

Topic: Functions

Explicit and Recursive Functions

Write the explicit and recursive function for each table.

1.

x	f(x)
0	-2
1	-9
2	-16
3	-23
4	-30

$$f(x) = -7x - 2$$

$$f(x) = \begin{cases} -2 & x=0 \\ f(x-1) - 7 & x > 0 \end{cases}$$

2.

x	g(x)
0	-3
1	2
2	7
3	12
4	17

$$g(x) = 5x - 3$$

$$g(x) = \begin{cases} -3 & x=0 \\ g(x-1) + 5 & x > 0 \end{cases}$$

3.

x	j(x)
0	1
1	6
2	36
3	216
4	1296

$$j(x) = 1(6)^x$$

$$j(x) = \begin{cases} 1 & x=0 \\ j(x-1) \cdot 6 & x > 0 \end{cases}$$

4.

x	f(x)
0	2
1	6
2	18
3	54
4	162

$$f(x) = 2(3)^x$$

$$f(x) = \begin{cases} 2 & x=0 \\ f(x-1) \cdot 3 & x > 0 \end{cases}$$

5.

x	g(x)
0	4
1	8
2	16
3	32
4	64

$$g(x) = 4(2)^x$$

$$g(x) = \begin{cases} 4 & x=0 \\ g(x-1) \cdot 2 & x > 0 \end{cases}$$

6.

x	h(x)
1	-2
2	-9
3	-16
4	-23
5	-30

$$h(x) = -7x + 5$$

$$h(x) = \begin{cases} 5 & x=0 \\ h(x-1) - 7 & x > 0 \end{cases}$$

7.

x	b(x)
1	1
2	2
3	4
4	8
5	16

$$b(x) = \frac{1}{2}(2)^x$$

$$b(x) = \begin{cases} \frac{1}{2} & x=0 \\ b(x-1) \cdot 2 & x > 0 \end{cases}$$

8.

x	p(x)
1	5
2	-3
3	-11
4	-19
5	-27

$$p(x) = -8x + 13$$

$$p(x) = \begin{cases} 13 & x=0 \\ p(x-1) - 8 & x > 0 \end{cases}$$

9.

x	f(x)
1	-2
2	-9
3	-16
4	-23
5	-30

$$f(x) = -7x + 5$$

$$f(x) = \begin{cases} 5 & x=0 \\ f(x-1) - 7 & x > 0 \end{cases}$$

10.

x	h(x)
1	3
2	6
3	12
4	24
5	48

$$h(x) = \frac{3}{2}(2)^x$$

$$h(x) = \begin{cases} \frac{3}{2} & x=0 \\ h(x-1) \cdot 2 & x > 0 \end{cases}$$

Given the following explicit functions, write the recursive function.

11. $f(x) = 3x + 2$

$$f(x) = \begin{cases} 2 & x=0 \\ f(x-1)+3 & x>0 \end{cases}$$

13. $h(x) = 4x - 2$

$$h(x) = \begin{cases} -2 & x=0 \\ h(x-1)+4 & x>0 \end{cases}$$

15. $t(x) = 5x - 7$

$$t(x) = \begin{cases} -7 & x=0 \\ t(x-1)+5 & x>0 \end{cases}$$

12. $g(x) = -2x + 5$

$$g(x) = \begin{cases} 5 & x=0 \\ g(x-1)-2 & x>0 \end{cases}$$

14. $j(x) = -3x - 8$

$$j(x) = \begin{cases} -8 & x=0 \\ j(x-1)-3 & x>0 \end{cases}$$

Given the following recursive functions, write the explicit function.

16. $f(x) = \begin{cases} 4 & \text{if } x = 0 \\ f(x-1) + 5 & \text{if } x > 0 \end{cases}$

$$f(x) = 5x + 4$$

19. $b(x) = \begin{cases} 2 & \text{if } x = 0 \\ f(x-1) - 4 & \text{if } x > 0 \end{cases}$

$$b(x) = -4x + 2$$

17. $g(x) = \begin{cases} -5 & \text{if } x = 0 \\ f(x-1) + 7 & \text{if } x > 0 \end{cases}$

$$g(x) = 7x - 5$$

20. $f(x) = \begin{cases} 3 & \text{if } x = 0 \\ f(x-1) + 1 & \text{if } x > 0 \end{cases}$

$$f(x) = 1x + 3$$

18. $j(x) = \begin{cases} -7 & \text{if } x = 0 \\ f(x-1) - 9 & \text{if } x > 0 \end{cases}$

$$j(x) = -9x - 7$$