Recursive and Explicit Series … Set 1

SEQUENCES REFERENCE SHEET

Arithmetic Sequence: A series of terms where the same number is added each time to produce the next term.

Geometric Sequence: A series of terms where each term is multiplied by the same number to produce the next term.

Recursive Formula: A formula that relies on the previous term for finding each term in the sequence. The first term must be given.

Explicit Formula: A formula you can use to find any term in a sequence.

	Arithmetic Sequence	Geometric Sequence
Recursive Formulas	$f(n) = f(n-1) + d$ $a_n = a_{n-1} + d$	$f(n) = r \times f(n-1)$ $a_n = r \times a_{n-1}$
Explicit Formulas	$f(n) = f(1) + d(n-1)$ $a_n = a_1 + d(n-1)$	$f(n) = f(1) \times r^{n-1}$ $a_n = a_1 \times r^{n-1}$

Practice: Write each sequence in the correct table (arithmetic or geometric).

0, 1, 2, 3, 4, 5, 6…

2, 6, 18, 54…

31, 27, 23, 19, 15…

-8, -2, 4, 10, 16…

-5, 10, -20, 40…

100, 1000, 10000…

Arithmetic Sequences

Sequence	Common Difference (d)	First term f(1) or a_1	Recursive Formulas	Explicit Formulas	f(15)	a_{40}

Geometric Sequences

Sequence	Common Ratio (r)	First term f(1) or a_1	Recursive Formulas	Explicit Formulas	f(15)	a_{40}

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Answers

Arithmetic Sequence: A series of terms where the same number is added each time to produce the next term.

Geometric Sequence: A series of terms where each term is multiplied by the same number to produce the next term.

Recursive Formula: A formula that relies on the previous term for finding each term in the sequence. The first term must be given.

Explicit Formula: A formula you can use to find any term in a sequence.

	Arithmetic Sequence	Geometric Sequence
Recursive Formulas	$f(n) = f(n-1) + d$ $a_n = a_{n-1} + d$	$f(n) = r \times f(n-1)$ $a_n = r \times a_{n-1}$
Explicit Formulas	$f(n) = f(1) + d(n-1)$ $a_n = a_1 + d(n-1)$	$f(n) = f(1) \times r^{n-1}$ $a_n = a_1 \times r^{n-1}$

Practice: Write each sequence in the correct table (arithmetic or geometric).

0, 1, 2, 3, 4, 5, 6…
2, 6, 18, 54…
31, 27, 23, 19, 15…
-8, -2, 4, 10, 16…
-5, 10, -20, 40…
100, 1000, 10000…

Arithmetic Sequences

Sequence	Common Difference (d)	First term f(1) or a_1	Recursive Formulas	Explicit Formulas	f(15)	a_{40}
0, 1, 2, 3, 4, 5, 6…	1	0	$f(1) = 0$ $f(n) = f(n-1) + 1$ $a_1 = 0$ $a_n = a_{n-1} + 1$	$f(n) = 0 + 1(n-1)$ $a_n = 0 + 1(n-1)$	14	39
31, 27, 23, 19, 15…	-4	31	$f(1) = 31$ $f(n) = f(n-1) - 4$ $a_1 = 31$ $a_n = a_{n-1} - 4$	$f(n) = 31 - 4(n-1)$ $a_n = 31 - 4(n-1)$	-25	-125
-8, -2, 4, 10, 16….	6	-8	$f(1) = -8$ $f(n) = f(n-1) + 6$ $a_1 = -8$ $a_n = a_{n-1} + 6$	$f(n) = -8 + 6(n-1)$ $a_n = -8 + 6(n-1)$	76	226

Geometric Sequences

Sequence	Common Ratio (r)	First term f(1) or a_1	Recursive Formulas	Explicit Formulas	f(15)	a_{40}
2, 6, 18, 54…	3	2	$f(1) = 2$ $f(n) = 3 \times f(n-1)$ $a_1 = 2$ $a_n = 3 \times a_{n-1}$	$f(n) = 2 \times 3^{n-1}$ $a_n = 2 \times 3^{n-1}$	9565938	8.105×10^{18}
-5, 10, -20, 40…	-2	-5	$f(1) = -5$ $f(n) = -2 \times f(n-1)$ $a_1 = -5$ $a_n = -2 \times a_{n-1}$	$f(n) = -5 \times (-2)^{n-1}$ $a_n = -5 \times (-2)^{n-1}$	-81920	2748779069440
100, 1000, 10000…	10	100	$f(1) = 100$ $f(n) = 10 \times f(n-1)$ $a_1 = -5$ $a_n = 10 \times a_{n-1}$	$f(n) = 100 \times 10^{n-1}$ $a_n = 100 \times 10^{n-1}$	1×10^{16}	1×10^{41}