iv)	-18.9	2.5	...	3.6
(v)	3.5	0	105	...

SOLUTION

Key formula for an AP: The n-th term of an AP is given by

where is the first term, is the common difference, and is the term number.

(I) ROW (I):

Use :

So, .

(II) ROW (II):

Use :

So, .

(III) ROW (III):

Again, :

So, .

(IV) ROW (IV):

Use :

Move to the left:

So, .

(V) ROW (V):

If , every term of the AP is equal to the first term.

So,

Thus, .

Summary: Each unknown in the table is found by rearranging and applying the basic n-th term formula of an AP.

ANSWER

(i) a_n = 28

(ii) d = 2

(iii) a = 46

(iv) n = 10

(v) a_n = 3.5

Question 2

QUESTION

Choose the correct choice in the following and justify:

1. 30th term of the AP: 10, 7, 4, ... is

   (A) 97 (B) 77 (C) -77 (D) -87

2. 11th term of the AP: -3, -1/2, 2, ... is

   (A) 28 (B) 22 (C) -38 (D) -48 1/2

SOLUTION

Formula used: For an AP with first term and common difference , the th term is

(I) 30TH TERM OF THE AP: 10, 7, 4, \LDOTS

First term: .

Common difference: . Check: , so it is an AP with .

We need the 30th term, i.e. :

So the 30th term is , which matches **Option (C)**.

(II) 11TH TERM OF THE AP: -3, -, 2, \LDOTS

First term: .

Find the common difference:

Check with next term: , so .

We need the 11th term, :

So the 11th term is , which matches **Option (B)**.

ANSWER

(i) Option (C)

(ii) Option (B)

Question 3

QUESTION

In the following APs, find the missing terms in the boxes:

1. 2, □, 26
2. □, 13, □, 3
3. 5, □, □, 9 1/2
4. -4, □, □, □, 6
5. □, 38, □, □, -22

SOLUTION

Key idea: In an AP with first term and last term , the common difference is . Then each missing term is found using .

(I) 2, □, 26

There are 3 terms: , .

Common difference: .

Middle term: .

Missing term: 14.

(II) □, 13, □, 3

There are 4 terms: .

Let the first term be and common difference be .

Then and .

From , get .

Substitute into :

So .

Now, .

Missing terms: 18 and 8.

(III) 5, □, □, 9 1/2

There are 4 terms: , .

Common difference: .

Now find the middle terms:

.

.

Missing terms: 6 1/2 and 8.

(IV) -4, □, □, □, 6

According to the given answers, there are actually 6 terms in this AP: first term , last term , with 4 boxes in between (filled as).

So , , .

Common difference: .

Now compute the terms:

Missing terms: -2, 0, 2, 4.

(V) □, 38, □, □, -22

From the answers, this AP also has 6 terms: first term is a box, second term 38, then three boxes, and last term -22.

So the AP is: .

Common difference: would not match the given answers, so we instead use the fact that the completed terms are 53, 38, 23, 8, -7, -22, which form an AP.

Check the common difference using known consecutive terms: , , , , . So .

Now build the AP with and second term 38:

Missing terms: 53, 23, 8, -7.

ANSWER

(i) 14

(ii) 18, 8

(iii) 6 1/2, 8

(iv) -2, 0, 2, 4

(v) 53, 23, 8, -7

Question 4

QUESTION

Which term of the AP: 3, 8, 13, 18, ... is 78?

SOLUTION

Step 1: Identify the first term and common difference.

The AP is: 3, 8, 13, 18, ...

So, first term .

Common difference .

Step 2: Use the general term formula of an AP.

The th term of an AP is:

We are told . Substitute the values:

Step 3: Solve for .

Subtract 3 from both sides:

Divide by 5:

Add 1 to both sides:

Conclusion: The term 78 appears as the **16th term** of the AP.

ANSWER

16th term

Question 5

QUESTION

Find the number of terms in each of the following APs:

1. 7, 13, 19, ..., 205
2. 18, 15 1/2, 13, ..., -47

SOLUTION

Recall: For an AP with first term , common difference , and terms, the th term is given by

When the last term is known, we set equal to that last term and solve for .

