



EXAMPLE 5 TAKS PRACTICE: Multiple Choice

What is the sum of the arithmetic series $\sum_{i=1}^{20} (4 + 3i)$?

- (A) 64 (B) 71 (C) 710 (D) 1420

CLASSIFY SERIES

You can verify that the series in Example 5 is arithmetic by evaluating $4 + 3i$ for the first few values of the index i . The resulting terms are 7, 10, 13, 16, . . . , which have a common difference of 3.

Solution

$$a_1 = 4 + 3(1) = 7$$

Identify first term.

$$a_{20} = 4 + 3(20) = 64$$

Identify last term.

$$S_{20} = 20 \left(\frac{7 + 64}{2} \right)$$

Write rule for S_{20} , substituting 7 for a_1 and 64 for a_{20} .

$$= 710$$

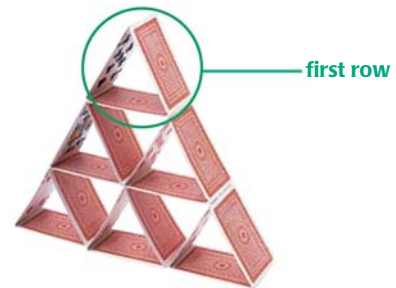
Simplify.

▶ The correct answer is C. (A) (B) (C) (D)

EXAMPLE 6 Use an arithmetic sequence and series in real life

HOUSE OF CARDS You are making a house of cards similar to the one shown.

- Write a rule for the number of cards in the n th row if the top row is row 1.
- What is the total number of cards if the house of cards has 14 rows?



Solution

- Starting with the top row, the numbers of cards in the rows are 3, 6, 9, 12, These numbers form an arithmetic sequence with a first term of 3 and a common difference of 3. So, a rule for the sequence is:

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

Write general rule.

$$= 3 + (n - 1)3$$

Substitute 3 for a_1 and 3 for d .

$$= 3n$$

Simplify.

- Find the sum of an arithmetic series with first term $a_1 = 3$ and last term $a_{14} = 3(14) = 42$.

$$\text{Total number of cards} = S_{14} = 14 \left(\frac{a_1 + a_{14}}{2} \right) = 14 \left(\frac{3 + 42}{2} \right) = 315$$

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GUIDED PRACTICE for Examples 5 and 6

- Find the sum of the arithmetic series $\sum_{i=1}^{12} (2 + 7i)$.

- WHAT IF?** In Example 6, what is the total number of cards if the house of cards has 8 rows?