

LESSON 6.2 Skills Practice

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This Is Series(ous) Business
Finite Arithmetic Series**Vocabulary**

Write a definition for each term in your own words.

1. tessellation

2. series

3. arithmetic series

4. finite series

5. infinite series



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Problem Set

Use sigma notation to rewrite each finite series. Then, calculate the given sum.

1. $4 + 8 + 12 + 16 + 20; S_5$

$$\begin{aligned} S_5 &= \sum_{i=1}^5 a_i \\ &= 4 + 8 + 12 \\ &= 24 \end{aligned}$$

2. $-1 + (-5) + (-9) + (-13); S_4$

3. $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32}; S_5$

4. $3 + (-2) + 1 + (-4) + (-1); S_5$

5. $0.5 + 1 + 1.5 + 2 + 2.5; S_5$

6. $-1 + 1 + (-1) + 1 + (-1) + 1; S_6$

Use Gauss's formula to calculate each finite arithmetic series.

7. $3 + 5 + 7 + 9 + 11$

$$\begin{aligned} S_n &= \frac{n(a_1 + a_n)}{2} \\ S_5 &= \frac{5(3 + 11)}{2} \\ &= 35 \end{aligned}$$

8. $-2 + (-3) + (-4) + (-5) + (-6) + (-7)$

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9. $\frac{1}{3} + \frac{2}{3} + 1 + \frac{4}{3} + \frac{5}{3} + 2 + \frac{7}{3}$

10. $1.3 + 2.5 + 3.7 + 4.9 + 6.1$

11. $1 + 2 + 3 + \cdots + 51$

12. $3 + 6 + 9 + \cdots + 30$

Write a function to calculate the sum of the first n terms of each arithmetic sequence. Then, determine S_3 by adding the first three terms and by using your function.

13. $1, 2, 3, 4, 5, \dots$

$a_1 = 1$ and $d = 1$

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

$= 1 + (n - 1)(1)$

$= n$

$S_n = f(n) = \frac{n(a_1 + a_n)}{2}$

$= \frac{n(1 + n)}{2}$

$= \frac{n^2 + n}{2}$

$S_3 = 1 + 2 + 3$

$= 6$

$S_3 = f(3) = \frac{3^2 + 3}{2}$

$= 6$

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14. 3, 6, 9, 12 . . .

15. -4, -8, -12, -16 . . .



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16. $-4, 0, 4, 8 \dots$

17. $-2, -4, -6, -8 \dots$

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18. $-2, -3, -4, -5 \dots$

A military band marches in a formation consisting of 8 rows. The first row has 2 band members, and each successive row has 3 more band members than the previous row. Use the given information to answer each question.

19. Write an arithmetic series to represent the number of band members in the formation. Then, rewrite the series using sigma notation.

$$2 + 5 + 8 + 11 + 14 + 17 + 20 + 23$$

$$\begin{aligned} S_8 &= \sum_{i=1}^8 a_i \\ &= 2 + 5 + 8 + 11 + 14 + 17 + 20 + 23 \\ &= 100 \end{aligned}$$

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20. Write an explicit formula to calculate the number of band members in any given row. Then, use the explicit formula to verify that the last row has 23 band members, or $a_8 = 23$.

21. Use Gauss's formula to determine the number of band members in the first 5 rows.

22. Use Gauss's formula to determine the total number of band members in the formation.

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23. Determine the additional number of band members needed to create 4 more rows.



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- 24. Determine the number of band members in the formation if the last row in the formation contains 44 members.