Which recursively defined function has a first term equal to 10 and a common difference of 4? # add to each term

(a) $f(1) = 10$, $f(x) = f(x-1) + 4$

previous term + 4

(b) $\cancel{f(1) = 4}$, $\cancel{f(x) = f(x-1) + 10}$

(c) $f(1) = 10$, $f(x) = 4f(x-1)$

product

(d) $\cancel{f(1) = 4}$, $\cancel{f(x) = 10f(x-1)}$

just another example

$(n+1) - 1 = n$

Which recursively defined function represents the sequence 3, 7, 15, 31, ...?

1, 2, 3, 4

$\times 2 + 1$

(a) $f(1) = 3$

$f(n+1) = 2^{f(n)} + 3$

$2^3 + 3 = 11$

(b) $f(1) = 3$

$f(n+1) = 2f(n) + 1$

$2(3) + 1 = 7$

$2(7) + 1 = 15$

$2(15) + 1 = 31$

(c) $f(1) = 3$

$f(n+1) = 2^{f(n)} - 1$

$2^3 - 1 = 7$

$2^7 - 1 = 127$

(d) $f(1) = 3$

$f(n+1) = 3f(n) - 2$

Recursive Sequence Practice:

1) Find the first four terms of the recursive sequence defined below.

$a_1 = -3$

$a_n = a_{(n-1)} - \cancel{n}\ 3$

$a_1 = -3$ $\quad (\text{prev. term}) - 3$

$a_2 = -6$ $\quad (-3) - 3$

$a_3 = -9$ $\quad (-6) - 3$

$a_4 = -12$ $\quad (-9) - 3$

Let's talk notation!

$a_1 = 1^{st}$ term

$a_n = n^{th}$ term

$a_{n-1} =$ previous term

$n =$ term #

Use the recursive sequence defined below to express the next three terms as fractions reduced to lowest terms.

$a_1 = 2$

$$\boxed{\begin{aligned} a_2 &= \frac{3}{4} \\ a_3 &= \frac{16}{3} \\ a_4 &= \frac{27}{256} \end{aligned}}$$

$a_1=2$

$a_n=\boxed{3(a_{n-1})^{-2}}$

$3\left(\text{PREV TERM}\right)^{-2}$

$3(2)^{-2}$

$3\left(\frac{3}{4}\right)^{-2}$

$3(\quad)^{-2}$

$\frac{16}{3}$

$3\left(\frac{16}{3}\right)^{-2}$

$\frac{27}{256}$

If a sequence is defined recursively by $f(0)=2$ and $f(n+1)=-2f(n)+3$ for $n \geq 0$, then $f(2)$ is equal to

(a) 1 (b) -11 (c) 5 (d) 17

$a_0 = 2$ $\qquad a_{n+1} = -2(a_n) + 3$

$a_1 = -1$ $\qquad -2(2) + 3$

$a_2 = 5$ $\qquad -2(-1) + 3$

Find the third term in the recursive sequence $a_{k+1} = 2a_k - 1$, where $a_1 = 3$.

$2(\quad) - 1$

$a_1 = 3$

$a_2 = 2(3) - 1 = 5$

$a_3 = 2(5) - 1 = \boxed{9}$

The Pell numbers can be defined recursively by the formula:

$p(n)=2p(n-1)+p(n-2)$. If $p(1)=0$, and $p(2)=1$, then what is the value of $p(6)$?

PRACTICE

If f(1)=3 and f(n)=-2f(n-1), then what is the value of f(5)? a_5

$a_1 = 3$ $\quad a_n = -2a_{n-1}$

$a_2 = -6$ $\quad -2(3)$

$a_3 = 12$ $\quad -2(-6)$

$a_4 = -24$ $\quad -2(12)$

$a_5 = 48$ $\quad -2(-24)$

While experimenting with her calculator, Candy creates the sequence 4, 9, 19, 39, 79, ... Write a recursive formula for Candy's sequence. Determine the eighth term in Candy's sequence.