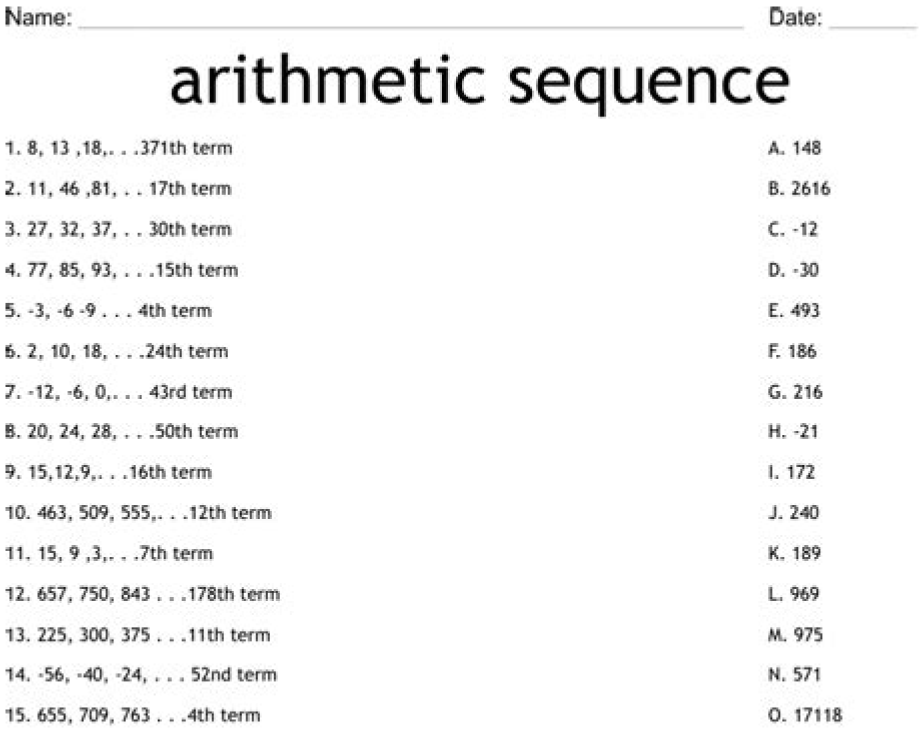
Arithmetic Sequence Worksheet With Answers



Name: ______________________ Date: ________

arithmetic sequence

1. 8, 13 ,18,. . .371th term
2. 11, 46 ,81, . . 17th term
3. 27, 32, 37, . . 30th term
4. 77, 85, 93, . . .15th term
5. -3, -6 -9 . . . 4th term
6. 2, 10, 18, . . .24th term
7. -12, -6, 0,. . . 43rd term
8. 20, 24, 28, . . .50th term
9. 15,12,9,. . .16th term
10. 463, 509, 555,. . .12th term
11. 15, 9 ,3,. . .7th term
12. 657, 750, 843 . . .178th term
13. 225, 300, 375 . . .11th term
14. -56, -40, -24, . . . 52nd term
15. 655, 709, 763 . . .4th term

A. 148
B. 2616
C. -12
D. -30
E. 493
F. 186
G. 216
H. -21
I. 172
J. 240
K. 189
L. 969
M. 975
N. 571
O. 17118

Arithmetic sequence worksheet with answers is an essential tool for students and educators alike, helping to solidify understanding of arithmetic sequences in a structured manner. Arithmetic sequences, or arithmetic progressions, are fundamental concepts in mathematics that deal with a sequence of numbers in which the difference of any two successive members is a constant. This property makes them a critical aspect of algebra and number theory. In this article, we will explore the concept of arithmetic sequences, provide a variety of worksheets tailored to different learning levels, and offer answers to ensure comprehension.

Understanding Arithmetic Sequences

An arithmetic sequence is defined by its first term and the common difference between consecutive terms. The general form of an arithmetic sequence can be expressed as:

- $a_n = a_1 + (n-1)d$

Where:
- a_n = the n^{th} term,
- a_1 = the first term,
- d = the common difference,
- n = the term number.

Examples of Arithmetic Sequences

1. Example 1: Consider the sequence 2, 5, 8, 11, 14.
- Here, the first term $a_1 = 2$ and the common difference $d = 3$ (5 - 2).

2. Example 2: The sequence 10, 7, 4, 1, -2.
- Here, the first term $a_1 = 10$ and the common difference $d = -3$ (7 - 10).

3. Example 3: The sequence 1, 3, 5, 7, 9.
- Here, $a_1 = 1$ and $d = 2$.

Creating an Arithmetic Sequence Worksheet

Worksheets are an effective way to practice the concept of arithmetic sequences. Below are several types of problems that can be included in an arithmetic sequence worksheet.

Types of Problems

1. Identifying Terms: Given the first term and common difference, find the n^{th} term.
- Example: If $a_1 = 4$ and $d = 3$, find a_5.

2. Finding Common Difference: Given two terms in the sequence, find the common difference.
- Example: If $a_3 = 10$ and $a_6 = 19$, find d.

