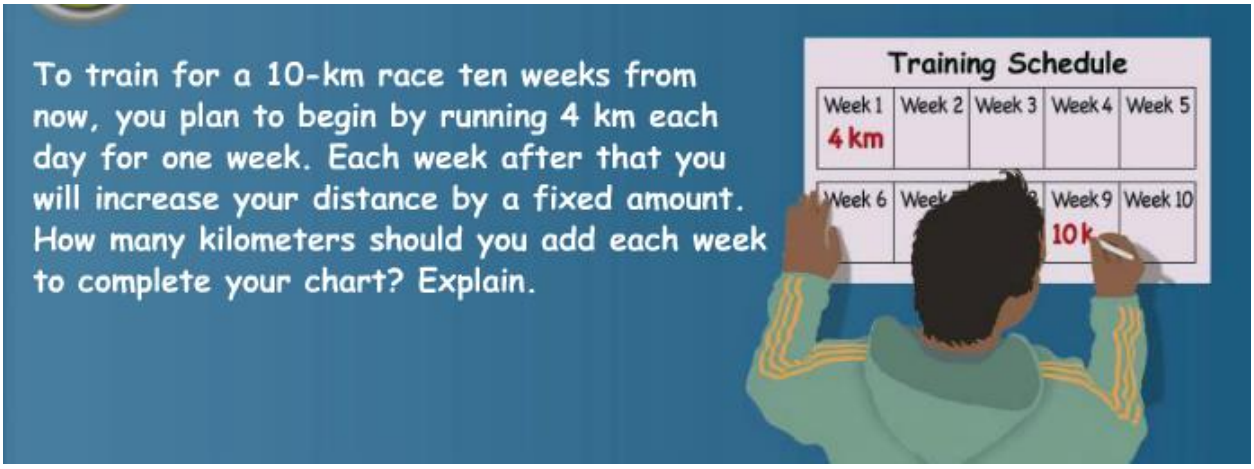
Aim: What is an Arithmetic Sequence? (Section 9-2)

Do Now:



I – Arithmetic Sequences

1) An **arithmetic sequence** is a sequence where the difference between consecutive terms is constant. This difference is the **common difference**.

2) Determine whether each sequence is arithmetic. If so, identify the common difference.

1. 1, 4, 7, 10, …

4 − 1 = 3

7 − 4 = 3

10 − 7 = 3

This sequence is arithmetic.

The common difference is ☐.

2. 6, 10, 14, 18, 22, …

3. 1, 3, 6, 10, 15, …

4. − 16, − 13, − 9, − 4, 2, …

5. 2, 9, 16, 23, 30, …

6. 43, 56, 69, 82, …

3) A recursive definition for this sequence has two parts:

$a_1 = a$ initial condition

$a_n = a_{n-1} + d$, for $n > 1$ recursive formula

4) An explicit definition for this sequence is a single formula:

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

II – Exercises

7. Reasoning Is the sequence represented by the formula $a_n = 4n + 8$ arithmetic? Explain.

Find the 24th term of each arithmetic sequence.

8. 4, 6, 8, 10, 12, …

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

$a_{24} = 4 + (24 - 1)2$

$a_{24} = 4 + 46$

$a_{24} =$ ☐

9. 2, 5, 8, 11, 14, …

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

10. 9, 5, 1, − 3, − 7, …

Find the missing terms in the following arithmetic sequences.

11. 2, ___, ___, 14, …

$14 = 2 + 3d$

$12 = 3d$

$d = 4$

$2 + 4 =$ ☐

12. 3, ☐, ☐21, …

13.65 , ☐ ☐2, …

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6 + 4 = ☐

14. Error Analysis Noah used the formula $a_n = a + (n - 1)d$ to find the 12th term in the sequence 2, 4, 7, 11, 16, …. Did Noah find the correct term? How do you know?

Find the missing term of each arithmetic sequence.

15. … 4, ___, 18, …

16. … 9, ☐, 37, …

Find the arithmetic mean of the given terms.

4 + 18 = 22

22 ÷ 2 = 11

The missing term is. ☐ .

17. 46, ☐, 28, …

18. −12, ☐, –4, …

19. … 4, ☐, 44, …

20. Error Analysis Your friend used the arithmetic mean to find the missing term in the following sequence: 3, ____, 29, 42, …. His answer was 13. What error did your friend make? What is the correct answer?

21. An architect is designing a building with sides in the shape of a trapezoid. The number of windows on each floor forms an arithmetic sequence. There are 124 windows on the first floor and 116 windows on the second floor.

a. Write an explicit formula to represent the sequence.

b. How many windows are on the tenth floor?

22. Your cousin opened a bank account with a deposit of $256 dollars. After one week, she had $280 in her account. After two weeks, she had $304, and after three weeks she had $328. If this pattern continues, how much money will your cousin have in her account after 18 weeks?