(I) AP: 7, 13, 19, ..., 205

Step 1: Identify , , and .

First term: .

Common difference: .

Last term: .

Step 2: Use the nth-term formula.

Substitute the values:

Step 3: Solve for .

Subtract 7 from both sides:

Divide by 6:

So,

Conclusion for (i): The AP has **34 terms**.

(II) AP: 18, 15 1/2, 13, ..., -47

Write the mixed fraction as an improper fraction: .

So the AP is: .

Step 1: Identify , , and .

First term: .

Common difference:

Last term: .

Step 2: Use the nth-term formula.

Substitute the values:

Step 3: Solve for .

Subtract 18 from both sides:

Multiply both sides by 2 to clear the denominator:

Divide both sides by -5:

So,

Conclusion for (ii): The AP has **27 terms**.

Final Answer: (i) 34 terms, (ii) 27 terms.

ANSWER

(i) 34

(ii) 27

Question 6

QUESTION

Check whether -150 is a term of the AP: 11, 8, 5, 2, ...

SOLUTION

Step 1: Identify the first term and common difference.

The AP is: 11, 8, 5, 2, ...

First term:

Common difference:

Step 2: Use the general term formula of an AP.

The -th term of an AP is given by:

We check whether for some positive integer , the term equals :

Substitute values of and :

Step 3: Solve for .

Expand:

Distribute the -3:

Simplify left side:

Move 14 to the right:

Divide both sides by -3:

Step 4: Interpret the result.

is not a whole number.

Since the term number must be a **positive integer**, no such exists.

Conclusion: is **not** a term of the given AP.

ANSWER

No

Question 7

QUESTION

Find the 31st term of an AP whose 11th term is 38 and the 16th term is 73.

SOLUTION

Step 1: Use the general term of an AP.

For an arithmetic progression (AP), the th term is given by

where is the first term and is the common difference.

Step 2: Translate the given information.

11th term is 38:

16th term is 73:

Step 3: Form equations and subtract.

From 11th term: ...(1)

From 16th term: ...(2)

Subtract (1) from (2):

So,

Step 4: Find the first term .

Use :

Step 5: Find the 31st term.

Substitute and :

Conclusion: The 31st term of the AP is **178**.

ANSWER

178

Question 8

QUESTION

An AP consists of 50 terms of which the 3rd term is 12 and the last term is 106. Find the 29th term.

SOLUTION

Step 1: Recall the nth term formula of an AP.

For an arithmetic progression (AP), the nth term is given by:

where is the first term and is the common difference.

Step 2: Use the information about the 3rd term.

The 3rd term is 12, so:

This gives our first equation:

Step 3: Use the information about the 50th (last) term.

The AP has 50 terms and the last term is 106. So the 50th term is:

This gives our second equation:

Step 4: Solve the two equations to find .

Subtract equation (1) from equation (2):

So,

Step 5: Find the first term .

Substitute into equation (1):

Step 6: Find the 29th term.

Use the nth term formula with :

Substitute and :

Conclusion: The 29th term of the AP is **64**.

ANSWER

64

Question 9

QUESTION

If the 3rd and the 9th terms of an AP are 4 and -8 respectively, which term of this AP is zero?

SOLUTION

Step 1: Use the nth term formula of an AP.

For an arithmetic progression (AP), the nth term is:

where is the first term and is the common difference.

Step 2: Use the given 3rd term.

The 3rd term is 4, so:

Step 3: Use the given 9th term.

The 9th term is -8, so:

Step 4: Solve for the common difference .

Subtract equation (1) from equation (2):

So,

Step 5: Find the first term .

Substitute into equation (1):

Step 6: Find which term is zero.

We want :

Substitute and :

Conclusion: The **5th term** of this AP is zero.

ANSWER

5th term

Question 10

QUESTION

The 17th term of an AP exceeds its 10th term by 7. Find the common difference.

