Arithmetic Series — Practice

CKSTEM Math Problem Solving · Grades 4–7

1 SPOT THE STEP

The list starts 4, 7, 10, 13, … and follows the same growth rule. What number comes next?

WORK IT OUT HERE

2 SPOT THE STEP

A pattern reads 9, 14, 19, 24, 29, … What is the constant step from one term to the next?

WORK IT OUT HERE

3 SPOT THE STEP

Exactly one of these lists has a constant step from term to term: List X: 3, 6, 9, 13, 16 / List Y: 4, 9, 14, 19, 24. Which list is the arithmetic one, and what is its step?

WORK IT OUT HERE

4 CONSTANT STEP

A stack of plates gets heavier each level by the same amount. Level 1 weighs 2 kg, level 2 weighs 6 kg, level 3 weighs 10 kg. How heavy is level 5?

WORK IT OUT HERE

5 CONSTANT STEP

A row of mailboxes has labels that grow by the same step. Mailbox 1 is labelled 6, mailbox 2 is labelled 13, mailbox 3 is labelled 20. What label is on mailbox 6?

WORK IT OUT HERE

6 CONSTANT STEP

A staircase has steps whose heights grow by the same amount. Step 1 is 10 cm tall, step 2 is 19 cm tall, step 3 is 28 cm tall. How tall is step 9?

WORK IT OUT HERE

7 FAR-TERM FORMULA

A pattern begins 3, 8, 13, 18, … What is the 15th term?

WORK IT OUT HERE

8 FAR-TERM FORMULA

A poster border is decorated with numbers 4, 11, 18, 25, … in order. What number sits at the 30th position?

WORK IT OUT HERE

9 FAR-TERM FORMULA

A long chain of lockers is numbered 8, 19, 30, 41, 52, … in that order. What number is on the 50th locker?

WORK IT OUT HERE

10 GAUSS PAIRING

What is the sum of the whole numbers from 1 to 20?

WORK IT OUT HERE

11 GAUSS PAIRING

Add every term in the sequence that begins 4, 7, 10, 13, … and ends at 25.

WORK IT OUT HERE

12 GAUSS PAIRING

Add every term in the sequence that begins 2, 9, 16, 23, … and ends at 93.

WORK IT OUT HERE

13 COUNT BY STEP

How many multiples of 3 are there from 12 up to 60, counting both endpoints?

WORK IT OUT HERE

14 COUNT BY STEP

How many multiples of 5 lie between 35 and 200, with both endpoints included?

WORK IT OUT HERE

15 COUNT BY STEP

How many multiples of 6 are there from 84 up to 300, with both ends included?

WORK IT OUT HERE

16 SUM A SLICE

A sequence begins 2, 5, 8, 11, … What is the sum of terms 3 through 6?

WORK IT OUT HERE

17 SUM A SLICE

A sequence begins 1, 5, 9, 13, … What is the sum of terms 5 through 12?

WORK IT OUT HERE

18 SUM A SLICE

A sequence begins 3, 8, 13, 18, … What is the sum of terms 10 through 25?

WORK IT OUT HERE

19 SUBTRACT TWO SERIES

Find the value of (2 + 4 + 6 + ... + 20) − (1 + 3 + 5 + ... + 19).

WORK IT OUT HERE

20 SUBTRACT TWO SERIES

Let S_2 be the sum of all multiples of 2 from 2 to 60, and let S_3 be the sum of all multiples of 3 from 3 to 60. By how much does S_2 exceed S_3?

WORK IT OUT HERE

21 SUBTRACT TWO SERIES

From 1 to 100, let S_5 be the sum of all multiples of 5 and S_7 be the sum of all multiples of 7. What is S_5 − S_7?

WORK IT OUT HERE

Answer Key

Each answer comes with a hint that names the move. The tag says which video to rewatch if you are stuck.

1. **16** — *Spot the Step*
Subtract two neighbouring terms to find the constant step, then add that step once.

2. **5** — *Spot the Step*
Take any term and subtract the term right before it — that gap is the step.

3. **List Y; step is 5** — *Spot the Step*
For each list, check that every consecutive gap matches; one list will fail the same-gap check.

4. **18 kilograms** — *Constant Step*
Find d from the first two levels, then add d four times to the level-1 weight to reach level 5.

5. **41** — *Constant Step*
Compute d from consecutive labels, then add d five times to the first label.

6. **82 centimetres** — *Constant Step*
Find d once, then jump to step 9 by adding d a total of eight times to the first step's height.

7. **73** — *Far-Term Formula*
Read the step from the first two terms, then apply the formula with n equal to 15.

8. **207** — *Far-Term Formula*
Identify d from consecutive labels, then plug a_1, d, and n equal to 30 into the formula.

9. **547** — *Far-Term Formula*
Find d once, then evaluate the formula with n equal to 50 — do not list the lockers.

10. **210** — *Gauss Pairing*
There are 20 terms. Pair the smallest with the largest and use the Gauss formula.

11. **116** — *Gauss Pairing*
Use the step to count how many terms there are, then apply the Gauss formula to the first and last.

12. **665** — *Gauss Pairing*
Recover n from the step, the start, and the end before plugging into the Gauss formula.

13. **17** — *Count by Step*
Subtract the start from the end, divide by the step, and remember the plus-one for both endpoints.

14. **34** — *Count by Step*
Use end minus start over step plus one — don't forget the plus-one.

15. **37** — *Count by Step*
Apply end minus start, divide by the step, then add one for the starting term.

16. **50** — *Sum a Slice*
First find the common step from consecutive terms; then use the far-term formula to locate term 3 and term 6, and Gauss-pair across the four terms in the slice.

17. **248** — *Sum a Slice*
Read the common step from consecutive terms; find term 5 and term 12 with the far-term formula; the slice has m − k + 1 terms — pair them.

18. **1368** — *Sum a Slice*
Read the step from neighbours, then find term 10 and term 25 with the far-term formula; Gauss-pair across the slice.

19. **10** — *Subtract Two Series*
Each side is its own arithmetic series — Gauss-pair them separately, then subtract.

20. **300** — *Subtract Two Series*
Find the count of each series with Count-by-Step, Gauss-pair each total, then subtract the smaller from the larger.

21. 315 — *Subtract Two Series*

Find the number of terms in each series with Count-by-Step, Gauss-pair each sum, then subtract.