DO NOW

1) A pendulum is released to swing freely. On the first swing, the pendulum travels a distance of 18 inches. On each successive swing, the pendulum travels 90% of the distance of the previous swing. What distance does the pendulum travel on its 10th swing? Round your answer to the nearest inch.

Geometric

$a_1 = 18$

$r = .9$

Explicit $A_n = a_1 \cdot r^{n-1}$

$A_{10} = 18 \cdot (.9)^{10-1}$

$A_{10} = 6.97\ldots$

7in

2. Find the 5th term using the recursive formula.

f(1) = 2

f(n) = f(n-1) - 10

$n=2$ $f(2) = 2 - 10$

$f(2) = -8$

$f(3) = -18$

$f(4) = -28$

$f(5) = -38$

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1) f(1) = 1

f(n) = f(n - 1) + n

B) f(5) = 15

f(6) = 21

f(7) = 28

f(8) = 36

f(9) = 45

f(10) = 55

2) f(n) = 22600 +(n - 1)800

f(n) = 800n + 21800

B) f(1) = 22600

f(n) = f(n - 1) + 800

C) f(4) = 25000

3) f(1) = 5

f(2) = 24

f(3) = 575

4) f(1) = 9

f(2) = 7

f(3) = 5

f(4) = 3

B) f(1) = 9

f(n) = f(n - 1) - 2

5) f(1) = 3

f(2) = 5

f(3) = 9

6) f(1) = -3

f(2) = -5

f(3) = -8

f(4) = -12

7) f(n) = 8240 +(n - 1)400

f(n) = 400n + 7840

B) f(1) = 8240

f(n) = f(n - 1) + 400

C) f(4) = 9440

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Explicit Vs Recursive

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	$f(n) = f(1) + d(n-1)$ $a_n = a_1 + d(n-1)$	$f(n) = f(1) \times r^{n-1}$ $a_n = a_1 \times r^{n-1}$

*use either function or subscript notation, not both!

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

Arithmetic or Geometric?

A G

0, 1, 2, 3, 4, 5, 6...

-8, -2, 4, 10, 16...

2, 6, 18, 54...

-5, 10, -20, 40...

31, 27, 23, 19, 15...

100, 1000, 10000...

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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

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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}

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Test Topics

- Arithmetic Sequences - Common Difference
- Geometric Sequences - Common Ratio
- Use & Writing Explicit Sequence Formulas
- Word Problems
- Writing, Applying, Recognizing Recursive Sequence Formulas

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