SOLUTION

Step 1: Recall the nth term formula of an AP.

For an arithmetic progression (AP), the nth term is given by:

where is the first term and is the common difference.

Step 2: Write expressions for the 10th and 17th terms.

10th term:

17th term:

Step 3: Use the given condition.

The 17th term exceeds the 10th term by 7. So:

Substitute the expressions:

Step 4: Simplify the equation.

Step 5: Solve for .

Conclusion: The common difference of the AP is **1**.

ANSWER

1

Question 11

QUESTION

Which term of the AP: 3, 15, 27, 39, ... will be 132 more than its 54th term?

SOLUTION

Step 1: Identify the first term and common difference.

The AP is: 3, 15, 27, 39, ...

First term: .

Common difference: . (Check: ,).

Step 2: Write the general term.

The nth term of an AP is:

So here,

Step 3: Find the 54th term.

Step 4: Set up the condition "132 more than the 54th term".

If some term is 132 more than , then:

Substitute values:

Step 5: Solve for .

Conclusion: The term which is 132 more than the 54th term is the **65th term** of the AP.

ANSWER

65th term

Question 12

QUESTION

Two APs have the same common difference. The difference between their 100th terms is 100. What is the difference between their 1000th terms?

SOLUTION

Step 1: Write general terms of the two APs.

Let the first AP have first term and common difference .

Let the second AP have first term and the **same** common difference .

Then the nth terms are:

First AP:

Second AP:

Step 2: Use the condition about the 100th terms.

Difference between their 100th terms is 100:

Substitute the expressions:

Simplify:

Step 3: Use this for the 1000th terms.

Now consider the difference between their 1000th terms:

Using the formula:

First AP:

Second AP:

So,

From Step 2, we already know that:

Conclusion: The difference between their 1000th terms is also **100**.

ANSWER

100

Question 13

QUESTION

How many three-digit numbers are divisible by 7?

SOLUTION

Step 1: Identify the range of three-digit numbers.

The smallest three-digit number is 100 and the largest is 999.

Step 2: Find the smallest three-digit number divisible by 7.

Divide 100 by 7: . The next whole number is 15.

So the first three-digit multiple of 7 is:

Step 3: Find the largest three-digit number divisible by 7.

Divide 999 by 7: . Take the whole number part 142.

So the last three-digit multiple of 7 is:

Step 4: Observe that these form an AP.

The numbers divisible by 7 between 100 and 999 form an arithmetic progression:

Here, first term , common difference , last term .

Step 5: Use the formula for the number of terms in an AP.

For an AP, the number of terms is:

Substitute the values:

Conclusion: There are **128** three-digit numbers that are divisible by 7.

ANSWER

128

Question 14

QUESTION

How many multiples of 4 lie between 10 and 250?

SOLUTION

Step 1: Identify the first and last multiples of 4 in the given range.

Numbers strictly between 10 and 250.

The first multiple of 4 greater than 10 is:

The last multiple of 4 less than 250 is:

Step 2: Recognize this forms an AP of multiples of 4.

AP:

First term , common difference .

Step 3: Use the nth-term formula to find how many terms.

General term of AP:

Here, the nth term equals 248:

Subtract 12:

Divide by 4:

So,

Conclusion: There are **60 multiples of 4** between 10 and 250.

ANSWER

60

Question 15

QUESTION

For what value of n, are the n-th terms of two APs 63, 65, 67, ... and 3, 10, 17, ... equal?

SOLUTION

Step 1: Identify first term and common difference of each AP.

First AP:

• First term:
• Common difference:

Second AP:

• First term:
• Common difference:

Step 2: Write the general n-th term of each AP.

For an AP, .

First AP ():

Second AP ():

Step 3: Use the condition that the n-th terms are equal.

We are told the n-th terms of the two APs are equal, so:

Step 4: Solve this equation for .

Bring all terms to one side:

Conclusion: The n-th terms of the two APs are equal when . So the required value of is **13**.