3. Real-World Problems: Create a scenario that can be modeled by an

arithmetic sequence.
- Example: A staircase has 5 steps, each step rises 2 inches higher than the previous one. How high is the 5th step?

4. Word Problems: Present problems in a narrative format.
- Example: Sarah saves $50 in the first month, and each subsequent month she saves $10 more than the previous month. How much will she save in the 6th month?

5. Finding the Sum: Include problems involving the sum of an arithmetic sequence.
- Example: Find the sum of the first 10 terms of the sequence where $a_1 = 2$ and $d = 4$.

Sample Arithmetic Sequence Worksheet

Here is a structured worksheet designed for students to practice arithmetic sequences:

Worksheet

Part A: Identify the Terms

1. Given $a_1 = 3$ and $d = 5$, find a_7.
2. If $a_1 = 12$ and $d = -2$, find a_{10}.

Part B: Finding Common Difference

3. If $a_4 = 20$ and $a_8 = 36$, find the common difference d.
4. Given $a_2 = 15$ and $a_5 = 30$, calculate d.

Part C: Real-World Problems

5. A train travels 100 km in the first hour, and each hour it travels an additional 20 km more. How far will it travel in the 4th hour?
6. A farmer plants 1 tree in the first year and increases the number of trees planted by 2 each subsequent year. How many trees will he plant in the 5th year?

Part D: Sum of the Sequence

7. Calculate the sum of the first 15 terms of the sequence where $a_1 = 5$ and $d = 3$.
8. Find the sum of the first 8 terms of the sequence where $a_1 = 10$ and $d = 4$.

Answers to the Worksheet

Providing answers to the worksheet is crucial for self-assessment. Below are the answers to the problems posed in the sample worksheet.

Answers

Part A: Identify the Terms

1. $a_7 = 3 + (7-1) \times 5 = 3 + 30 = 33$
2. $a_{10} = 12 + (10-1) \times (-2) = 12 - 18 = -6$

Part B: Finding Common Difference

3. Given $a_4 = 20$ and $a_8 = 36$:
- From a_4: $a_4 = a_1 + 3d$
- From a_8: $a_8 = a_1 + 7d$
- Subtracting the two equations gives $36 - 20 = 4d$
- Solving gives $d = 4$.

4. Given $a_2 = 15$ and $a_5 = 30$:
- From a_2: $a_2 = a_1 + d$
- From a_5: $a_5 = a_1 + 4d$
- Subtracting gives $30 - 15 = 3d$
- Thus, $d = 5$.

Part C: Real-World Problems

5. The distance traveled in the 4th hour is:
- $100 + 3 \times 20 = 160$ km.

6. The farmer will plant:
- $1 + 4 \times 2 = 9$ trees in the 5th year.

Part D: Sum of the Sequence

7. The sum of the first 15 terms is:
- $S_n = \frac{n}{2} (2a_1 + (n-1)d)$
- $S_{15} = \frac{15}{2} (2 \times 5 + (15-1) \times 3) = \frac{15}{2} (10 + 42) = \frac{15}{2} \times 52 = 390$.

8. The sum of the first 8 terms is:
- $S_8 = \frac{8}{2} (2 \times 10 + (8-1) \times 4) = 4 \times (20 + 28) = 4 \times 48 = 192$.

Conclusion

An arithmetic sequence worksheet with answers serves as a vital resource for reinforcing the principles of arithmetic sequences. By practicing various types of problems, students can enhance their understanding of sequences, develop problem-solving skills, and apply these concepts to real-world scenarios. Worksheets also provide a structured approach to learning, making it easier for educators to assess student progress. Whether you are a student looking to practice or a teacher creating assignments, arithmetic sequence worksheets are invaluable tools in mastering this fundamental area of mathematics.

Frequently Asked Questions

What is an arithmetic sequence?

An arithmetic sequence is a sequence of numbers in which the difference between consecutive terms is constant.

How do you find the nth term of an arithmetic sequence?

The nth term can be found using the formula: a_n = a_1 + (n-1)d, where a_n is the nth term, a_1 is the first term, n is the term number, and d is the common difference.

What is the formula for the sum of the first n terms of an arithmetic sequence?

The sum of the first n terms (S_n) can be calculated using the formula: S_n = n/2 (a_1 + a_n), or alternatively S_n = n/2 (2a_1 + (n-1)d).

What types of problems can be solved using an arithmetic sequence worksheet?

An arithmetic sequence worksheet can include problems such as finding the nth term, calculating the sum of a certain number of terms, and identifying the common difference.

Are there any online resources for arithmetic sequence worksheets?

Yes, there are many online resources and educational websites that offer free printable arithmetic sequence worksheets with answers.

How can I check my answers on an arithmetic sequence worksheet?

You can check your answers by comparing them to the provided solutions at the end of the worksheet or by using online calculators that can verify your calculations.

What are some real-life applications of arithmetic sequences?

Arithmetic sequences can be found in real-life situations such as calculating savings over time with regular deposits, determining the total distance traveled with constant speed, and understanding patterns in schedules or timelines.

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