Taller punto 1

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$$X_{n+1} = 4X_n + X_n^2 \qquad X_0 = 4\sin^2\theta$$

a)

$$X_{n+1} = 4\sin^2(2^{n+1}\theta) \quad \theta \in (0, \pi/2)$$

$$4X_n + X_n^2 = 4\sin^2(2^{n+1}\theta)$$

$$X_{K+1} = 4X_K - X_K^2 \qquad X_{K+1} = 4\sin^2(2^{K+1}\theta)$$

$$X_{K+2} = 4X_{K+1} - X_{K+1}^2 \qquad X_{K+2} = 4\sin^2(2^{K+2}\theta)$$

$$X_{K+2} = 16\sin^2(2^{K+1}) - 16\sin^4(2^{K+1}\theta)$$

$$X_{K+2} = 16\sin^2(2^{K+1}\theta)(1 - \sin^2(2^{K+1}\theta)$$

$$\cancel{4}\sin^2(2^{K+2}\theta) = \cancel{16}\sin^2(2^{K+1}\theta)\cos^2(2^{K+1}\theta)$$

$$\sin^2(2^{K+2}\theta) = 4\sin^2(2^{K+1}\theta)\cos^2(2^{K+1}\theta)$$

$$\sin^2(4^{K+1}\theta) = 4\sin^2(2^{K+1}\theta)\cos^2(2^{K+1}\theta)$$

$$\sin^2(4^{K+1}\theta) = (2\sin(2^{K+1}\theta)\cos(2^{K+1}\theta))^2$$

$$\sin^2(4^{K+1}\theta) = \left(\frac{\cancel{2}\sin(4^{K+1}\theta)}{\cancel{2}}\right)^2$$

$$\sin^2(4^{K+1}\theta) = \sin^2(4^{K+1}\theta)$$

b)

$$x_{n+1} = 4x_n - 4x_n^2, \qquad x_0 = sin^2\theta,$$

$$x_{n+1} = sin^2(2^{n+1}\theta), \qquad \theta \in [0, \pi/2].$$

$$X_{0+1} = 4\sin^2\theta - 4\sin^4\theta$$

$$X_{0+1} = 4\sin^2\theta(1 - \sin^2\theta)$$

$$X_{0+1} = 4\sin^2\theta(\cos^2\theta)$$

$$X_{0+1} = 2\sin^2(2\theta)$$

no conduce