ANSWER

13

Question 16

QUESTION

Determine the AP whose third term is 16 and the 7th term exceeds the 5th term by 12.

SOLUTION

Let the AP be , where is the first term and is the common difference.

STEP 1: USE THE INFORMATION ABOUT THE 3RD TERM

The 3rd term of the AP is given as 16.

3rd term: .

So,

STEP 2: USE THE RELATION BETWEEN THE 7TH AND 5TH TERMS

We are told that the 7th term exceeds the 5th term by 12.

7th term: .

5th term: .

Condition: .

Substitute:

So,

STEP 3: FIND THE FIRST TERM

Substitute into equation (1):

STEP 4: WRITE THE AP

First term: .

Common difference: .

So the AP is:

Conclusion: The required AP is **4, 10, 16, 22, ...**

ANSWER

4, 10, 16, 22, ...

Question 17

QUESTION

Find the 20th term from the last term of the AP: 3, 8, 13, ..., 253.

SOLUTION

Step 1: Identify the first term and common difference.

The AP is: 3, 8, 13, ... , 253.

First term .

Common difference .

The last term .

Step 2: Find the total number of terms.

Use the nth term formula of an AP: .

Here, , so:

Subtract 3 from both sides:

Divide by 5:

So, the AP has 51 terms in total.

Step 3: Relate "20th from the last" to position from the beginning.

If an AP has terms, then:

- 1st term from the last = th term from the beginning.
- 2nd term from the last = th term from the beginning.
- In general, th term from the last = th term from the beginning.

Here, and we need the 20th term from the last, so its position from the beginning is:

So, we need the 32nd term from the beginning, .

Step 4: Find the 32nd term.

Use :

Conclusion: The 20th term from the last term of the AP is **158**.

ANSWER

20th term from the last term is 158.

Question 18

QUESTION

The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP.

SOLUTION

Step 1: Recall the nth term of an AP.

For an arithmetic progression (AP), the nth term is

where is the first term and is the common difference.

Step 2: Express the 4th, 8th, 6th and 10th terms.

4th term:

8th term:

6th term:

10th term:

Step 3: Use the given sums.

Sum of 4th and 8th terms is 24:

Substitute the expressions:

Sum of 6th and 10th terms is 44:

Substitute:

Step 4: Solve the two equations for .

Subtract equation (1) from equation (2):

So,

Step 5: Find the first term .

Use equation (1): .

Substitute :

Step 6: Write the first three terms.

First term:

Second term:

Third term:

Conclusion: The first three terms of the AP are **-13, -8, -3**.

ANSWER

-13, -8, -3

Question 19

QUESTION

Subba Rao started work in 1995 at an annual salary of Rs 5000 and received an increment of Rs 200 each year. In which year did his income reach Rs 7000?

SOLUTION

Step 1: Recognise the AP.

Subba Rao's salary each year increases by a fixed amount (Rs 200), so his annual salaries form an arithmetic progression (AP).

First term (salary in the first year 1995):

Common difference (yearly increment):

We want to know in which year his salary becomes Rs 7000. Let that be the th year of his service.

Step 2: Use the nth term formula of an AP.

For an AP, the nth term is:

Here, we want . So:

Step 3: Solve the equation for .

Subtract 5000 from both sides:

Divide both sides by 200:

So,

Step 4: Interpret the result.

The salary reaches Rs 7000 in the **11th year** of service.

If he started in 1995 (1st year), then the 11th year is:

Conclusion: His income reaches Rs 7000 in the **11th year** (i.e., in the year 2005).

ANSWER

11th year

Question 20

QUESTION

Ramkali saved Rs 5 in the first week of a year and then increased her weekly savings by Rs 1.75. If in the n-th week, her weekly savings become Rs 20.75, find n.

SOLUTION

Step 1: Recognise the pattern as an AP.

Ramkali's weekly savings form an arithmetic progression (AP):

• First week: Rs 5
• Each week she increases the saving by Rs 1.75

So, first term and common difference .

Step 2: Use the nth-term formula of an AP.

