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}
0, 1, 2, 3, 4 …	+1	0	$a_1 = 0$ $a_n = a_{n-1} + 1$	$a_n = 0 + 1(n-1)$ $= 0 + 1n = 1$ $= 1n - 1$	$1(15) - 1$ 14	$1(40) - 1$ 39
-8, -2, 4, 10	+6	-8	$a_1 = -8$ $a_n = a_{n-1} + 6$	$a_n = -8 + 6(n-1)$ $= -8 + 6n - 6$ $= -14 + 6n$	$-14 + 6(15)$ 76	$-14 + 6(40)$ 226
31, 27, 23 …	-4	31	$a_1 = 31$ $a_n = a_{n-1} - 4$	$a_n = 31 - 4(n-1)$ $31 - 4n + 4$ $= 35 - 4n$	$35 - 4(15)$ -25	$35 - 4(40)$ -125

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	$a_1 = 2$ $a_n = 3(a_{n-1})$	$a_n = 2(3)^{n-1}$	$2(3)^{15-1}$ 9565938	$2(3)^{40-1}$ 8.1×10^{18}
-5, 10, -20, 40	×-2	-5	$a_1 = -5$ $a_n = -2(a_{n-1})$	$a_n = -5(-2)^{n-1}$	$-5(-2)^{15-1}$ -81920	$-5(-2)^{40-1}$ -2.7×10^{12}
100, 1000, 10000	×10	100	$a_1 = 100$ $a_n = 10(a_{n-1})$	$a_n = 100(10)^{n-1}$	$100(10)^{15-1}$ 1×10^{16}	$100(10)^{40-1}$ 1×10^{41}