

F Lent Inductive Sequences

Find the first five terms of the following sequences. I expect them to be fully cancelled down fractions (or, obviously, whole numbers).

1. $u_{n+1} = 2u_n - 1$ with $u_1 = 3$.

3, 5, 9, 17, 33

2. $t_{n+1} = 3t_n + 1$ with $t_1 = \frac{1}{3}$.

$\frac{1}{3}$, 2, 7, 22, 67

3. $a_{n+1} = 1 - 5a_n$ with $a_1 = 4$.

4, -19, 96, -479, 2396

4. $u_{n+1} = \frac{1}{u_n+2}$ with $u_1 = 1$.

1, $\frac{1}{3}$, $\frac{3}{7}$, $\frac{7}{17}$, $\frac{17}{41}$

5. $\theta_{n+1} = \frac{\theta_n+1}{\theta_n}$ with $\theta_1 = 1$.

1, 2, $\frac{3}{2}$, $\frac{5}{3}$, $\frac{8}{5}$

6. $\psi_{n+1} = 1 + \frac{2}{\psi_n}$ with $\psi_1 = 3$.

3, $\frac{5}{3}$, $\frac{11}{5}$, $\frac{21}{11}$, $\frac{43}{21}$

7. (a) $\alpha_{n+1} = \frac{\alpha_n-1}{\alpha_n+1}$ with $\alpha_1 = 5$.

5, $\frac{2}{3}$, $-\frac{1}{5}$, $-\frac{3}{2}$, 5

(b) What would the 123rd term of this sequence be?

$-\frac{1}{5}$