

Name _____, _____, _____

Project 7
Sequences

A. For each of the following sequences identify the next two missing terms and describe the pattern that the terms in the sequence follow.

1. {1, 3, 6, 10, 15, 21, 28, 36, _____, _____, ...}

Pattern _____

2. {1, -1, 0, 1, -3, -2, -1, 0, 1, -5, -4, -3, -2, -1, 0, 1, _____, _____, ...}

Pattern _____

3. {3, 4, 6, 8, 12, 14, 18, 20, 24, 30, _____, _____, ...}

Pattern _____

4. {0, 2, 5, 9, 14, 20, 27, 35, 44, _____, _____, ...}

Pattern _____

5. {1, 2, 24, 720, 40320, _____, _____, ...}

Pattern _____

6. {1, 5, 14, 30, 55, 91, 140, _____, _____, ...}

Pattern _____

7. {1, 1, 1, 1, 2, 1, 1, 3, 3, 1, 1, 4, 6, _____, _____, ...}

Pattern _____

B. For each of the following sequences find the specified missing terms.

8. S is an arithmetic sequence for which the 4th and 10th terms are 17 and 95, resp.

Find the 1st term and the 27th term: $a_1 = \underline{\hspace{2cm}}$, $a_{27} = \underline{\hspace{2cm}}$

9. S is an arithmetic sequence for which the 5th and 14th terms are 20 and -61, resp.

Find the 11th term and the 31st term: $a_{11} = \underline{\hspace{2cm}}$, $a_{31} = \underline{\hspace{2cm}}$

10. S is an geometric sequence for which the 2nd and 4th terms are -384 and -864, resp.

Find the 1st term and the 7th term: $a_1 = \underline{\hspace{2cm}}$, $a_7 = \underline{\hspace{2cm}}$

C. For each of the following sequences find a functional formula for generating all of the terms of the sequence and find the 39th term of the sequence.

11. $\{5, 11, 17, 23, 29, 35, 41, \dots\}$ where the first differences are constant.

Formula: $\underline{\hspace{2cm}}$ $a_{39} = \underline{\hspace{2cm}}$

12. $\{11, 16, 22, 29, 37, 46, \dots\}$ where the second differences are constant.

Formula: $\underline{\hspace{2cm}}$ $a_{39} = \underline{\hspace{2cm}}$

13. $\{21, 15, 11, 9, 9, 11, \dots\}$ where the second differences are constant.

Formula: $\underline{\hspace{2cm}}$ $a_{39} = \underline{\hspace{2cm}}$

14. $\{2, -4, 40, -208, 1312, -7744, \dots\} = \left\{ \begin{array}{l} a_n = -4a_{n-1} + 12a_{n-2}, n \geq 3 \\ a_1 = 2 \\ a_2 = -4 \end{array} \right\}$

Formula: $\underline{\hspace{2cm}}$ $a_{39} = \underline{\hspace{2cm}}$

15. $\{1, 1, 2, 3, 5, 8, 13, 21, 34, 55, \dots\} = \left\{ \begin{array}{l} a_n = a_{n-1} + a_{n-2}, n \geq 3 \\ a_1 = 1 \\ a_2 = 1 \end{array} \right\}$

Formula: $\underline{\hspace{2cm}}$ $a_{39} = \underline{\hspace{2cm}}$