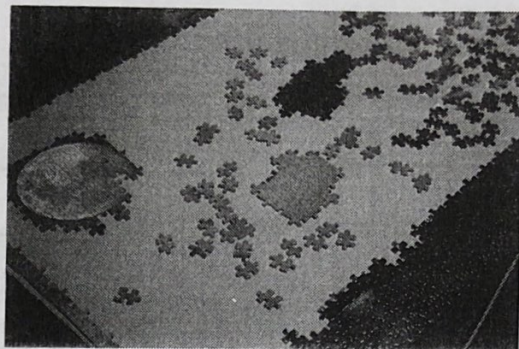


# 1.8 What Comes Next? What Comes Later?

## A Practice Understanding Task



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For each of the following tables,

- describe how to find the next term in the sequence,
- write a recursive rule for the function,
- describe how the features identified in the recursive rule can be used to write an explicit rule for the function, and
- write an explicit rule for the function.
- identify if the function is arithmetic, geometric or neither

Example:

x	y
0	5
1	8
2	11
3	14
4	?
...	...
n	?

- To find the next term: add 3 to the previous term
- Recursive rule:  $f(0) = 5, f(n) = f(n - 1) + 3$
- To find the  $n^{\text{th}}$  term: start with 5 and add 3  $n$  times
- Explicit rule:  $f(n) = 5 + 3n$
- Arithmetic, geometric, or neither? Arithmetic

### Function A

- How to find the next term: multiply by 2
- Recursive rule:  $f(1) = 5, f(n) = 2f(n-1)$
- To find the  $n^{\text{th}}$  term: start at 5 and multiply by 2 (n-1) times
- Explicit rule:  $f(n) = 5(2)^{(n-1)}$
- Arithmetic, geometric, or neither? Geometric

x	y
1	5
2	10
3	20
4	40
5	?
...	...
n	?

**Function B**

6. How to find the next term: -9 from the previous term
7. Recursive rule:  $f(1) = -8$   $f(n) = f(n-1) - 9$
8. To find the  $n^{\text{th}}$  term: start at -8 and subtract 9 (n-1) times
9. Explicit rule:  $f(n) = -8 - 9(n-1)$
10. Arithmetic, geometric, or neither? Arithmetic

x	y
1	-8
2	-17
3	-26
4	-35
5	-44
6	-53
...	...
n	

**Function C**

11. To find the next term: multiply by 3
12. Recursive rule:  $f(1) = 2$   $f(n) = 3f(n-1)$
13. To find the  $n^{\text{th}}$  term: start at 2 and multiply by 3 (n-1) times
14. Explicit rule:  $f(n) = 2(3)^{n-1}$
15. Arithmetic, geometric, or neither? Geometric

x	y
1	2
2	6
3	18
4	54
5	162
6	486
...	...
n	

**Function D**

16. To find the next term: Add 12 to the previous term
17. Recursive rule:  $f(1) = 3$   $f(n) = f(n-1) + 12$
18. To find the  $n^{\text{th}}$  term: start at 3 and add 12 (n-1) times
19. Explicit rule:  $f(n) = 3 + 12(n-1)$
20. Arithmetic, geometric, or neither? Arithmetic

x	y
1	3
2	15
3	27
4	39
5	51
6	?
...	...
n	?

**Function E**

21. To find the next term: Add  $\frac{3}{5}$  to the previous term
22. Recursive rule:  $f(0) = 1$   $f(n) = f(n-1) + \frac{3}{5}$
23. To find the  $n^{\text{th}}$  term: Start at 1 and add  $\frac{3}{5}$   $n$  times
24. Explicit rule:  $f(n) = 1 + \frac{3}{5}n$
25. Arithmetic, geometric, or neither? \_\_\_\_\_

x	y
0	1
1	$1\frac{3}{5}$
2	$2\frac{1}{5}$
3	$2\frac{4}{5}$
4	$3\frac{2}{5}$
5	4
...	...
n	

$\downarrow + \frac{3}{5}$

**\* Function F**

26. To find the next term: add  $1+2n$  to the previous term
27. Recursive rule:  $f(0) = 3$   $f(n) = f(n-1) + (2n+1)$
28. To find the  $n^{\text{th}}$  term: Start at 3 and add  $(2n+1)$   $n$  times
29. Explicit rule:  $f(n) = n^2 + 3$
30. Arithmetic, geometric, or neither? Neither

x	y
0	3
1	4
2	7
3	12
4	19
5	?
...	...
n	?

$1, 3, 5, 7$   
 $\downarrow +2 \quad \downarrow +2 \quad \downarrow +2$

$\downarrow +1$   
 $\downarrow +3$   
 $\downarrow +5$   
 $\downarrow +7$   
 $\left. \right\} 1+2n$

**Function G**

31. To find the next term: multiply the previous term by  $\frac{1}{5}$
32. Recursive rule:  $f(1) = 10$   $f(n) = \frac{1}{5}f(n-1)$
33. To find the  $n^{\text{th}}$  term: Start at 10 and multiply by  $\frac{1}{5}$   $(n-1)$  times
34. Explicit rule:  $f(n) = 10\left(\frac{1}{5}\right)^{n-1}$
35. Arithmetic, geometric, or neither? Geometric

x	y
1	10
2	2
3	$\frac{2}{5}$
4	$\frac{2}{25}$
5	$\frac{2}{125}$
6	$\frac{2}{625}$
...	...
n	

$\downarrow \times \frac{1}{5}$