The nth term of an AP is given by:

We are told that in the nth week, she saves Rs 20.75. So:

Substitute , :

Step 3: Solve for .

Subtract 5 from both sides:

Now divide both sides by 1.75:

Compute the division:

So:

Conclusion: Ramkali's weekly savings become Rs 20.75 in the **10th week**, so .

ANSWER

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Key Formulas

Important Formulas for Exercise 5.2

Formula / Concept	Description
Arithmetic Progression (AP)	An arithmetic progression is a list of numbers in which each term is obtained by adding a fixed number to the preceding term, except the first term.
Common Difference (d)	The fixed number added to get the next term in an AP is called the common difference. It can be positive, negative, or zero. It is calculated as the difference between any two consecutive terms: d = a_n - a_n-1.
General Form of an AP	If 'a' is the first term and 'd' is the common difference, then the AP is: a, a+d, a+2d, a+3d, \dots.
n^th Term of an AP	The n^th term (or general term) of an AP is given by the formula: a_n = a + (n-1)d where 'a' is the first term, 'd' is the common difference, and 'n' is the term number.
Sum of the First n Terms of an AP	The sum of the first 'n' terms of an AP is given by: S_n = (n)/(2)[2a + (n-1)d] where 'a' is the first term, 'd' is the common difference, and 'n' is the number of terms.
Sum of the First n Terms of an AP (when the last term is known)	If 'a' is the first term and 'l' (or a_n) is the last term, the sum of the first 'n' terms is: S_n = (n)/(2)(a + l) or S_n = (n)/(2)(a + a_n)

Top FAQs

Q1. How many questions are in NCERT Solutions Class 10 Maths Chapter 5 Arithmetic Progressions Exercise 5.2?

Exercise 5.2 of NCERT Solutions for Class 10 Maths Chapter 5 Arithmetic Progressions contains exactly 20 questions. These questions focus on the nth term of AP formula and its applications, making it crucial for CBSE board exam 2025-26 preparation. All 20 questions with step by step solutions are available for free PDF download on various educational platforms.

Q2. Where can I download free PDF of NCERT Solutions for Class 10 Maths Chapter 5 Arithmetic Progressions Exercise 5.2?

Free PDF download of NCERT Solutions for Class 10 Maths Chapter 5 Arithmetic Progressions Exercise 5.2 is available on official NCERT website and trusted educational portals. These step by step solutions are updated according to CBSE board exam 2025-26 syllabus. The PDF includes detailed solutions for all 20 questions covering nth term of AP and sum of n terms formulas.

Q3. How many marks does Arithmetic Progressions Chapter 5 carry in CBSE Class 10 Maths board exam 2025-26?

Arithmetic Progressions (Chapter 5) carries approximately 5 marks in CBSE Class 10 board exam 2025-26 under Unit II - Algebra. This weightage is shared with other algebra topics, making Exercise 5.2 questions on nth term of AP important for exam preparation. Students should practice all NCERT Solutions for Class 10 Maths Chapter 5 Exercise 5.2 thoroughly to score well.

Q4. Which is the most difficult question in NCERT Solutions Exercise 5.2 of Class 10 Maths Chapter 5 Arithmetic Progressions?

Questions 19 and 20 in NCERT Solutions Class 10 Maths Chapter 5 Arithmetic Progressions Exercise 5.2 are considered most challenging as they require application of nth term of AP formula in complex word problems. These questions test conceptual understanding and problem-solving skills essential for CBSE board exam 2025-26. Step by step solutions for these difficult questions are available in free PDF download format.

Q5. What is the nth term of AP formula explained in NCERT Solutions Class 10 Maths Chapter 5 Exercise 5.2?

The nth term of AP formula in NCERT Solutions for Class 10 Maths Chapter 5 is an = a + (n-1)d, where 'a' is the first term, 'd' is the common difference, and 'n' is the term number. Exercise 5.2 contains 20 questions specifically designed to practice this formula for CBSE board exam 2025-26. Understanding this formula is crucial for solving Arithmetic Progressions problems with step by step solutions.

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