

Self Check #17, Sequences

Given the first four numbers in each arithmetic sequence write a recursive and explicit formula:

1. -3, 3, 9, 15 $d=6$
 Recursive $f(x) = -3, f(x+1) = f(x) + 6$
 Explicit $f(x) = -3 + 6x$
2. 2, -5, -12, -19 $d=-7$
 Recursive $f(x) = 2, f(x+1) = f(x) - 7$
 Explicit $f(x) = 2 + -7x$

Given the first four numbers in each geometric sequence write a recursive and explicit formula:

3. 32, 16, 8, 4 $r = \frac{1}{2}$
 Recursive: $f(x) = 32, f(x+1) = f(x) \cdot \frac{1}{2}$
 Explicit: $f(x) = 32 \cdot (\frac{1}{2})^x$
4. -5, 15, -45, 135 $r = -3$
 Recursive: $f(x) = -5, f(x+1) = f(x) \cdot (-3)$
 Explicit: $f(x) = -5(-3)^x$

Give the following tables, answer the questions

5.

x	f(x)
1	6
2	15
3	24
4	33
5	f(5)
...	...

a
 $15-6=9$
 $24-15=9$
 $33-24=9$
 Arith

a) To find the next term, add 9
b) Next term in the table: $f(5) = 42$
c) Type of Sequence: Arith.
d) Recursive Rule: $f(x) = -3, f(x+1) = f(x) + 9$
e) Explicit Rule: $f(x) = -3 + 9x$
f) Type of Function: Linear.

6.

x	f(x)
1	1
2	4
3	9
4	16
5	f(5)
...	...

a) To find the next term, Squared
b) Next term in the table: $f(5) = 25$
c) Type of Sequence: other
d) Recursive Rule: —
e) Explicit Rule: —
f) Type of Function: other

7.

x	f(x)
1	6
2	18
3	54
4	162
5	f(5)
...	...

$5:3$
 $\frac{18}{6}=3$
 $\frac{54}{18}=3$
 $\frac{162}{54}=3$
 Geom

a) To find the next term, mult. by 3
b) Next term in the table: $f(5) = 486$
c) Type of Sequence: Geo
d) Recursive Rule: $f(x) = 2, f(x+1) = f(x) \cdot 3$
e) Explicit Rule: $f(x) = 2 \cdot (3)^x$
f) Type of Function:

Give the following Arithmetic Sequence, fill out the table and answer the questions below.

x	0	1	2	3	4	n
y	0	3	6	9	12

$$m = d = \frac{\Delta y}{\Delta x} = \frac{12-3}{4-1} = \frac{9}{3} = 3$$

$$d = 3$$

8. Explicit Rule: $f(x) = 0$
 $f(x+1) = f(x) + 3$ Recursive Rule: $f(x) = 0 + 3x$

9. What is the 8th term in the sequence?

$$f(x) = 0 + 3(x)$$

$$= 24$$

Give the following Geometric Sequence, fill out the table and answer the questions below.

x	0	1	2	3	4	n
y	2	8	32	128	512

$$\frac{y_3}{y_1} = r^{(x)} \Rightarrow \frac{128}{8} = r^{3-1}$$

$$= 16 = r^2$$

$$= 4 = r$$

10. Explicit Rule: $f(x) = 2$
 $f(x+1) = f(x) \cdot 4$ Recursive Rule: $f(x) = 2 \cdot 4^x$

11. What is the 6th term in the sequence?

$$f(x) = 2 \cdot 4^6$$

$$= 8192$$

Determine the following and answer the questions

x	1	2	3	4	N
Y	512	256	128	64

Linear or Exponential?

Arithmetic or Geometric?

12. Explicit Rule: $f(x) = 512$
 $f(x+1) = f(x) \cdot \frac{1}{2}$ Recursive Rule: $f(x) = 512 \cdot (\frac{1}{2})^x$

$$\frac{256}{512} = \frac{1}{2}$$

13. What is the 8th term in the sequence?

$$f(x) = 512 \left(\frac{1}{2}\right)^8$$

$$= 2$$

$$\frac{128}{256} = \frac{1}{2}$$

$$r = \frac{1}{2}$$

Find the next four terms in each of the following sequences.

14. $f(0) = -2, f(x+1) = f(x) + 4$
 -2, 2, 6, 10

15. $f(0) = 1, f(x+1) = f(x) \cdot (-4)$
 1, -4, 16, -64

What is the 8th term in the following sequences?

16. $f(0) = 8, f(x+1) = f(x) - 3$
 Exp. $f(x) = 8 - 3x$
 $f(8) = 8 - 3(8) = 16$

17. $f(0) = -1, f(x+1) = f(x) \cdot 3$
 Exp. $f(x) = -1 \cdot 3^x$
 $f(8) = -1 \cdot 3^8$
 $= -6561$

18. $f(x) = 5 \cdot 2^x$
 $f(8) = 5 \cdot 2^8$
 $= 1280$

19. $f(x) = -6 + x \cdot 5$
 $f(8) = -6 + (8)5$
 $= -6 + 40$
 $= 34$

20. Cal is collecting baseball cards. The following table shows how many cards Cal will have after each month.

After month 4, he had 23 cards, and after month 8, he had 35 cards. Fill in the table to show his monthly card collection total.

Arithmetic

weeks	0	1	2	3	4	5	6	7	8	N
acorns	11	14	17	20	23	26	29	32	35

How many cards did he start with?

11 cards ($f(0) = 11$)

When will he have more than 75 cards?

Exp. $f(x) = 11 + 3x$

$75 = 11 + 3x$

$64 = 3x$

$21.3 = x$

after 22 months

$\frac{\Delta y}{\Delta x} = d$

$\frac{35-23}{8-4} = \frac{12}{4} = 3$

$d = 3$

21. What is the 25th term of the sequence 8, 17, 26, 35, ...?

$f(x) = 8 + 9x$

$f(25) = 8 + 9(25) = 233$

22. What is the 6th term of the geometric sequence which $f(0) = 4$, $f(x+1) = f(x) \cdot 3$?

4, 12, 36, 108, 324, 972, 2916

23. List the first 4 terms of the sequence which $f(x) = -3x + 17$

17, 14, 11, 8,

24. List the first 4 terms of the sequence which $f(x) = -10(3)^x$.

-10, -30, -90, -270

25. What is the 10th term of the arithmetic sequence which $f(0) = 45$, $f(x+1) = f(x) - 5$

Exp. $f(x) = 45 - 5x$

$f(10) = 45 - 5(10)$

$= 45 - 50$

$= -5$